A NEUROPHENOMENOLOGICAL DESCRIPTION OF THE GUIDED IMAGERY AND MUSIC EXPERIENCE

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Andrea McGraw Hunt
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Examining Committee Members:
Kenneth Bruscia, Advisory Chair, Music Therapy
Cheryl Dileo, Music Therapy
Richard Brodhead, Music Studies
Alison Reynolds, Music Education

ABSTRACT

The Bonny Method of Guided Imagery and Music (GIM) is an individual form of music psychotherapy known for facilitating profound and embodied music and imagery experiences. GIM theorists have argued that the use of music and imagery can facilitate a mind-body interaction, leading to powerful experiences that affect all facets of a person's being. But this interaction has not been directly examined in GIM, despite the need to understand its nature and risks. This gap in research is due to the inherent limitations of the two major paradigms used in this field: quantitative research cannot account for unique individual responses to phenomena, while qualitative research is not predictive in the same way as quantitative, positivistic research. This study used a new research approach, *neurophenomenology,* in order to link participants' descriptions of qualitative music and imagery experiences with electroencephalographic (EEG) data, providing context for the brain data while also illuminating the neurological effect of imagery experiences. The music and imagery session used a guided imagery script which focused on six different kinds of imagery experiences (Affect, Body, Interaction, Kinesthetic, Memories, Visual) and was pre-recorded over two different classical musical pieces selected from the GIM literature. Four participants each underwent individual music and imagery sessions using the pre-recorded script and music while having simultaneous EEG data collected. Afterward, participants viewed a video of their sessions with the researcher and described their imagery experiences during a phenomenological interview. The contents of the transcribed interviews were coded into phenomenological categories concerning the congruence of image with guiding cue, imagery modality, stability of imagery, awareness of guiding and music, and awareness of altered state of consciousness (ASC). Meanwhile, consultants performed coherence analyses on the EEG data, examining relationships between major regions of the brain according to both guiding condition and frequency ranges of brain waves. The researcher integrated the phenomenological and EEG data for each participant, and then across cases to determine patterns of subjective experience and brain response. Each participant demonstrated distinctive styles of reported imagery experience with brain responses, ranging from minimal emotional involvement with alertness, to drowsy, disjointed body sensory imagery, to drowsy, disconnected emotional imagery, to a deeper exploration of consciousness with a consistent ASC. Cross-case comparisons of the integrated data showed that 1) the ASC involves both physical relaxation and ongoing focus on the imagery experience; 2) imagery generates brain activity in the same regions that would process information from similar real-life experiences; 3) beta and gamma frequencies played a significant role in how participants maintained an ASC and made meaning out of the imagery. Implications of these and other conclusions from the separate examination of EEG and phenomenological data are discussed.

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CHAPTER 1

INTRODUCTION

When I began training as a therapist in the Bonny Method of Guided Imagery and Music (GIM), I was required to experience GIM as a client. I underwent sessions with a fully-trained Fellow once or twice a month for nearly two years. My experiences as a client were profound, and five years later I can recall them very vividly. I can clearly remember the experiences I had during the music and imagery portion of the sessions, where, lying down on a mat, I followed the therapist's guidance to relax my body and open my full awareness to the music so that I could explore whatever my imagination offered in response.

One session, toward the end of this series, seemed to encapsulate all the work I had done with my therapist. I revisited a previously sorrowful image of the World Trade Center towers, gutted and black from the terrorist attacks of September 11th. But when I climbed down to the bottom of one tower, I found that it was not a huge abyss as I had feared. And, with the music, I felt myself rising in height inside the tower and then becoming the tower as it knit itself back together. My legs and torso felt as strong as steel beams, driven into the earth; I was solid and clear and me in every inch of my being, with the music resonating within me and reinforcing this feeling. I had many other powerful imagery experiences prior to the Tower one, each building on the one before. These powerful imagery experiences had in common a sense of embodied emotion which made the imagery feel very real and meaningful. I count these imagery experiences as among the most profound in my life, and thus they have had a great effect on my sense of self, my worldview, and my relationships with others.

Later, as I began conducting music therapy research, I wondered what exactly my GIM clients and I were internally experiencing during sessions. What made the imagery experiences so powerful, and how was it that my clients sometimes had these experiences and sometimes they did not? What was the nature of the embodied emotion that we perceived as being an integral part of the very meaningful experiences in GIM? If I knew this, could I, as their therapist, help facilitate more such experiences in order to help them find what they sought in therapy?

On the whole, music therapy literature has not adequately described what clients undergo when they engage in music therapy experiences. In the U.S., the demand for objective, verifiable data and research is high, and will continue to be so as long as music therapy seeks to be integrated into Western healthcare systems. But such data are so specific and particular to certain phenomena, especially when focused on outcomes of music therapy interventions; these data leave out the creative, individualized, and aesthetic experience of music which makes music therapy so appealing for clients and therapists alike. Quantitative data cannot adequately address variation in experience and practice, because these are difficult to measure and control in positivistic methodology. On the other hand, qualitative research paradigms seek to address these problems by holistically examining music therapy phenomena in-situ, because the phenomena are unique to each clinical situation. Further, it is antithetical to the non-positivistic worldview to make predictive conclusions from qualitative research data (Aigen, 1995). It is not just a matter of translating qualitative data into more generalizable forms. These data are intrinsically different from objective data and therefore cannot be simply generalized in the same way as objective data. The subjective experience of music therapy is simply different from the objective behavior of that same experience, though these perspectives are, truthfully, two different views of the same event (Bruscia, 1995).

Based on my experiences as a GIM client and trainee therapist, I know that imagery experiences can be real, life-changing, and deeply meaningful. These experiences integrate body and mind seamlessly, causing and complementing each other, and impacting daily life. I believe this integration plays a major role in how any psychotherapy works, but particularly GIM which is aesthetic and holistic, and claims to utilize the mind-body connection in order to facilitate healing. It is clear that one kind of research methodology—quantitative or qualitative—cannot adequately describe the integrating dynamics that occur in a given GIM experience. These perspectives, while valuable, are different facets of the same, whole experience in real-life situations, and while studying one perspective alone can be useful, that perspective is limited to the restrictions of the paradigm.

The present research aims to integrate these perspectives by examining what occurs during a GIM session from the participant's perspective in terms of both subjective experience and objective brain activity. I examined both perspectives concurrently to find how they relate to each other for each participant. By doing this, I attempt to provide as complete a description as possible of what a participant undergoes during the music and imagery portion of a session, illustrating the mind-body connection for each participant, and possibly across participants.

The current chapter contains a description and definition of GIM, background on its theoretical origins, the need for examining the subjective experience of an individual's GIM session and his/her concurrent brain activity in an integrated manner. To provide some focus for such a study, I will give a brief overview of Wilber's (2000) quadrants and his theoretical description and categorization of phenomena. Using these categories, I will define which ones apply to this research, and outline the present study's philosophical problem. In response to this problem, I will discuss Varela's (1996) *neurophenomenology* which proposes a means by which the two particular perspectives most related to this research question can be studied in an integrated manner.

Guided Imagery and Music

The Bonny Method of Guided Imagery and Music (GIM) is a form of music psychotherapy, often described as an exploration of consciousness, where the client images to programs of recorded classical music while in a deeply relaxed state. During the imagery portion of the session, the client continuously dialogues with the therapist, describing his/her imagery experiences, which may contain daydreams, memories, visual images, body sensations, and emotions. As the client becomes more aware of his/her internal experience, these images may become cathartic, transformative, or possibly transpersonal (that is, unifying or transcendent) (Bonny, 1979/2000g). Practitioners (Fellows in the Association for Music and Imagery) receive training specific to the method, and practice in the US and 19 other countries. Currently there are about 100 Fellows in the US and an additional 90 Fellows outside of the US, most of whom conduct GIM sessions in private practice (Association for Music and Imagery, 2009). GIM has been used with a variety of populations, including adults seeking self-actualization, persons in recovery, patients who are terminally ill, persons with mood and personality disorders, and persons with physical illness. It is mainly practiced as a form of individual therapy. Although the literature has relatively recently sought to make a distinction between individual and group formats of GIM through different terminology, for the sake of simplicity here I will use "GIM" which is a broad umbrella term that incorporates individual and group imagery work as well as any adaptations to the individual GIM format (Bruscia, 2002a).

Quantitative research in GIM has mainly focused on the outcomes of the therapy process, addressing its effectiveness for psychological needs (Hammer, 1996; Heiderscheit, 2005; Körlin & Wrangsjö, 2002; Maack & Nolan, 1999; McKinney, Antoni, Kumar, & Kumar, 1995; Murphy, 2008; Wrangsjö & Körlin, 1995) and physiological needs (Bonny, 1983; Jacobi, 1995; McDonald, 1986, 1990). Some studies have also demonstrated positive outcomes for combined psychological and physiological needs (McKinney, 1994, McKinney, Antoni, Kumar, Tims, & McCabe, 1997; McKinney, Tims, Kumar, & Kumar, 1997), and one study has examined positive outcomes for clients with psychological, physiological, and sociological needs (Burns, 1999). In terms of client responses to GIM, Lem (1998) analyzed subjects' EEG responses to a particular piece of GIM music while in an altered state of consciousness. Lewis (1998-1999) identified and categorized subjects' GIM imagery into types of transpersonal experiences and tallied their frequencies according to their corresponding music programs. Burns (2000) manipulated music and imagery session conditions to determine whether the presence or absence of music and induction affected participants' imagery experiences. Band, Quilter, & Miller (2001-2002) compared subjects' responses to GIM imagery according to type of induction and music program, resulting in broad conclusions about music's ability to elicit emotion and promote imagery. Scott (2007-2008) correlated subjects' coping styles, to their imagery and behaviors exhibited during the GIM experience, identifying the ways individuals with different coping styles used the session to their benefit.

Qualitative research provides more details of clients' profound therapeutic experiences in GIM. Much of the research is in the form of case studies of clients who have psychological issues, such as eating disorders and/or addictions (Wick, 1990; Clark 1991; Pickett, 1992); recovery from abuse (Borling, 1992; Tasney, 1993; Ventre, 1994); multiple personality disorder (Pickett & Sonnen, 1993); bereavement (Kirkland, 2007-2008) and personal growth (Lewis, 1993; McKinney, 1993). Some case studies also describe work with clients dealing with medical issues , such as AIDS (Bruscia, 1991 & 1992); Ankylosis Spondylitis (Merritt, 1993); Rheumatoid Arthritis (Jacobi & Eisenberg, 2001-2002); and terminal illness (Marr, 1998-1999; Cadrin, 2005-2006). A few heuristic studies include first-hand clients' experiences in their GIM work (Buell, 1999; Isenberg-Grzeda, 1999; Newell, 1999).

The literature suggests that clients undergo profound psychological, and often physiological, experiences through their GIM work. The nature of these GIM experiences is as yet addressed only theoretically in the literature. Given the sheer amount of the above research, it is ethically vital that the GIM experience itself be thoroughly studied in order to understand what this technique demands of clients both physiologically and psychologically, what are the contraindications for GIM, and how GIM can be used most effectively.

Origins of GIM

Understanding the background of GIM may be helpful in apprehending its underlying theory and premise. Helen Bonny developed the technique through her work as a music therapist at the Maryland Psychiatric Research Center in the late 1960s, where she provided music for research sessions studying the psychotherapeutic uses of LSD-induced cathartic experiences. The altered state of consciousness (ASC) brought about by the LSD "trip" could be contained and facilitated by the use of carefully applied music selections (Bonny, 1972/2002b). Through experimentation and by incorporating some of the techniques used by Leuner's Guided Affective Imagery (1969), she later found that the use of a relaxation induction could help clients achieve an ASC, and do so in an even safer and more effective way than by using LSD (Bonny, 1980/2002d). Therefore, Bonny's subsequent development of the GIM method discarded the use of LSD.

The relaxation induction is an essential component of the GIM session. After engaging in a preliminary discussion through which a focus and intention for the session is formed, the therapist prepares the client for the music and imagery experience by directing the client to lie down on a mat or table, focus his/her attention to each part of the body, and helping the body to relax. The relaxation exercise also focuses the mind on the present moment, creating a sense of relaxed awareness. At this point, the therapist begins playing the selected music program. With a relaxed physical and psychological posture, the client is able to be open to the music and open to explore his/her consciousness (Bonny, 1977/2002f).

Once the music begins, clients begin to report images they are having in response to the music. Imagery comes in many forms, involving any of the senses, memories, fantasies, and especially emotions tied to any and all of these. The therapist encourages the client to explore images as they arise and assists the client in having "the fullest expression of his psyche which is possible" (Bonny, 1979/2002g, p. 98). Bonny goes on to describe how the imagery exploration ideally leads to catharsis, insight, and action, components essential to progress in any psychotherapy. She defines catharsis as the release of restricted and intense emotions, usually repressed or unconscious, which the client is reluctant to express. But in order to be helpful, she continues, such expression must be followed up with insight, that is, understanding the origin of the released emotion. For maximum benefit, Bonny believes clients then need to take some kind of beneficial action based on that insight. In GIM, however, that action or behavioral change can occur within the imagery, during the therapy session itself. For example, a client may cease avoiding a recurring troublesome scene or memory, or may find a new way to relate to the image of a problematic person or situation (Bonny, 1979/2002g). Thus engagement with imagery experienced in the ASC facilitates all these psychotherapeutic benefits. Bonny felt that “the purpose of GIM is to mine the depths in order to bring reintegration, insight, and wholeness” (Bonny, 1979/2002g, p. 96).

However, the client has to be open to this “mining” of the unconscious, the therapist cannot do it for the client. Only the client can relax his body, only the client can open himself to the music experience. And just as the imagery is solely the client’s responsibility, it is also uniquely and specifically the client’s experience. Therefore no outside authority or theory is needed (or welcome) to interpret the imagery experience (Bonny, 1979/2002g). This fits with the strong humanistic origins of GIM, as Bonny believed strongly that individuals possess within them all that was necessary for their own healing (Bonny, 1999/2002s).

Although solely responsible for the imagery, the client is not alone in the experience; the therapist (known as the “guide” in the GIM context) is a companion on the imagery journey for the client (known as the “traveler”). The guide is physically at the traveler’s side during the imagery experience and verbally asks the traveler to fully describe the imagery so that the guide can imagine being in the imagery as well. This empathic stance helps the guide understand what the traveler is experiencing so that the guide can help deepen the experience as it unfolds. The guide’s verbal interventions are not directive, rather they seek to help the traveler be fully present in his image (e.g., “Where are you?” “What do you see around you?”), to open the traveler up to other aspects of the image (“Can you see anything else?” “What does that feel like?”), to encourage action and reaction to the image (“Do you want to touch it? Can you touch it?”) and to reinforce meaningful moments of the experience (“Really open up to that feeling” “Yes, you really can do it”… etc.)(Bonny, 1999/2002s).

The music is as important a presence in the session as the guide and traveler. Bonny stated that

> music is the stimulus that evokes the changes which occur in perception, and these are dictated by tension/release mechanisms within the music, by instrumental color, melodic line, cadences which together raise emotions, memories, and feelings within the listener. In response to these musical effects, images relating to the five senses emerge and become the basis for the music experience (Bonny, 1994/2002k, p. 150).

The choice of GIM music is therefore crucial. Bonny and her students discovered through both the LSD research and early use of GIM that Western classical music provided the necessary variety, structure, complexity, and depth of harmonic and melodic qualities needed for self-exploration. In the beginning, Bonny sometimes used popular music, but found that it was simpler in its musical characteristics, and “less intrusive” than Western classical music. Therefore popular music was better suited for group settings of GIM where the goal was helping members become acquainted with ASC work rather than engage in deep exploration of consciousness (Bonny, 1994/2002k).

Need for Study

As more practitioners became trained in the GIM techniques and as they practiced more widely with more and more clients, some of Bonny's initial theoretical assumptions were tested. For instance, in Bonny and Savary's (1973) first publication about GIM, the dangers of uncovering unconscious material were nearly brushed aside: "Listeners discover mind spaces they never knew existed. Some of these contain negative elements, but the unconscious tends readily to transform the negative images into positive ones" (pp. 44-45, as cited in Bonny, 1994/2002k). Bonny later noted that this was not necessarily true: "We have learned that music does not automatically change what we call negative into positive… the purposes for GIM are to allow parts of ourselves to be exposed and explored. This process is not always pleasant or comfortable. It can be frightening and nonproductive if such experiences come to us when we are vulnerable and alone" (Bonny, 1994/2002k, p. 148). For this reason, the group formats common in early GIM were modified to be less evocative and more contained, leaving the more intense uncovering work to the one-on-one "dyad" format for which GIM is best recognized (Bonny, 1994/2002k). In this way, clients would be less vulnerable in group settings where they would not get as much one-on-one attention and support from a trained facilitator. Over the years, practitioners have been recognizing these concerns about clients' psychological vulnerability as they explored ways to appropriately use GIM for different clinical populations (Bruscia, 1991; Bonny, 1988; Burns, 2002; Clarkson, 1995; Marr, 1998-1999; Wesley, 2002), cultures (Short, 2005-2006), and settings (Roy, 1996-1997; Short, 2002; Powell, 2007-2008). And even within the traditional psychotherapeutic setting of individual GIM, many adaptations have been developed to address unique psychological needs for particular conditions (summarized in Meadows, 2002) which require extra care in a GIM context. Clearly the power of the GIM experience must be handled very carefully.

Yet, that theoretical power of the GIM experience—its mind-body connection—has not been directly explored in-depth in the literature. Bonny used primarily quantitative research methods to document the objective effects of GIM (Bonny, 1983, Bonny & McCarron, 1984), seeking to gain acceptance from the mainstream medical and therapy communities for her method. Much of her other work discussed therapeutic phenomena in a theoretical context, such as deeply meaningful and cathartic experiences, ineffable spiritual experiences, and the psychological structures in which GIM operated. Whereas these latter works provided a starting place for generating a working theory of GIM, they also sometimes led to GIM's being labeled as "witchcraft" by behavioral music therapists (Summer, 2002, p. 78). Like many forms of psycho- and music therapy, GIM straddles the fence between subjective and objective, ineffable and tangible.

The theoretical literature that later emerged describing the mind-body connection in GIM (described in detail in the next chapter) is compelling, but lacks direct research evidence. Körlin's (2002) use of brain scans to illustrate the effect of traumatic imagery on the brain was not obtained during a GIM experience. And like Perilli (2002) and Goldberg (2002), both GIM theorists, Körlin (2002) also uses clinical examples to illustrate the theories, showing only these limited subjective examples to describe the phenomenon. All three authors, however, have no means of showing how the brain functions and the holistic nature of the processes they describe during the GIM experience.

Because most quantitative research focuses on the outcome of GIM therapy or on broad categories of responses to GIM, it has not been used to describe the phenomenon itself, or the subjective experience of it. For instance, Lem (1998) examined EEG and imagery responses to a particular piece of music, but the subjective reports of the imagery were so generalized (labeled as “visual”), that their content was lost. Lewis (1998-1999) examined the number of transpersonal experiences in GIM sessions she guided according to the music programs she used, but the categorization of experiences originated with the author, not the participants. Burns’ (2000) isolation of the effects of GIM session variables could not describe the full experience of a GIM session. Band, et al. (2001-2002) reached broad conclusions in their research, establishing that the style of music can affect imagery, and that the structure of the induction can be suggestive for the imagery portion to follow. But these generalizations did not account for individual responses to the music conditions, for example, which might affect emotional or aesthetic reactions to the imagery. Similarly, Scott (2007-2008) compared client coping styles to responses to GIM, focusing on that singular aspect of the GIM clinical situation. Whereas Scott analyzed and categorized individual imagery responses in addition to psychometric testing, this focus forced the researchers to make generalizations about individuals’ responses.

So the quantitative literature has not adequately addressed the subjective nature of the GIM experience. On the other hand, the qualitative research, which does include rich first-person descriptions of the GIM process, is far too detailed and context-bound to make general conclusions, and lacks the objective data to describe the neurological processes involved in the therapeutic experience. Because GIM is an exploration of consciousness (Bonny, 1978/2002t), what is needed is a research methodology that can examine consciousness by looking at both objective (third person) and subjective (first person) perspectives, integrating data from both body and psyche. At this point it is necessary to clarify the nature of these kinds of data in order to develop the most appropriate method to address the research question.

Wilber's Quadrants

The philosopher Ken Wilber has developed a means of understanding the world (e.g., objects, ideas, phenomena) in all its complexity through categories of exterior/interior and individual/collective. In graphic form, these two main categories form a matrix, resulting in a map of Quadrants (Figure 1). The upper right quadrant is called Exterior-Individual, the upper left is Interior-Individual, the lower right is Exterior-Collective, and the lower left is Interior-Collective. This map also shows examples of phenomena found in each quadrant. Note that the upper right quadrant contains phenomena which are objectively verifiable and particular to a singular instance of each kind. Worldviews such as materialism and research methods such as double-blind clinical trials fit within this quadrant. The upper left quadrant contains phenomena which are subjective and are known to occur only from the perspective of inside singular phenomena. Worldviews such as constructivism and research methods such as phenomenology belong in this quadrant. The lower right quadrant contains observable phenomena that emerge out of systems, such as economic behavior of a nation or the solar system's movement through space. In the lower left, one can find subjective

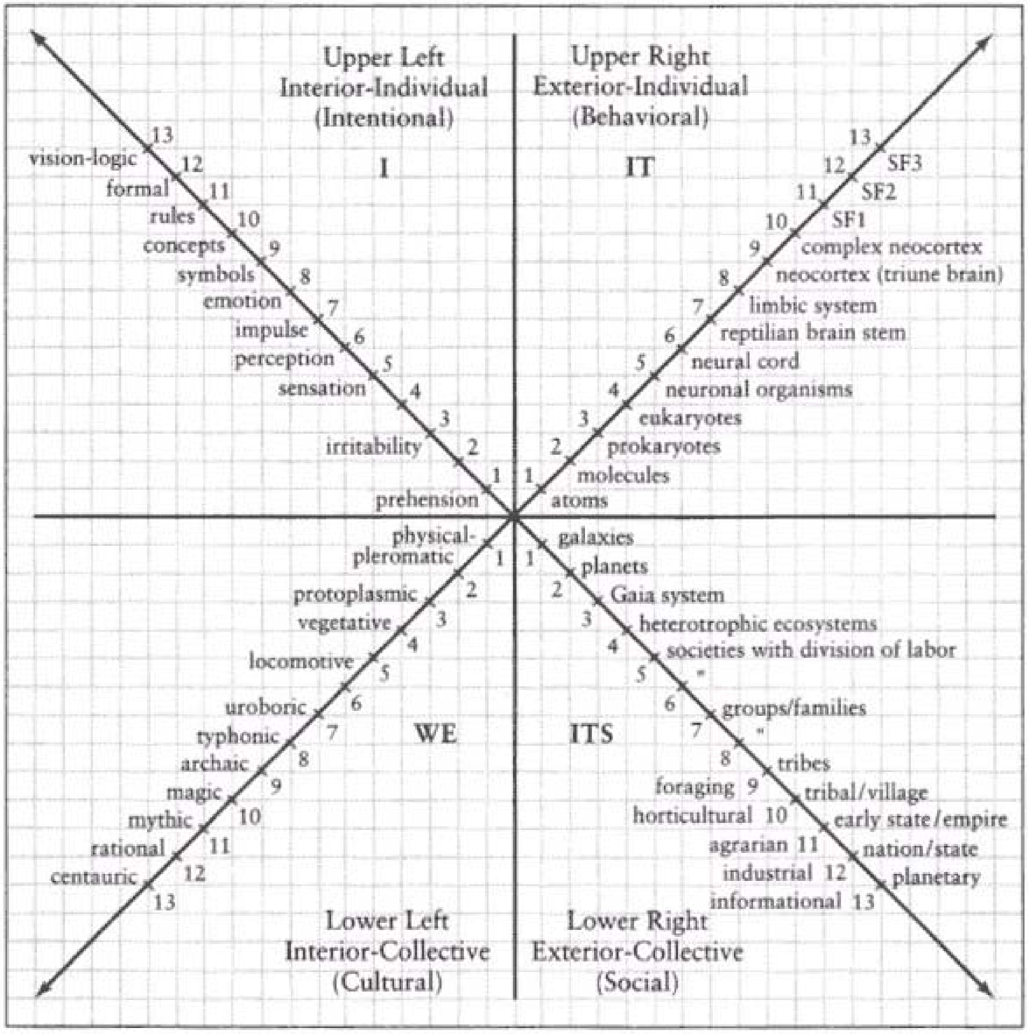

Figure 1. Wilber's Quadrants. *Note*. From "Excerpt C: The ways we are in this together: Intersubjectivity and interobjectivity in the holonic kosmos," Retrieved November 26, 2008 from http://wilber.shambhala.com/html/books/kosmos/excerptC/intro-1.cfm (Part I), by K. Wilber, 2008, Boston: Shambhala Publications. Copyright 2008 by Shambhala Publications. Reprinted with permission.

collective phenomena such as culture and “group-think” experiences.

The present research focuses on the Upper Left (UL) and Upper Right (UR) quadrants alone, as the GIM experience is a one-to-one form of psychotherapy which engages the interior and exterior worlds of the individual client to make integral change in both individual and collective quadrants. So the subjective reports of that client’s (multi-quadrant) experience would reside in the UL quadrant, while the client’s observable behaviors and physiological data (the exterior world of that client, the perspective seen by the therapist in the session) would reside in the UR quadrant.

By clarifying the nature of the subjective GIM experience and its relation to the objective EEG data, it is easier to see how the research methods for each are vastly different. It is also clear how complex it would be to integrate these data. But it is necessary to do so to address what has been known in philosophy of mind as “the hard problem,” (Nagel, 1974) which questions how phenomenal data (that is, first-person, subjective, UL experiences) can be studied in materialist, UR terms. Wilber put it this way:

> We are then faced with two apparently absolute but contradictory truths: the truth of immediate experience, which tells me unmistakably that consciousness exists, and the truth of science, which tells me unmistakably that the world consists only of arrangements of fundamental units (quarks, atoms, strings, etc.) that possess no consciousness whatsoever, and no amount of rearranging those mindless units will result in mind (Wilber, 2000, p. 174).

The realities of the UL and the UR seem difficult to reconcile, and thus there remains an “explanatory gap” between subjective phenomena and their corresponding objective phenomena which has confounded philosophers to this day. But Wilber (2000) proposes that it is possible to view this problem not from a dualist ("the UL and UR interact mysteriously") or materialist ("there is no UL") perspective, but from an integrated one, a perspective which equally values the reality of all four quadrants as a whole, utilizing research methodologies appropriate for each kind of phenomena.

Neurophenomenology

Wilber (2000) cites Varela's (1996) development of neurophenomenology as one example of an integral approach to the two upper quadrants (UL and UR). The principles of neurophenomenology are groundbreaking in the sense that, using views similar to Wilber's perspectives, they recognize ways that first-person, subjective experiences can be examined in conjunction with third-person objective data. The methodology's first principle holds that first-person, subjective experiences are irreducible. Therefore they can be examined as they are, with no assumptions about their nature (e.g., whether or not they are manifestations of material events, such as brain chemistry), nor with any epistemological wrangling. The second principle requires that such exploration of subjective phenomena must utilize a rigorous investigational technique. Using a gesture of reflexive awareness called Phenomenological Reduction, investigation can strive to attain intuitions of the descriptive structural invariants of an experience. Varela's working hypothesis stated that "phenomenological accounts of the structure of experience and their counterparts in cognitive science relate to each other through reciprocal constraints" (Varela, 1996, p. 343). The crux of Varela's methodology is that both subjective and objective evidence are equally important, and therefore are given the same attention. In this way, "phenomenological accounts… can provide direct experiential validation for a neurobiological proposal (conditional to a rigorous methodological examination); [and]

structural aspects of human experience itself can constrain the interpretation of empirical results" (Lutz, 2002, p. 135). Both kinds of data "mutually constrain" each other, where the first-person phenomenal data guide the analysis and interpretation of the physiological data, and "the phenomenologically enriched neuroscientific analyses provoke revisions and refinements of the phenomenological accounts, as well as facilitate the subject's becoming aware of previously inaccessible or phenomenally unavailable aspects of his or her mental life" (Thompson, et al., 2005, p. 8). Thus, these mutual constraints ultimately will be dynamic in nature. However, at this time there is not sufficient data for a true constraint for the neurological perspective affecting the interpretation of the subjective perspective. Altogether, these principles recognize the fact that individuals' experiences have both subjective and objective perspectives which are parts of the whole experience. Therefore, they can be studied in an integrated fashion.

Neurophenomenological methods have been employed in two studies (Lutz, Lachaux, Martinerie, & Varela, 2002; Petitmengin, Navarro, & Le Van Quyen, 2007). In the Lutz, et al.(2002) study, participants were first trained in methods of reflexive awareness so that they could fully describe their experiences of phenomena presented to them (e.g., a 3-D optical illusion). EEG data were collected while participants processed the task. Participants later described the experience of completing the task, and these descriptions were reduced into categories of experience for each participant. After undergoing many trials, patterns of experience emerged within each individual, and some categories of experience also emerged across individuals, including experiences of "steady readiness," "fragmented readiness," and "unreadiness." Correlating the EEG data and first-person categories revealed relationships between reaction time and level of preparedness, as well as instances of synchrony between various brain regions related to the states of readiness. Overall, the data corroborated and further explained previous findings in cognitive neuroscience research, that is, while it confirmed the location of particular brain functions, it also demonstrated how these functions were mediated by degrees of attention to the task. Additionally, it confirmed that the ongoing states of consciousness immediately preceding and following the task also affected the response to the task. Thus, the methodology showed how first-person data can inform and explain objective, third-person data in a meaningful way.

Problem Statement

This project proposes to apply the neurophenomenological approach to the GIM context by finding relationships between participants' objective EEG data and their concurrent subjective imagery and experiential data (clients' reports of their imagery and experience during a "semi-directed" GIM session, where the researcher provides open-ended imagery direction throughout the session). It is hoped that these relationships will reveal patterns of subjective and objective response and illuminate what is occurring within an individual during a GIM session. The study's specific research question is: under different types of guiding interventions, what brain activity (EEG coherence and alertness states) occurs, and how does this activity relate to the concurrent subjective experiences (e.g., listening and imaging) as verbally described by the individual participants? The sub-problems include:

1. For each individual, are there consistent relationships between subjective experiences and neurological patterns according to categories of guiding interventions? Within each category of intervention:

a. How do EEG coherence and/or alertness states relate to compliance with guiding?

b. How do EEG coherence and/or alertness states relate to experienced imagery modality?

c. How do EEG coherence and/or alertness states relate to the dynamics of the imagery experience?

d. How do EEG coherence and/or alertness states relate to reported awareness of the guiding?

e. How do EEG coherence and/or alertness states relate to reported awareness of the music?

f. How do EEG coherence and/or alertness states relate to reported perceived state of consciousness?

2. If such relationships exist, to what extent are they found in more than one individual?

Summary

GIM is a form of music psychotherapy that is used to address a variety of psychological and physiological needs. Much of GIM's theory focuses on the client's internal experience of music and imagery, and the shifting of and exploration of consciousness, as well as the method's ability to bring about profound psychological and physiological benefits through its use of the mind-body connection, often identified by clients as a sense of embodied emotion. However, because of the "uncovering" nature of exploring the unconscious, practitioners have noted that powerful GIM experiences may not be helpful if clients are psychologically vulnerable; thus adaptations and contraindications of GIM have been developed as therapists work with an increasingly wider array of clientele. The nature of GIM experiences need to be thoroughly understood because of these risks.

However, thus far it has not been possible to study the mind-body nature of these experiences due to the inherent limitations of qualitative and quantitative research paradigms. Quantitative research examines observable, measurable phenomena, which cannot account for individual subjective experiences; qualitative research describes individual subjective experiences and is not grounded in observable, measurable data which can be generalized across the population. Exploration of the intersection of first- and third-person perspectives of the GIM experience requires a new, integrated research paradigm.

Neurophenomenology presents a promising method for studying this interaction. By using participants trained in reporting their ongoing experiences and by correlating these reports with neuroelectric data (EEG), it is possible to ground the objective data in the subjective data, providing it context which can explain both patterns and aberrations of response. Thus both kinds of data have equal weight and are viewed as equally meaningful and informative. No information is lost due to averaging out odd data or discounting reflexive responses because of their subjectivity.

This project proposes to use neurophenomenological methods in examining the GIM experience so that the interaction of mind-body can be better understood. In short, the research seeks to understand and describe the individual’s experience in the GIM session. Such knowledge will greatly help GIM practitioners understand what aspects of the experience are most effective and essential, so that they may help clients utilize these aspects to their full potential.

CHAPTER 2

BRAIN ACTIVITY AND THE COMPONENTS OF GIM

In chapters 2, 3, and 4, I will present literature that illuminates the study's main question: how is a person's ongoing brain activity as objectively measured by electroencephalography (EEG) related to his/her subjective phenomenological experiences of GIM? In Chapter 2, I will present the literature that relates to EEG and GIM and its components, namely music, imagery, emotion, and altered states of consciousness. In Chapter 3, I will summarize the literature regarding phenomenological descriptions of the GIM experience, also including all the facets of GIM (music, imagery, etc.). In Chapter 4 I will examine the GIM literature linking neurological and phenomenological theories and their implications for this study, and then discuss the significance of neurophenomenology particularly for this research question.

Brain Activity and Guided Imagery and Music

EEG and Music

Only two EEG studies could be found that examined music listening experiences to whole pieces of music. Instead, much of the EEG and music literature examines Event-Related Potentials (ERPs), which are repeated presentations of brief stimuli to focus investigation on perception of that type of stimuli. Because the present study is examining an ongoing music experience, the following two studies are presented.

Petsche, Pockberger, & Rappelsberger (1987) approached their research into music and brain response from the perspective of schemas, that is, cognitive maps of the environment formed as much by one's personality as by sensory input and one's experience. Such maps permit the ability to anticipate experience, including music.

Because of its temporal nature, music requires attention to immediate past and present, and anticipation of the future. Therefore, there are neurological schemas for music just as there are neurological schemas of other experiences. This permits new music to be comprehended and appreciated by the listener, because without a music schema, music would be meaningless noise. In a third-person sense, (neuroscience) schemas can be represented by neurological activity and connections, which can be measured by EEG. EEG is also ideal for such research because of its high temporal resolution, which can measure nearly instantaneous responses to stimuli. Petsche, et al. (1987) asked one research question: Are cognitive maps arising during the perception of music revealed in EEG data, and by what methods could they (even small parts of these schemas) be recognized?

The method included three different kinds of music experiences, only one of which is relevant to the present study (listening to a recording of a Mozart string quartet). Using 19 electrodes on each of 32 male and female subjects (not screened for musicianship), the researchers collected EEG data over 1-minute long testing conditions. Fifteen sections of two-second-long intervals were analyzed from each subject's trial, and compared to resting baseline conditions. Across subjects, Petsche, et al. demonstrated that they were able to trace brain processing in spontaneous EEG by tracking changes in power (the amplitude, or strength, of the brain waves), median frequency (the median range of the electric signal, measured in Hz), and coherence parameters (whether and where brain signals were synchronizing between two different electrodes); all three conditions were affected by music listening. They also found that extended brain regions seemed to be involved in processing music (frontal, temporal, precentral, and across hemispheres). Due to this, the researchers noted that it is “hopeless” to try to confirm a strict lateralization of musical functions in the brain, because “different and extended areas in both hemispheres undergo changes during musical tasks” (p. 75).

Another study compared four participants’ EEG responses to music before and after smoking marijuana (THC-induced ASC) (Fachner, 2002). This study brought EEG into a naturalistic setting where participants engaged in their usual practice of smoking marijuana while listening to popular music, therefore increasing the probability of realistic results. The comparisons found post-THC increases in parietal alpha power and overall increased power in temporal and occipital areas. Alpha frequencies are believed to be a sign of a passive “idle state” in the brain, while beta frequencies have been called a “bridge between the external world” and theta frequencies have been viewed as a link to “the internal world” (White, 1999, p. 344). Fachner’s study also found that theta frequencies changed in temporal areas, and he felt this corroborated with the participants’ perception of altered time while in the post-THC state. Overall, the notion of studying music experience via EEG in a naturalistic setting and examining the brain’s ongoing music experience rather than discrete ERPs of music is most helpful and relevant to the present study.

Given the limited amount of research in this area, little appears to be known about the brain’s response to an ongoing music experience. These studies confirm, however, that such research is possible, and that it is likely to return very complex results. The GIM experience will naturally only increase the complexity of response as it will add imagery and ASCs to the experience as well.

EEG and Imagery

Imagery involves many different kinds of inner experiences. In broad terms, Overton (2004) describes “imaginoception” as a top-down neurological process, originating with the central nervous system (CNS) rather than “perception” where information originates in the peripheral nervous system. This is an important distinction, as it means that mental imagery occurs independent of perceptual input. So, some of the neurological process in GIM likely originates in the CNS and stays there, perhaps cycling between different areas of the brain as different kinds of reactions are triggered. Overton states that, given that the subcortical limbic and nearby structures are widely known to be involved in storing memories and processing negative emotions such as worry, anxiety, anger, and fear, *and* that imaginoception involves the same brain structures as those required for corresponding sensory perception, “it is likely that many circuits and nuclei of the brain… are not fully capable of discerning between imanginoceptive and perceptive sources of information and can thus be ‘deceived’ by imaginoceptive manipulations” (p. 19). Therefore imagery can feel very real, and be emotionally charged. Overton notes that, during EEG testing, a decrease of alpha power in relaxed subjects with closed eyes could be considered an electrophysiological measure of imagery, and the site of this decrease has been associated with the modality of that imagery (visual, kinesthetic, etc.). Even though decreased alpha activity may also indicate a variety of other cognitive behaviors (e.g., Barratt, 1956, Van Winsum, Sergeant, & Geuze, 1984), Overton provides EEG evidence showing that mental imagery is required for many of these same cognitive tasks, including memory, learning, information processing, reasoning, planning, perception, and action. In these situations, the mental image is a “surrogate” for the actual objects of focus. Thus, mental imagery “replaces perception as the source of information to resolve a problem” (p. 23). Given these two major properties—the emotional, true-to-life aspect of imagery as well as its problem-solving function—imagery seems to be essential in any psychotherapy.

In terms of visual imagery, some researchers disagree about the nature of its neural correlates. Kozhedub, Sviderskaya, and Taratynova (2007) state that EEG measures show that the neural correlates for visual imagery are different than those for visual perception, whereas Overton (2004) cites several studies that indicate that the neural correlates for perception and imagery are the same (Kosslyn, 1994, 1995; Levine, Warach, & Farah, 1985; Posner & Raichle, 1997). Otherwise, Kozhedub, et al. (2007) found that subjects who were directed to imagine standard images or create original images with specific parameters demonstrated interhemispheric activity during these tasks. Additionally, the creation of original images led to patterns of longer-distance (diagonal) interhemispheric activity than imaging standard mental images. These local and long-distance synchronizations led Kozhedub, et al. to theorize that the imagery correlates may be radial in nature, with complex relationships throughout the cortex, and may include subcortical brain regions as well.

Detecting emotion via EEG appears to be the most complex psychological experience to observe in this manner. Most studies indicate that EEG activity in general increases throughout the brain during intense emotional experiences (whether positive or negative), both in terms of power of all frequencies and in terms of synchronization among brain regions (Danko, Bechtereva, Shemyakina, & Antonova, 2003). The exception to this occurred in Sidorova, Kostyunina, and Kulikov’s study (1992): when subjects induced the emotions anger, joy, and fear, EEG detected increased alpha power and synchronization specifically in the left temporal lobe for all three of these emotions, to nearly the same degree.

Most research since this has attempted to isolate particular emotions and their corresponding brain activity. One area of focus is the gamma frequency band and its apparent relationship to negative emotions, as reviewed in Oathes, et al. (2008). These authors cite research that describes the gamma band's tendency to build in power over repeated presentations of aversive stimuli rather than being time-locked to the stimuli. This characteristic likely indicates that gamma is the result of an internal neural process rather than external perception. In other words, gamma may indicate reflection and memory retrieval.

Oathes', et al. (2008) study compared subjects with Generalized Anxiety Disorder (GAD) and controls without anxiety in an EEG assessment of their experiences of worry. The research found that gamma activity occurred in the same electrode sites regardless of group, but GAD subjects had significantly higher levels of gamma activity during the experience of worry. The GAD subjects also had significantly higher subjective ratings of worry compared to the controls, corresponding to the differences in gamma activity between groups.

Looking at another kind of emotional experience, Sebastiani, Simoni, Gemignani, Ghelarducci, and Santarcangelo (2003) examined hypnotizable and non-hypnotizable subjects' responses to neutral and unpleasant imagery. Interestingly, only the hypnotizable subjects showed any EEG differences during the unpleasant imagery stimulus—an overall increase in beta2 and decrease in alpha frequencies. The difference between hypnotizable and non-hypnotizable groups' performance in this study may have implications for EEG detection of imagery with experienced versus non-experienced GIM clients.

Clearly all EEG frequencies are implicated in emotional experience over a wide area of the brain. Danko, et al. (2003) felt that the generally observed simultaneous increase in EEG power over all frequency bands during intense emotional experiences may indicate the cortical areas' relationship with the subcortical emotional centers of the brain, as their study found intense local activity that may be focused downward into the limbic structures rather than across into other cortical areas. As yet, however, these broad findings are not yet conclusive about how EEG measures are related to emotional experience.

Kinesthetic imagery is another type of imagery often reported in GIM. Functional MRI studies show that motor execution and mental imagery of the same action activates overlapping and/or similar neural networks in primary motor and related areas of the brain (Gerardin, et al., 2000; Ehrsson, Kuhtz-Buschbeck, & Forssberg, 2002). The difference between the brain activity of movement imagery versus brain activity of actual movement is that brain activity associated with the former occurs throughout the mental image of movement (Pfurtscheller & Neuper, 1997; Pfurtscheller, Brunner, Schlögl, & Lopes da Silva., 2006), whereas the activity shifts to a different kind when the movement is executed (Stancak & Pfurtscheller, 1996a,b; Derambure et al., 1999). However, the strength of EEG response is highly dependent on the individual and the amount of conscious focus on the image of movement (Pfurtscheller, Scherer, Müller-Putz & Lopes da Silva, 2008). One of the variables affecting EEG response is the manner in which the individual imagines the movement, including whether he/she is visually picturing the limb moving, or "feeling" the limb move, as well as how vivid or intense this image is, and the degree of motivation for movement (Pfurtscheller, et al., 2008).

To summarize, the EEG literature in imagery indicates that, generally, the modality of the imagery (visual, emotional, kinesthetic, etc.) is reflected in the sensory areas of the brain known to be related to that modality. Wider neural networks become involved when imagery is original or creative in nature (cross-hemisphere activity), and when imagery has emotional and/or memory content (subcortical activity). Again, however, EEG responses are highly individualized and may be dependent upon the vividness of the imagery and the degree of focus upon that image.

EEG and ASC

Many researchers have also examined EEG responses to altered-states of consciousness (ASC) including meditation, relaxation, REM-sleep stage dreaming, and induced hallucinatory states. Overall, this body of research has found alpha and theta wave activity to be predominant in ASCs, as well as differences between types of ASCs experiences occurring in terms of location and degree of synchronization between brain regions.

The relaxation training literature has found that, generally, theta wave activity increases during meditation/relaxation exercises, primarily for central, occipital, and parietal regions of the brain (Jacobs & Friedman, 2004). Other research has also found that bilateral alpha waves increased in power after training and engaging in a biofeedback relaxation technique using New Age or classical music and directed imagery. In fact, EEG activity (particularly theta) increases significantly more during a relaxation exercise with music than when listening to music alone (Jacobs & Friedman, 2004). These researchers compared the ASC achieved in these experiences to Stage 1 (that is, non-REM) sleep.

Meditation is a subset of relaxation experiences involving practices that self-regulate the body and mind, thereby affecting mental events by engaging a specific attentional set (Cahn & Polich, 2006). Most of these research findings indicate increases in alpha activity during meditative states (Fachner & Rittner, 2004; literature reviewed in Cahn & Polich, 2006). However, it is possible that this increase is primarily due to the relaxation aspect of the meditative state rather than from influences on attention or perception (see literature cited in Cahn & Polich, 2006). But EEG activity unique to meditation includes higher frontal-midline *theta* power during meditation and hypnosis, as found in some studies cited by Cahn and Polich. This activity is generated by cortical areas connected with attention-demanding tasks, perhaps indicating a shift in focus or attention rather than relaxation. Many studies also found that not only does the alpha and theta range increase during meditation, but these frequencies also increase in coherence (or synchronization) across electrodes (Cahn & Polich, 2006), demonstrating the involvement of neural networks at these frequency ranges.

Fachner and Rittner's (2004) study highlighted the unique ways individuals can respond to meditation or trance states through examination of a man and woman's EEG responses to sound-induced trance (via a monochord) and a posture and sound-induced (via ritual rattles) trance. The researchers compared the participants' imagery reports given after each experience to the corresponding EEGs. For the monochord experience, imagery that indicated a high degree of alertness and intentional imagery was related to decreased theta waves, while more relaxed and contemplative imagery was related to increased alpha waves. These responses correspond to the above findings regarding the brain activity related to relaxation (primarily alpha waves) and the attentional aspects of meditation (primarily theta waves). The body posture and ritual rattles experience in Fachner and Rittner (2004) revealed more similar EEG responses corresponding to increased theta band for both participants, particularly in visual brain regions (corresponding with vivid visual imagery). This corroborated previous research which found increased theta activity for similar trance induction via body posture and rattle sounds (Guttmann, 1990). Additionally, both participants had increased beta wave activity, which the authors ascribed to emotional reactions to the ASC. As can be seen in the differences between these two subjects' experiences, finding specific EEG correlates for particular meditation states is difficult, given the highly unique and phenomenal nature of these experiences. Thus research in this area has been limited (Cahn & Polich, 2006).

The ASC achieved in GIM has also often been compared to the ASC that occurs in dream states (Bonny, 1975/2002f). Hypnagogic imagery is dream state imagery, whose EEG activity has also been frequently studied. Hayashi, Katoh, and Hori (1999) found relationships between content of dream imagery and EEG responses as participants were falling asleep. While participants shifted through different states of awareness as they fell asleep, the content of the images they reported began to shift according to different states. For example, whereas images of people occurred in all of the EEG stages, these images peaked during EEG stages known to correlate with REM-stage sleep.

Hori, Ogawa, Abe, and Nittono (2008) reviewed literature discussing brain activity during REM sleep and its relationship to imagery. Several of these studies theorize that the eye movement in REM sleep is directly linked to activity in the visual cortex, thus indicating visual dream states. Hori, et al. go on to describe results of earlier positron emission topography (PET) studies which suggest that the premotor region is activated during imagined movements and that the frontal lobe limbic activity is activated during experiences of unpleasant imagery; both of these results again demonstrate that the modality of the imagery correlates with the areas of the brain known to process that modality. Hori, et al. cite Ogawa, Nittono and Hori (2006) who suggested that rapid eye movements might trigger visual images from the visual cortex and activate particular fronto-central regions which facilitate active, vivid, and emotional dreams during REM sleep. Further, unique to the hypnagogic literature (compared to all the ASC EEG literature), Hori, et al. summarize literature that indicates gamma synchronization increases during active phases of REM sleep, particularly in prefrontal regions. This synchronization is widely believed to indicate that the brain is binding information into memory. Hori, et al. also share theories that dreams are generated during REM sleep when the frontal cortex and limbic system influence the sleep-regulation system before REM sleep begins. Therefore, the intensity of emotions and the episodic memory for dream content are both probably determined before REM sleep even starts. In terms of GIM, this might indicate that it is not so much the ASC itself that opens a traveler to an emotional image, but rather the readiness of the traveler to experience an image with emotional content *before* entering the ASC that determines the affective content of the image; that is, “ego receptivity” leads to the healthy evocation of imagery (Bonny, 1979/2002g).

One unique study worth mentioning examines the effect of ganzfeld-induced imagery on EEG responses (Pütz, Braeunig, & Wackermann, 2006). Multimodal Ganzfeld (MMGF)-induced imagery occurs during an ASC induced by having clients wear translucent goggles illuminated by a bright red light and then headphones playing a monotonous sound of a waterfall for a sustained period. This technique has been shown to lead to hallucinatory-like imagery. Previous EEG research had shown that the MMGF technique led to an activated waking state with accelerated alpha activity. These results, along with other cited research, indicate that alpha is highly related to voluntary, induced, or spontaneously occurring mental imagery. This study related subjective reports of MMGF-induced imagery with EEG signals obtained 30 seconds immediately prior to the reports of the image as it occurred; the timing was obtained by the subjects’ pressing a button when they realized they were having imagery and then verbally reporting it to the researchers. Once they finished the reporting, they would return to the MMGF stimulation and enter an ASC again. Most imagery was visual in nature, with acoustical (auditory) imagery the next most frequent. The researchers found that faster alpha frequencies increased in power prior to hallucinatory imagery, while slower alpha waves decreased throughout the imagery experience. Additionally, some increase in delta (slower frequency than theta, usually associated with deep sleep) and beta activity immediately prior to the subjects’ self-report was theorized to be related to the cognitive processing required to press the button and report the imagery to the researchers, moving the subject from passive observer of the imagery to an acting agent in the world. This latter result is interesting in a traditional GIM context, as it may describe the traveler's shifting awareness required to verbally report imagery to the therapist during an ASC. Interestingly, the subjects did not report any emotional content to their imagery, nor did the EEGs detect any gamma band activity found in the hypnagogic research.

In general, the aforementioned ASC literature has found that alpha waves increase in power and synchronization during relaxation into an ASC, and that theta waves increase in power and synchronization during contemplative and meditative experiences. Other research shows that alpha increases particularly during imagery experiences, whereas during REM sleep gamma band activity seems to indicate the involvement of emotional and memory structures which may be activated in order to access and bind memories related to the imagery. Another interesting link between these findings and GIM is that the hallucinogenic drug LSD causes theta wave production in the amygdala and hippocampus, part of the emotional and memory centers of the brain (Overton, 2004). So Bonny's use of LSD in her early work utilized the effect of the drug on these brain structures, which was inducing similar brain activity and ASCs as those seen in the above studies.

EEG and GIM

There is one study that utilizes EEG in a GIM context. Lem (1998) compared his psycho-acoustic profile of a piece of music commonly used in GIM (Pierne's *Konzertstück for Harp and Orchestra*, Op. 39) with EEG responses and reports of visual imagery. This mainly quantitative study examined 27 subjects' averaged EEG responses to create a composite EEG response for comparison with the psycho-acoustic profile of the music.

Lem created the psycho-acoustic profile of the Pierne piece by taking the digital graphical waveform (the picture of the music's soundwaves created by computer recording software which represents sound frequencies and volume) and segmenting it according to both formal structural analysis of the music score and his own demarcations of building and releasing of musical tension. During data collection, participants were connected to EEG equipment and, one minute before the start of the music, were instructed to close their eyes, take a few deep breaths, and focus on their sense of hearing. The EEG data were collected from 12 electrode sites on the frontal, temporal, parietal, and occipital areas. The music selection lasted for 13 minutes, and after this, participants were interviewed about their imagery experiences. The data were analyzed by comparing the composite EEG responses and Lem's psychoacoustic profile of the music, and the composite EEG responses with the verbal responses to the interview.

Lem found a link between sudden bursts of EEG activity and visual imagery, and also a correlation between the overall frequency changes in the composite EEG and the intensity of sound as described by the psycho-acoustic profile of the music stimulus. In terms of the former, Lem stated that this connection indicated affective involvement in the imagery, and in the latter, a counterarousal response where intensity of sound resulted in increased internal focus and slower EEG frequencies. Lem identified possible musical features that may induce the isolated bursts of EEG response with this particular piece of music: a "rapid release of psycho-acoustic tension preceded by a large-scale increase in the intensity of stimulation…[and] in the quiet (release) sections, the harp plays delicate arpeggios ad libitum" (p. 14).

Lem also found more frontal (anterior) lobe activity than he anticipated, given that most “non-ordinary” brain states (as understood at the time) seemed to show more posterior brain activity. However, as cited above, current EEG research in ASCs have shown that frontal-midline theta activity has been frequently found in meditation experiences. Because of the low number and the location of electrode sites, Lem was not able to do more precise spatial mapping of brain response in this study.

Whereas Lem’s research attempts to connect objective biological data with imagery experiences, this connection is weak and lacks sufficient detail to be meaningful for the present research question. First, his conceptualization of the psycho-acoustic profile of the music was his own, and did not account for the participants’ own concepts of the music experience. Second, he put all the EEG data responses together in order to create a composite model for his analysis, which disregarded individual responses to the experience. Third, in his imagery data, he focused only on visual imagery (despite the study’s title which seems to indicate several kinds of imagery), and the methodology did not clearly describe how experiences of visual imagery were linked with specific musical moments and corresponding EEG responses. Nor did he address the qualities of the imagery in connection with EEG responses. The report did not indicate if interviews after each session utilized any playback of the music or the use of any other cues to help with imagery recall, which would pinpoint the timing of the imagery with the music and EEG. Finally, it is not clear how the category of “not reported visual imagery” came about, or how he was able to quantify this imagery, let alone draw conclusions about its relationship to the composite EEG.

The bulk of Lem's report focuses solely on the observable composite EEG data and its relationship to the music alone, as if the music was the sole independent variable in the GIM situation, and the participants were a homogenous group responding similarly to that stimulus. Lem's conceptualization ignores (perhaps intentionally) all the other factors known to influence clients' responses to GIM, such as client personality, therapist-client relationship, client situatedness, and so on. But this is partly due to Lem's use of a positivistic paradigm which requires focusing on a few very specific variables, which as has been discussed before, limits the view of the entire therapeutic dynamic occurring in the GIM situation.

After reviewing the above research, it is clear that analyzing EEG responses to a GIM experience is a very complex undertaking. Because the experience involves music, imagery, and an ASC, many different brain structures and functions are involved. Due to this complexity, individuals respond uniquely to this experience. Therefore, for the research method to fit the situation, individual responses to the GIM experience must first be analyzed individually *before* analyzing them collectively. Further, it is clear from the above research that for the subjective responses to have any meaning for the objective data, these responses need to be gathered in more detail and with less pre-conceptualizing from the researcher's perspective (e.g., Lem's psychoacoustic profile); a more constructivist, phenomenological approach is warranted. Thus, at this point I will discuss phenomenological descriptions of GIM and their relevance to the present study.

CHAPTER 3

PHENOMENOLOGICAL DESCRIPTIONS OF GIM

When seeking to understand client and therapist experiences in GIM, researchers who wish to look beyond a case study format often turn to phenomenology, the study of subjective experience. Experiences of both client and therapist are examined in this chapter.

Phenomenological GIM studies that examined *client* experiences include Kasayka (1991), Hanks (1992), Brooks (1998), Grocke (1999), Abrams (2000), Abbott (2005), and Bruscia, et al. (2005). Each of these studies examined different aspects of the client's experience for different purposes. Kasayka (1991) and Bruscia, et al. (2005) utilized forms of music and imagery analysis, but looking for different phenomena: Kasayka to examine transpersonal experiences evoked by the music, and Bruscia, et al. to examine all potential imagery experiences evoked by the music. Like Kasayka, Abrams (2000) studied clients' transpersonal experiences, but also studied their constructs of these experiences. Grocke (1999) and Abbott (2005) examined experiences that clients defined as particularly meaningful for them. Brooks (1998) analyzed client experiences for manifestations of a particular Jungian archetype, whereas Hanks (1992) compared imagery of clients from different cultures as they experienced different kinds of music. As detailed below, each study's method is unique according to the demands of the phenomena being studied.

Kasayka (1991) investigated how a particular GIM music program affected clients' transpersonal experiences. Kasayka chose a phenomenological methodology because of the method's openness to all of the potential meaning that could arise in a

GIM session; a more positivistic analysis would limit the kinds of data to be observed and, thus, the meaning of the overall experience. She used Ferrara's (1984) phenomenological method of musical analysis and Forinash's (1990) phenomenological method of session analysis. This resulted in Kasayka's matching up her own phenomenological music analysis moment-by-moment with client imagery, behavioral observations (e.g., facial expressions, body responses), and Kasayka's interventions. Kasayka concluded that the musical sequences of the program both elicit and support transpersonal experiences and described particular musical features of each piece and the clients' corresponding imagery that supported this conclusion. Though the study provides a rich and powerful description of these experiences, Kasayka's approach included assumptions about the nature of transpersonal imagery and did not appear to allow for clients to categorize their own imagery as such. Further, Kasayka went into guiding these sessions having already completed her own analysis of the music from the perspective of its power to elicit transpersonal experiences. In these ways, Kasayka imposed some of her own concepts of the GIM experience onto the participants, and thus it is unclear how and to what degree the results are contaminated.

Bruscia, et al. (2005) also engaged in phenomenological music analysis, but solely for the purpose of identifying the potential kinds of imagery the *Imagery-M* (Bonny & Bruscia, 1996) GIM music program could elicit. In this collaborative heuristic approach, the research group analyzed the program by individually experiencing and then comparing members' ASC responses to the music and imagery, using Bruscia's (1999) heuristic method of music analysis. This analysis involved transcribing individual participants' ASC responses focusing on the music alone, and again in a usual GIM imagery session to the same music program. Individuals' imagery and music responses were aligned moment-by-moment with the music in order to identify relationships between the participants' experience and the music. The types of music experiences and imagery were categorized (e.g., visual, fantasy, interactional) within each piece of music, resulting in a description of a wide range of imagery potentials for the entire program. Compared to Kasayka's study, this research did not intend to link a particular imagery experience to the music; rather, the participants actively engaged in open listening strategies for the purpose of discovering as many imagery experiences as possible with this program. The difficulty with this approach, however, is that the wide-ranging results were very difficult to summarize. The researchers concluded that these results indicated that there is likely not a unidirectional, causal relationship between music and imagery, as has been assumed in the GIM field. Instead, the research showed that music is "also an agent or party in a multi-faceted, inter-subjective interaction" (p. 29) where the perception of music is affected not only by its objective elements and structures, but also by the state of the imager and the ongoing imagery experienced by the imager. Further, the guide influences these interactions among music, imager, and imagery, and the guide is also affected by these elements as well. Taken all together, these elements and forces create an "intersubjective" experience in GIM.

Contrasting again with Kasayka's (1991) methodology, Abrams (2000) examined participants' descriptions of transpersonal experiences in GIM along with their constructs of these experiences. In addition to his interviews of nine GIM therapists about their transpersonal experiences as a client in GIM, he asked the participants to use specialized computer software to identify constructs of these experiences by identifying polarities of the elements of these experiences. As a result, Abrams was able to develop a model/definition of transpersonal experiences based on the aggregate of the participants' constructs: transpersonal experiences were defined by the degree of relationship of unitive (as opposed to separate) and universal (as opposed to particular) music and imagery experiences. In addition, participants felt that transpersonal experiences helped them expand consciousness and led to greater self-awareness and potential for growth. Because of the use of the computer software, this methodology was not purely phenomenological, but also incorporated construct analysis, which Abrams felt was important given the difficulty of verbalizing ineffable experience (such as transpersonal experiences) and the need to not only understand the nature of the experience, but also the rules under which they function. Even so, whereas the data were gathered from the participants' perspectives (rather than through the interpretations of their guides), they were reflective in nature, and did not emerge directly from the GIM experience.

In a more client-centered approach, Grocke (1999) utilized a phenomenological method to examine "pivotal moments" in GIM, that is, turning points in therapy that led to changes in clients' worldview and personal lives. Grocke chose phenomenology because it was important to her that participants defined and verified their own descriptions of their meaningful experiences, and for Grocke to be faithful to these descriptions in analyzing the data. Therefore she interviewed clients asking them to recall pivotal moments in their GIM therapy processes, and then interviewed each of their therapists about the same experiences from their perspectives. As a result, Grocke found four themes of pivotal moments common to all participants:

1) Pivotal moments are remembered and described in vivid detail

2) Pivotal moments are emotional experiences

3) The pivotal experience is embodied

4) The pivotal experience impacts on the person's life (p. 217).

Grocke then defined "pivotal moments" as not necessarily "positive" or pleasant; they

> are also embodied experiences, but they often come from dark, distressing imagery, which was experienced by the clients in this study, as awful and horrid. The precise moment of change however, was the point of resolution. The essential feature of pivotal experiences therefore is that they are life changing (p. 218).

Thus pivotal moments are distinguished from transpersonal or peak experiences which are always positive in nature, and may not actually translate to life change. This research methodology focused on the meaning clients take from their experiences, though it did so by analyzing their recollections and reflections on the experiences rather than on experiences in-vivo. The approach also allowed clients to construct their own concepts of "pivotal moments" which permitted clients' unique experiences to be examined as they are.

In a similar study, Abbott (2005) used phenomenological and transcendental realism methodologies to gather and analyze data regarding clients' recollections of their positive and negative experiences of the music in GIM sessions. Abbott interviewed twelve participants about their past GIM experiences, asking them to describe "positive" and "negative" experiences. The concept of the "negative" experience led to some confusion for the participants, as they shared that though their negative experiences were unpleasant, they were ultimately beneficial. On the other hand, participants had no difficulty identifying "positive" experiences to share. In the end, while each participant had a unique manner of experiencing the music, Abbott found a structure of experience across all kinds of sessions where clients reacted, engaged, closed, and reflected upon each experience. Abbott found that "active involvement in each of these phases helped to make the music experiences therapeutic" from the clients' perspectives (p. 53). Additionally, clients interacted with all four elements of a GIM session (music, client, imagery, and therapist) regardless of whether it was a positive or negative experience, and these four elements interacted during these experiences. Further, the client was the primary agent of these interactions. Positive experiences seemed to help clients open and relate to any therapeutic material that was being perceived as positive, whereas negative experiences helped clients acknowledge and learn how to cope with material perceived as negative. So it could be important for clients to experience both, and that work with both is interrelated. This conclusion relates to Grocke's (1999) findings showing that unpleasant experiences can lead to a productive shift in the therapeutic process. In executing the research, Abbott discovered that her personal concepts of positive and negative experiences impacted the data collection by the way she phrased interview questions. But by allowing clients to form their own ideas of positive and negative experiences, the method permitted Abbott to hold these personal constructs at bay in order to understand the participants' constructs of these experiences. Again, like Grocke's (1999) and Abrams' (2000) studies, this research analyzed participants' recollections of experiences rather than data collected in-vivo.

Brooks (1998) utilized a hermeneutic approach in her research, a method which is closely related to phenomenology (Kenny, Langenberg, & Loewy, 2005). In this study, Brooks examined six men's responses in six GIM sessions to determine how the Jungian anima archetype (the feminine side of men) manifested in session material. Using content from session discussions and imagery responses, Brooks created transcripts of the data and then identified manifestations of the anima according to guidelines generated from the literature. She found that exploration of the anima was significant in each man's process, GIM was particularly useful in helping these men explore their anima, and the session material related to anima led to a refined definition of the anima. Finally, the therapist's assessment and interpretation of a man's relationship with his anima can help him/her understand his therapeutic process. Brooks' methodology went through changes according to the nature of the data she collected. For instance, Brooks initially also collected data through interviews in addition to the data from the session material. However, she realized that these interviews were potentially contaminating the data because of the different roles she played as researcher versus therapist (participants tended to be less authentic during interviews than during sessions) and because clients were not able to reflect on their anima experiences given that the anima is often an unconscious entity. Additionally, because the GIM sessions also seemed to allow free exploration of the anima in a supportive context, the sessions alone presented ample data regarding the research question. Therefore, Brooks abandoned the interview data and focused solely on the GIM session data. Brooks demonstrated attentiveness to the dynamics that contributed to the quality of the data and adjusted her methodology to best answer her research question. In this case, the in-vivo data were the most useful in examining the manifestations of anima in the BMGIM process for these participants.

Hanks (1992) turned her focus to clients' cultures when she studied Taiwanese and Western participants' imagery to Chinese and Western classical music in GIM sessions. Her purpose was "to systematically explore the content, form, and nature of the subjects' experiences of the music in order to determine the essential structure of that experience" (p. 25). In her analysis of the subjects' imagery, Hanks applied some of Kohut's theories of concurrent psychological and musical development, and Stewart's theories of archetypal affects. As a result, she found confirmation of these theories, while also noting similarities and differences of responses to the music between the groups. Her report did not describe her method of data collection and analysis in detail. However, her results indicated that she may have engaged in hermeneutic analysis by examining imagery content according to Kohut's and Stewart's theories. It also appears that she engaged in a moment-by-moment analysis of imagery compared to the concurrent music, and compared these results across the participants. She then found some patterns of response between the Taiwanese and Western groups, where participants described similar imagery to particular Chinese and Western music. Although she stated that some imagery was characteristic of each group, she did not describe these experiences. Thus, overall, the report lacks not only methodological detail but also sufficient detail to determine whether she fully answered her research question.

In summary, these studies offer the following knowledge about client imagery experiences within GIM sessions:

- Elements of GIM music can influence client imagery, and some music may be particularly suited to elicit particular kinds of imagery experiences (e.g., transpersonal experiences)
- The music does not directly cause imagery, rather, music, client, and imagery interact in the moment to produce the imagery experience; the intervention of the guide also influences the imagery experience

- Transpersonal GIM experiences involve a correlation between unitive and universal experiences in imagery, and help to expand consciousness
- Pivotal/therapeutic moments in GIM can be (and often are) unpleasant experiences that need to be worked through in order to be beneficial
- Men were able to freely access and explore their feminine sides in a GIM context
- Western and Taiwanese clients were able to experience imagery to both Western and Chinese classical music, and they had similar and different kinds of imagery experiences to these programs.

These results indicate a growing knowledge of client experiences in GIM, but are wide-ranging and still do not address the research question of this study regarding the relationship of body and mind during a GIM session.

Given that the present research intends to focus on the holistic-subjective and neurological-objective description of the moment-by-moment client experience in a GIM session, these studies present several helpful points in terms of design:

- The entire session environment, including session room, music, rapport with the researcher, and the readiness of the participant, needs to be approached with the intention to support an intersubjective response of "music, imager, and imagery" as discussed in Bruscia, et al. (2005)
- A constructivist, phenomenological approach to data collection will allow the clients' subjective experiences to be examined most naturally and holistically, from their first-person perspectives

- Care must be taken to ensure that the study design would not impose any preconceptions or assumptions onto the participants' subjective experience
- Whereas reflections on GIM experiences can explore the meaning participants gain from those experiences, they do not describe the subjective experiences themselves, moment-by-moment
- During data collection, first-person data must be continually referenced to the research question in order to determine that the right data are being collected by the most appropriate means

Showing the usefulness of phenomenology to the study of experiences in GIM, two studies have examined the therapist's experience. Bruscia's (1998) work identified modes of consciousness he experienced while guiding a GIM session; these modes helped him clarify how he could be present for his clients in the most effective way possible. Taking this concept further, Abbott (2008) studied six therapists' experiences and behaviors while guiding a GIM session. Her findings identified clear therapeutic intentions therapists had throughout the phases of the session, which helped give form to the session, but did not define each client's work. Both of these studies allowed their phenomena of focus to present themselves wholly and within their contexts, so that they could be understood as naively as possible, without the presuppositions or constructs which might have constrained or colored them in a positivistic paradigm. The studies described in this chapter provide support for phenomenology's ability to value individual subjective experiences and to describe them fully in a GIM context. Thus phenomenology appears to be a useful component to the methodology for the present study. At this point, I will now discuss GIM literature that addresses the research question from a theoretical perspective.

CHAPTER 4

GIM, NEUROLOGY, AND NEUROPHENOMENOLOGY

The purpose of this chapter is to present the GIM literature linking neurological and phenomenological theories, and to examine their implications for this study. I will then discuss the usefulness of neurophenomenology in addressing the current research question.

Neurology and Phenomenology in GIM

Helen Bonny proposed some preliminary theories about how the body and mind interact in GIM. First was the role of the ASC in the music and imagery experience. The ASC is key to the therapeutic benefit of GIM; Bonny cited Tart's (1972) definition of the ASC as "a qualitative alteration in the overall pattern of mental functioning, such that the experiencer feels his consciousness is radically different from the way it functions ordinarily" (Bonny, 1977/2002f, p. 80). To Bonny, the ASC permitted clients to access layers of consciousness which include repressed events and influences, as well as untapped resources and strengths. Bonny's representation of these layers of consciousness are described in Figure 2. Music, Bonny stated, has qualities "which correlate with eliciting affective drug experience" (Bonny, 1977/2002f, p. 86). Therefore, along with the induction exercise, music can facilitate exploration of a "wide sweep of those levels or layers of consciousness" (Bonny, 1977/2002f, p.86). The LSD research at the beginning of GIM's development utilized the brain's neurochemical response to the drug to facilitate an ASC and psychotherapeutic growth. Bonny's discovery of the relaxation induction as an alternative to LSD revealed that a similar, and even more

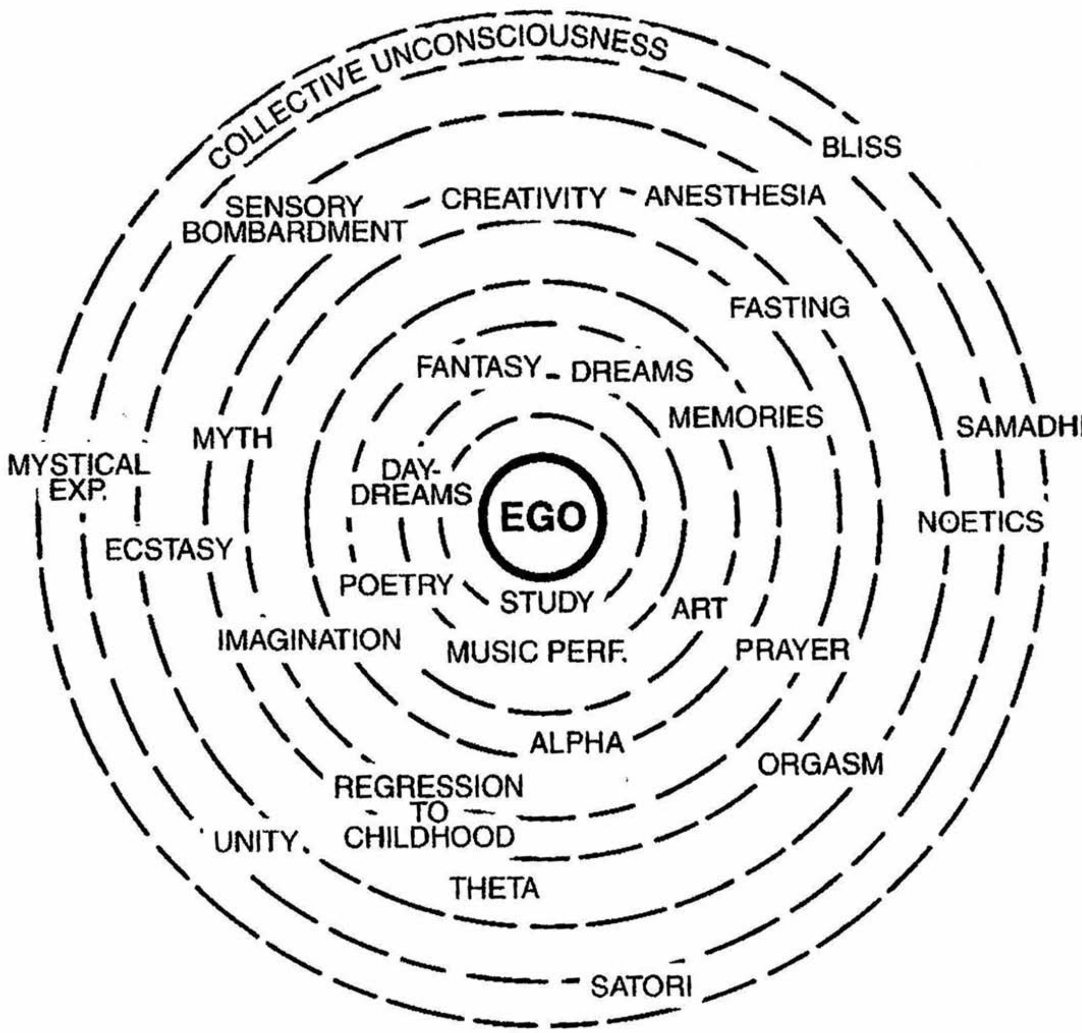

Figure 2. Bonny's Cut-Log Diagram of Consciousness. *Note.* From "Music and consciousness," in L. Summer (Ed.), *Music consciousness: The evolution of Guided Imagery and Music* (pp. 82). Gilsum, NH: Barcelona Publishers. Copyright 2002 by Barcelona Publishers. Reprinted with permission.

effective, altered state could be achieved without artificially inducing neurochemical responses. So the induction serves to alter the brain's activity prior to the start of the imagery portion of the GIM session, just as LSD did for those early sessions. The music continues this shifting of brain activity, moving it from one level of awareness to another. This is evident in Bonny's cut-log diagram, where some of these layers are labeled according to EEG brain wave frequencies (e.g., alpha, beta, and theta).

But Bonny was also very interested in the neurophysiology of emotion in music performance, and how this related to the communication and perception of emotion in music. She cites Manfred Clynes' work which proposes that all forms of expression, and particularly music, contain "essentic forms" of each primary emotion (e.g., love, hate, anger, joy, grief) which are recognized by the brain. In terms of music, the performer translates affect through his/her body into the instrument, and then into sound that has an effect on the listener, particularly if the composer's biological affective intentions (or, in Clynes' terms, "sentic cycles") are faithfully reproduced. In terms of the therapeutic and healing aspect of this theory, Clynes states that "the release of specific neurochemicals in the brain associated with essentic forms of basic emotions may produce changes in the organism which depend on the context in which essentic form is viewed" (Clynes, 1983, as cited in Bonny, 1986/2002i, p. 127). Bonny's interest in these areas seems to indicate at least some belief that music acts as an external force on the psyche and body, and that if the client is readied (through entering an ASC), music can facilitate movement into different brain states and corresponding levels of consciousness.

Since then, other GIM clinicians have conceived theories to explain how and why the technique can facilitate a therapeutic exploration of consciousness. Three theorists describe how therapeutic imagery involves body-felt emotion by making a connection between internal experience and the body. Goldberg, in her Holographic Field Theory (2002), defines emotions as "episodes of coordinated changes" involving neurophysiological activation, motor expression, and subjective (evaluative) feeling "in response to external or internal events significant to the organism" (Scherer, 2000, as cited in Goldberg, 2002, p. 361). Emotional responses begin as physiological arousal and then involve appraisal or evaluation, a subjective phenomenon. So the very process of experiencing emotion already involves the interaction of psychological and physiological experience.

Goldberg hypothesizes that GIM works by using imagery which develops as a function of emotional response to music. Music may generate conscious or unconscious emotion by direct stimulation of the autonomic nervous system (ANS); in turn, emotion may evoke an image, leading to a cycle of response between and among music, emotion, and image (Goldberg, 2002). Music has the ability to elicit emotion because of its direct connection to the ANS, the emotion-processing centers, and to the cortex of the brain (Thaut, 1990). This music-emotion-imagery cycle leads to expansion of the Self through exploration of different states of consciousness, and this expansion of the Self leads to therapeutic change.

Perilli (2002) goes further in explaining how emotional experiences are stored, accessed, and referenced in life experience in her description of how metaphor is relevant to GIM. Emotional experiences are consolidated into imaginative schemas that have been embodied at the neuropsychological level since birth, schemas which help organize responses to stimuli and the environment, and which orient the organism to what is happening around him/her.

Music can evoke these schemas because of its varied sensory, emotional, and kinesthetic (embodied) components that relate to all the basic imaginative schemas. The schemas provide a foundation for metaphors, which are ways of relating new perceptual information to already organized information. Imagery, in turn, is generated from metaphors. The metaphorical processes enable the creation of new metaphors, and therefore, the expansion of one's personal inventory of imagery (Perilli, 2002).

Perilli (2002) continues: "The brain in fact modifies information on the internal and external environment in response to perceptions, thus acquiring new knowledge useful for change and growth" (p. 438). Music provides the background, structure, support, and subtext for source information to construct new metaphors. According to Perilli, the music programs in GIM elicit at least three kinds of imaginative schemas:

- Schema of Balance—stimulated by music that evokes/organizes kinesthetic/perceptual responses
- Schema of Movement—stimulated by music that evokes neuromotor, directional responses (particularly "ballistic movement" —reptilian, subcortical & cortical brain levels; bodily sensations and primary emotions)
- Schema of Rhythm—stimulated by music that evokes temporal organization of neurological and neuropsychological responses

Discrepancy between these schemas can "provoke a different state of consciousness, bring up memories of a repressed event… [and] engender new metaphors" (p. 440). All three schemas are parts of an overriding schema, the Schema of Change, which is the foundation of every biological and therapeutic process. Note that all three schemas involve integration of body and perception, and differ in terms of relating to space, direction, and time. Thus, when GIM processes stimulate dissonance between these schemas, GIM facilitates the generation of new metaphors, which also generates new awareness and insight.

Working from a perspective of pathology, Körlin's (2002) theory of neuropsychology and trauma relates cognitive neuroscience theory to GIM clinical situations dealing with traumatic imagery. He theorizes that GIM can help the mind process dysfunctional traumatic memory into functional memory though "cortical consolidation." This process may involve incorporating unintegrated information into existing permanent memories, a similar process to Perilli's metaphor generation theory. Some theorists, including Körlin, believe that dreams are essential to this process, as they can help consolidate new explicit memories into a coherent set of representative schema. Because GIM uses altered-state work with imagery experiences similar to dreaming, the method can also facilitate this consolidating process.

Körlin (2002) describes how creative imaging requires higher brain processing and perception of music in the neocortex. GIM uses this creative imaging skill set with music, which (in the ASC) can activate brain areas that integrate memory, body functions, affect/emotion, perception, and discursive and analogic representations. Thus GIM brings forth inner resources that may be unconscious and inaccessible when conscious. While inner resources can manifest in many different forms, bodily experiences are especially helpful to those recovering from trauma, as these are healing in nature, for example, imagery of swaying in branches of a tree, feeling safe, hearing mom's voice, and so forth. In the process of mobilizing resources, Körlin states that traumatized people may have strong, deep defenses which lead to isolation; the more protection the defense offers, the more isolated the person becomes—an interpersonal dilemma. The defense reflects the client's distrust of relationships and avoidance of emotion. This shutting off of emotion and relationship is also related to difficulty creating autobiographical memory of the traumatic event, an essential task in becoming a functional self after trauma. If emotion is related to body experiences (Goldberg, 2002) then bodily experiences of emotion are needed in order to develop autobiographical memory, which then facilitates healing from trauma. In GIM, the transformation of cognitive memory into autobiographical memory occurs through symbolic processing of the traumatic memories—this replaces the intrusive, re-traumatizing affective experiences of post-traumatic pathology with "owning" of the affect.

Körlin (2002) states that whenever a traumatic memory is translated into an analogic symbol (image), the transformation brings forth not only the traumatic memory, but also additional information such as personal resources. These resources may take the form of realities or facts related to the event which may help in understanding and managing a similar event in the future. The image may also reflect how the trauma affected self-perceptions and relationships. So the GIM process, even for clients who have difficulty consolidating their traumatic experiences, and even when the stress from trauma can hinder this process at a neurobiological level, can still facilitate the integration and functioning of self due to its ability to work with implicit memories of body experiences along with symbolic representations of the past and present in imagery, all evoked and supported by the music.

To summarize the last three chapters, first, there is EEG evidence that experiences of music, ASCs, imagery, and emotion, separately and sometimes together, have corresponding brain activity. Second, phenomenological research in GIM has shown how imagery involves lived experiences with the music, emotion, and self which expand awareness. Third, GIM practitioners have produced some theories describing how profound aesthetic and affective experiences use and affect the body and mind. But as of yet the actual music-imagery experience has not been directly examined. Here again is the "hard problem," or, how to view and study the integration of objective and subjective experience of consciousness. Again, I will return to Wilber and Varela to help describe a way forward through neurophenomenology

Significance of Neurophenomenology

The preceding research establishes the existence of first-person and third-person realities in the GIM imagery experience, and that both are important in understanding the experience. This research also demonstrates that it is possible to study first-person and third-person experience, but so far only separately. Many philosophers and researchers would argue that these views are mutually exclusive; however, Wilber (2008) makes the case that integral philosophical approaches assert that all philosophies are "right" in the sense that they each emerged for a reason. Each worldview is valid because it addresses a view that someone is experiencing. So an integral researcher seeks to understand how it is that various theories, philosophies, and perspectives of phenomena can co-exist, even though (or particularly because) they focus on very different phenomena. Scientific objectivity emerged due to the reality of third-person singular examination of materials (UR). Phenomenology emerged due to the reality of examination of first-person experiences (UL). Systems theory emerged due to the reality of the third-person plural behavior of systems (LR). Anthropology and ethnography emerged due to the reality of second-person cultural experiences and myths (LL). None of these particular perspectives are “truer” than the others, or “right” to the exclusion of the others; they each address a particular perspective of entities in the world. By acknowledging the co-existence and tetra-interaction of these perspectives, the questions that arise are: How do they relate to each other? How can they inform each other? The separation of these perspectives has led to philosophical problems such as that of body-mind and dualism vs. materialism. By first acknowledging the realities of these perspectives (brain activity that correlates with perception and cognitive tasks; subjective experiences of emotion and transcendence), it is possible to see that these are merely different views of the same event, and that integrating the information from these views can lead to greater understanding of the nature of that event.

Therefore, it is important to clearly identify what exactly this research proposes to examine, and from what perspectives. Returning to the UL and UR quadrants in Wilber’s quadrants (see Figure 1 in Chapter 1), I will describe the subdivisions of these areas here, since they are the focus of the present study. Figure 3 depicts Wilber’s concepts of the Indigenous Perspectives which reside in each quadrant (Wilber, 2008). These perspectives describe each possible viewpoint from within each quadrant. Within the UR there is an inside perspective of “it” (or “me”) and an outside perspective. The inside perspective means that an exterior entity (an "it" or "its") is viewed from *inside* its own boundaries. In other words, this perspective is a first-person view of third-person

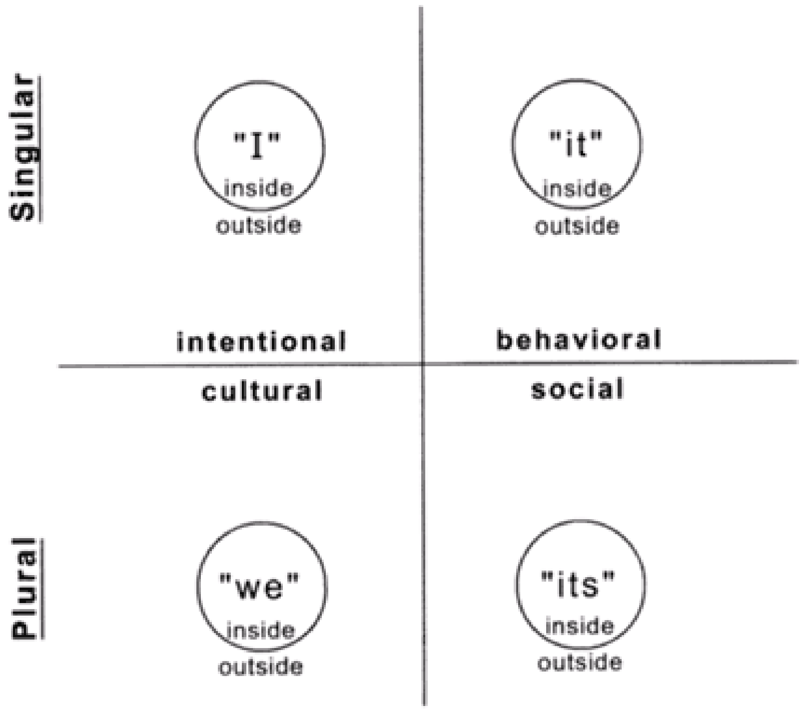

Figure 3. Wilber's Eight Indigenous Perspectives. *Note*. From "Excerpt D: The look of a feeling: The importance of post/structuralism," Retrieved July 1, 2009 from http://wilber.shambhala.com/html/books/kosmos/excerptD/part1.cfm (Part I), by K. Wilber, 2009, Boston: Shambhala Publications. Copyright 2009 by Shambhala Publications. Reprinted with permission.

realities; for example, I can observe and measure my own heart and breathing rates. Research in this area uses methodologies such as biological phenomenology and autopoiesis.

In the outside perspective, the “it” is perceived from *outside* its own boundary. This is a third-person view of third-person realities; for example, I can observe and measure Joe’s heart and breathing rates. Research here uses methodologies such as behaviorism, positivism, and empiricism.

Within the UL, there is the inside perspective of “I” and an outside perspective of “I.” The inside “I” perspective examines the “I” from inside its own boundary. This is a first-person view of first-person realities; for example, I experience a surge of sadness when I recall a particular memory. Accessing this perspective requires techniques such as phenomenology, introspection, and meditation. The outside “I” perspective examines *interior* experiences (an "I" or "we") from *outside* their own boundaries. This is a third-person view of first-person realities; for example, my description of my sadness to you, or, in broader and more objective forms, Freud’s theory of psychosexual development. This perspective can be accessed via methodologies such as developmental structuralism. Wilber describes this perspective as “the look of a feeling” (Wilber, 2009). This perspective permits me to describe or reconstruct the interior experience of myself or another person so that others can understand and apprehend that experience as well.

But in order to describe or reconstruct another’s interior experience, that person and I need to communicate about his/her experience so that I can comprehend it. In this way, the first-person singular experience moves into a first-person plural one: “We” (Wilber, 2009). But my role can also become second-person, in the form of a mediator, who can assist the participant in explicating his/her experience, and who can then also provide expression and validation of the experience by creating explicit accounts of this which are available to intersubjective feedback (Varela & Shear, 1999).

As stated before, however, GIM experiences can affect a person's world through all four quadrants. A person does not live in a vacuum, apart from everything else in his/her environment, nor can a person keep the environment and its meanings, influences, behaviors, and so forth, outside of his/her internal world. GIM experiences can involve physiological changes (e.g., decreasing stress hormones) or awareness of one's own behavior – both of which are UR phenomena. The decreasing stress hormones could be a result of releasing a strong emotion, or of a positive sense of self (UL phenomena). But the emotion could have been directed at a family member, regarding the expressive life of that family (LL). And this may be tied to a frustration with society's ideas about family life and the role of families (LR). Thus a single GIM experience can resonate within all the quadrants for that person.

That being said, because the source of the subjective data for this study will come from the first-person, individual participant's experience, it is this perspective which is the focus of the subjective side of this study. Participants may report experiences which resonate with the other quadrants and perspectives, but this research will acknowledge these through the lens of the outside of "I" as this is the closest a researcher can get to the participant's original experiences. So I (as researcher) will focus specifically on the inside and outside of each participant's "I" (subjective data) and the outside of each participant's "it" (objective data); I will examine the subjective, interior perspective of each person, and attempt to summarize or describe it from the outside (my perspective of the interior perspective). Then I will seek to find the relationships between each participant's "I" experience and the corresponding objective, exterior and observable behaviors (EEG).

How to arrange this connection is still a difficult task. Again, because this is a study of consciousness, I require a method designed to examine consciousness. As described in Chapter 1, neurophenomenology uses first-person data regarding a particular experience to ground and provide context for third-person neurological data collected during that experience. In this way, it may be possible to uncover even new third-person data which might previously have been discarded because it was viewed as meaningless from a third-person perspective (e.g., statistical "noise"), but when correlated with first-person data, it has another layer of information to help explain its existence (Thompson, et al., 2005).

Thus far there have only been two published studies that claim to use pure neurophenomenological methods. The first study, mentioned in Chapter 1, focused on experiences of a visual perception task (Lutz, et al., 2002). The second study examined subjects' experiences leading up to and including their seizure activity (Petitmengin, et al., 2007). These researchers combined EEG phase-synchrony analysis of seizure activity with content of subject interviews focused on distressing and sudden experiences of epileptic seizures. The interviews were designed to elicit as much awareness as possible of the sensations and experiences leading up to the seizure. Thus the phenomenological content included physical sensations, behaviors, and sometimes cognitive reactions or emotions. In correlating these data, researchers discovered that a seizure is the neurological climax of a process of neural desynchronization that begins hours beforehand. Additionally, symptoms of neural desynchronization can be perceived by the seizure patient in the form of negative symptoms. Further, these negative symptoms often build in intensity until the seizure aura abruptly manifests. These two phases differ in that the negative symptoms seem to occur due to progressive loss of neurological phase synchrony in the affected areas of the brain, while the aura, usually perceived as a very positive sensation, is due to hyper-synchronicity of the affected brain areas, which is the onset of the seizure. Thus the neurophenomenological approach helped identify structures of experience that clarified phases of neurological activity in seizures. Knowledge of these structures can help manage seizure activity without medication by helping patients identify prodromal symptoms earlier and use cognitive and behavioral techniques to prevent seizures.

However, the Petitmengin, et al. (2007) and Lutz, et al. (2002) studies examine their respective phenomena in ways that would not work for the present study. First, in Lutz, et al. (2001), the phenomenon was a brief experience of visual perception which was examined through hundreds of trials in order to detect patterns of response. The GIM experience is too lengthy and complex for each individual to undergo more than a few times in a single study. The Petitmengin, et al. (2007) research focused solely on physiological sensations and EEG measures related to seizure activity, whereas the present study seeks to examine a much broader range of experience during the GIM session.

However, one other article has discussed the phenomenon of mental imagery from a neurphenomenological perspective. Thompson (2007) provides a philosophical approach to the phenomenon, summarizing reigning theories in philosophy of mind regarding the nature of visual imagery. He then argues that neurophenomenology does not regard imagery as simply a pictorial and spatial representation of a scene or objects (a view posited and argued by Kosslyn, 1994), or as a description or mental representation of how an object or scene would look based on our propositional knowledge of visual properties (a view held by Pylyshyn, 2003). Rather, it views a mental image as “the mental activity of re-presenting an object by mentally evoking and subjectively simulating a perceptual experience of [an] object” (p. 156). In other words, “in visualizing an object, we subjectively simulate a visual experience of the object, and the content of this experience is not given by an image or picture” (p. 157). This fits with the nature of imagery in GIM, where imagery is a lived experience, and where it is possible for travelers to interact with the images based on their knowledge of the image and all it represents to them. Thompson proposes that examining imagery in a neurophenomenological way would “try to relate the experiential structure of the visualizing act to the dynamical structure of brain activity” (p. 160). By using first- and second-person methods to describe the subjective experience of “visualizing,” these descriptions could be phenomenologically analyzed to determine the experiential structure of imaging, and these results would guide the neurodynamic analysis. Such a study is what I have outlined in this research; however, it is clear that this particular methodology has not been attempted before in the music therapy field, let alone in cognitive neuroscience.

It must be noted that there are some limitations to this research design. It is a music therapy study, and not a cognitive neuroscience study. Nor is it a philosophical enterprise. I chose neurophenomenology because of its suitability for this research question, which emerged out of my personal and clinical experience as a GIM client and trainee. Therefore this study aims to form conclusions useful to GIM and music therapy, and does not claim to answer questions from a cognitive neuroscience perspective. Also, because the GIM session format needs to be modified in order to meet the limitations of the EEG technology, this study's results are limited in terms of direct applicability to individual GIM sessions. However, given that these adaptations do not detract from the essential therapeutic elements of GIM (e.g., the ASC, the imagery experience, the embodied emotions), the results will still be relevant to GIM as it is being practiced.

In summary, conventional cognitive neuroscience research regarding phenomena related to the GIM experience results in extremely complex data which is difficult to comprehend, and which cannot account for wide-ranging individual responses. Phenomenological research in GIM offers rich descriptions of particular kinds of client experiences, but has not been able to describe the mind-body connection during a GIM session. Neurophenomenology offers a means of integrating subjective and objective data in order to add a new dimension to both kinds of data; seen in each other's contexts, it may be possible to understand the interaction of mind and body during a GIM experience.

Purpose of Present Study

This research seeks to describe participants' music and imagery experiences during a GIM session using both objective and subjective data. Phenomenologically speaking, the research is focused upon the moment-by-moment experience of the GIM session, from the participant's perspective, and upon any and all aspects of that experience that may emerge for each individual. Physiologically speaking, the research is focused upon the EEG data collected during the GIM experience. The integration of these data will help to illuminate the nature of the mind-body interaction during music and imagery experiences. The integrated data will be analyzed to determine if there are patterns of neurological and subjective responses to the GIM experience first within, then across, individuals. The research is therefore not focused upon a particular aspect of the GIM experience, nor is it concerned with past GIM experiences.

CHAPTER 5

METHOD

Design

This study is mixed-method in design, utilizing both quantitative and qualitative methods of gathering and interpreting data in an integrated, neurophenomenological approach (Varela, 1996). It is descriptive in nature, correlating quantitative EEG data with qualitative first-person descriptions of participants' experiences while undergoing music and imagery sessions.

The two different research methods that will be used in this study each has its own epistemology; the integration of these two views is possible only through a new, "integral" epistemology (Wilber, 2000, 2006). Referring to the map of the Quadrants (Figure 1 in Chapter 1), this worldview posits that all four quadrants are simply descriptions of a Whole, and that each quadrant is a facet of that whole. Each quadrant has its own significance, use, and value, equal to all the others. Moreover, each quadrant interacts reciprocally with the others. From the perspective of one quadrant, for example, the mind (UL) interacts with the body (UR), the mind interacts with its culture (LL), and the mind interacts with the environmental system (LR). Wilber describes this as "tetra-interaction" (Wilber, 2000, p. 184).

Neurophenomenology simultaneously focuses on the upper two quadrants by examining consciousness in terms of first-person (subjective, UL) experience correlated with third-person (objective, UR) data. Rather than seeing reality/truth as only objective and external (UR), with consciousness simply the apprehension of a "feature-full world," which is represented in the brain through mechanistic means (Varela, 1996, p. 345), and rather than seeing reality/truth as only subjective and internal (UL), with consciousness so unique to each experience that it is impossible to relate outside of the self, neurophenomenology treats these perspectives of the UR and UL as "mutually overlapping" (p. 346). Wilber would say that they "mutually interact." The overlap/interaction of the subjective experience with the objective perspective of that experience is the focus of this methodology. Varela states, "[t]he empirical questions must be guided by first-person evidence" (p. 344). In this case, understanding brain activity during a music and imagery experience must be guided by the person's subjective reports during that activity; whereas understanding the person's subjective reports on the nature of the music and imagery experience must be guided by the objective data (i.e., EEG analysis).

The quality of the phenomenological perspective in neurophenomenology is maintained through the use of participants trained in reflexive awareness, and their and the researchers' focus on the structural invariants of the experience at hand. In terms of reflexive awareness, as is described later, participants must be able to accurately and fully describe as much as possible what is in their awareness during the experience. Through these descriptions, researchers determine "structural invariants" (Varela, 1996, p. 342) which are based on the tripartite human experience of time: past, present, and future—all in the same moment. What one is currently experiencing is not isolated from the immediate past, nor is it isolated from what one is expecting to come in the immediate future. This is especially relevant in a field such as music therapy, where the medium of experience is music, which unfolds in time. The structural invariants derived from the studied experience therefore reflect this chronological, dynamic nature of human awareness, and thus need to be thoroughly understood by the researcher in order to be accurately distilled.

Given that, the researcher's role in this research is one of mediator between the first- and third-person perspectives. Each participant must communicate his/her subjective imagery experience in a way that the researcher can understand and document it, and in a way that others can understand it. Thus the analysis of the subjective experience moves the content from the "inside of I" in Wilber's UL quadrant to the "outside of I" (see Figure 3 in Chapter 2). The researcher's second-person role permits the first-person data to be bridged with the third-person EEG data by working with each participant to identify the structural invariants of each experience, categorizing them, and relating these with the corresponding EEG waves.

Thus, because the present study integrates phenomenological data with EEG data, it combines paradigms and methods of research from two quadrants, and treats the resulting qualitative and quantitative data interdependently. The qualitative data constrains and is constrained by the quantitative data, and the quantitative data constrains and is constrained by the qualitative data. As a result, this study has been designed to: 1) gain insight into how the participants individually and collectively experienced the music and imagery session, while also determining how their wide range of subjective experiences were reflected in the EEG data— insights which could not have been gained by qualitative research of the phenomena alone; and 2) to describe brain processes that occur individually and collectively during the music and imagery experiences as subjectively reported by the participants—findings which could not have been achieved by quantitative research of only the EEG data.

Pilot Study

Prior to collecting data from the research participants, I conducted a pilot study which served two purposes: first, to refine the phenomenological data collection and analysis procedures, and second, to test and refine the technical aspects of the EEG data collection and analysis procedures.

In terms of the first objective, I intended to describe the participants' imagery experiences as accurately as possible. I chose to conduct the pilot study with myself as participant and with a GIM-trained guide to assist, using the research procedure described below. By taking on the role as participant in the pilot study, I was able to identify and examine my own assumptions, biases, and habitual perspectives that I bring to the interview process and phenomenological data analysis, so that I could execute these procedures in a way that is as faithful to the data as possible. Further, the pilot also assessed the effectiveness of the induction exercise, the selection of music program, and the guiding script.

In terms of the second objective, the pilot session addressed the technical concerns relating to the collection of objective data, including: determining the amount and level of EEG data needed to correlate the data with first-person experiences; testing and using the EEG acquisition equipment; and evaluating the comfort needs of participants. The pilot session also tested the methods and process of EEG data analysis, outlined below, and initially involved the consultation of a neurologist and an electrical engineer.

Pilot Equipment and Materials

The hospital laboratory was equipped with Nicolet EEG machines. The pilot session used all available 23 electrodes, using the 10-20 international scalp topographic system for electrode placement, as this is the minimum number of electrode sites usually used in clinical EEG testing and is also a frequently used number of sites used in EEG research of this kind. The EEG acquisition equipment included video and audio monitoring, which simultaneously records and displays EEG data on a computer screen.

For the session, I created a semi-directed guided imagery script to be used with two pieces of music from the *Nostalgia* GIM program (Bruscia, 2002c): Alwyn: Oboe Concerto Grosso #1 (Siciliano) and Barber: Piano Concerto – second movement (Canzone – Moderato) (see references for complete discography information). Together these pieces are approximately 12 minutes in length. The script was designed to match the musical form and therapeutic intent of these pieces as used in clinical GIM situations; the theme and variations form of both pieces, along with their haunting melodies, suggested revisiting past memories or places (Bruscia, personal communication, May 5, 2009). Therefore, the guiding script suggested open-ended imagery within a suggested scene of a house with many rooms. As the guiding continued, the script encouraged recalling people and memories from one's past. The induction and guiding were pre-recorded with my voice, mixed into the music recordings, and then copied onto CD for playback in the pilot session.

Other equipment included a portable stereo in order to play the music CD. During the session, I reclined comfortably on the usual examination chair in a way that permitted and did not interfere with placement of the EEG electrodes on my head. For the post-session interview, I used a digital audio recorder to record the conversation with my colleague.

Pilot Procedure

The session was conducted in an exam room of an outpatient EEG lab at a large urban hospital, after the last scheduled patient for the day. A lab technician prepared my scalp and placed the electrodes, checked the impedance (the electrical conductivity of the electrodes on the scalp, ensuring a good connection), and started the EEG recording software for the session. The technician left the room, leaving my colleague and me to start the music and begin.

The recorded script included a ball of light induction (see Appendix A) intended to progressively relax my body and focus my mind so that I could enter a relaxed state. The script then guided me to attend to the music and begin to image according to structured directions (e.g., imagining a house, imagining entering the house, etc.) I remained silent during the entire session, as the facial movements from my talking would have created interference with the EEG signal. When the final guiding direction had finished and I had returned to an alert state, my colleague disconnected me from the EEG station and we adjourned to a nearby private reading room to view the session as recorded by the EEG acquisition software.

We replayed the session from the beginning, and my colleague conducted a phenomenological interview of my experiences. Conducting this interview at times required us to intentionally refocus on the imagery experience rather than the detailed content of my imagery, and also required us to focus on the experience *as experienced* rather than my interpretation or meaning-making of the experience while being interviewed. This awareness would prove helpful when I began to interview the actual participants of the study.

I transcribed the recorded interview and then, using the EEG software in the lab, replayed the session to attempt to correlate the timing of my experiences with the EEG data. This proved to be an imprecise undertaking at best, from an EEG perspective. Though the recorded guiding cues and music were audible in the session's EEG recording, and these provided some signposts for identifying when I experienced a particular image, this still potentially left a window of up to 1 second of time where I was about to experience something or was done experiencing an image. This length of time is considered to be, in an EEG context, a very large window during which a great deal of brain activity occurs.

Further, the initial qualitative analysis showed how rich and broad the imagery experience was, and how difficult it would be to categorize the experiences in a simple, straightforward manner. To keep the phenomenological categories (PhCs) manageable in number, I categorized my imagery experiences according to sensory modality (e.g., Body, Auditory, Affective, Visual, etc.). However, many if not most of my experiences involved several sensory modalities occurring simultaneously. This initial analysis created 19 PhCs (in the form of sensory categories) occurring across a total of 57 separate instances of imagery for the entire 20-minute session.

Due to my data analyst's concerns about the precision of the timing of the PhCs in the EEG data, I decided to further analyze the music and guiding recording separately to determine External Clusters which would provide a clear timing anchor in addition to the PhCs for analysis. The External Clusters included significant musical and verbal cues and were operationally defined according to timing and musical/language characteristics. This layer of analysis would be analyzed in addition to the PhCs in order to explain the EEG data. The completed External Clusters analysis led to 65 total events across the 20-minute session.

Unfortunately however, the prospect of a combined statistical analysis of 57 PhCs and 65 External Clusters became overwhelming, both in terms of executing the data analysis as well as making meaningful conclusions of the results. In reviewing the session script, it was also apparent that the guiding script, although semi-directed, still left a great deal of time for an experienced GIM traveler to go beyond the intended imagery experience, and thus create rich additional imagery which, for this study's purpose, would only serve to make the analysis much more difficult.

Given these concerns, I revised the guiding directions that accompanied the music in order to further limit and focus the participants' imagery experiences, and in order to time segments of the experience more precisely for statistical EEG analysis. While maintaining the original narrative to fit the music, these revisions included the creation of a much more directed imagery script, with less time in between guiding cues for participants to freely image. Each guiding direction fit into categories of guiding probes. These probes helped focus the participants on six different sensory modalities rather than on a wide range of potential imagery experiences. The details of the creation of the probes are discussed below.

This adjustment in methodology meant that I would not be able to track EEG responses moment-by-moment across the session, rather I would be analyzing the EEG data in groups of segments according to guiding categories. Therefore, though I desired to be able to relate the music and imagery to the EEG data moment-by-moment, it would not be possible to do so using this revised method.

Participants

Two male and two female participants (four total) responded to emailed appeals to local GIM practitioners or flyers posted in the Temple University Boyer College of Music and Dance (Appendix B), and volunteered to participate in the study. Their ages ranged from 33 to 58, and their GIM experience ranged from 25 to over 70 personal sessions. One participant was a GIM Fellow, and two participants were advanced GIM trainees. The participants met all the inclusion criteria and had none of the exclusion criteria. That is, they never had been my GIM client in the past or at present, and they did not have any neurological problems that might complicate the EEG data (e.g., seizure disorders, history of any brain injury or stroke, or multiple sclerosis). They also did not have any psychological or physiological problems that might hinder full participation in the GIM sessions (e.g., taking psychiatric medications, hearing loss, physical pain or disability, psychosis or other severe mental illness). I attempted to recruit an equal number of musician and non-musician participants, as brain structures between these populations have been shown to be different (Petsche, et al., 1987; Schlaug, 2003). However, all of the available participants were musicians, and no non-musicians volunteered.

An essential component of neurophenomenology is that, in order to obtain the highest-quality and richest subjective reports that can best inform the neurological data, participants must be trained in reflexive awareness. Varela and his colleagues used meditation techniques, particularly borrowing from Zen Buddhism, in order to train subjects in reflexive awareness for their research (Varela, 1996). GIM methods employ much of the same kinds of self-reflection as these methods, thus, the present study required that participants be experienced travelers in GIM. Given the amount of GIM experience they possessed, it was expected that this study's participants would be able to report in detail their states of awareness and experiences during the music and imagery experience.

Temple University's Institutional Review Board (IRB) approved this research (see Appendix C), and participants gave informed consent before participating in the study by signing forms that described the potential benefits and minimal risks anticipated with this research (Appendix D). The EEG technicians, who placed the electrodes for each session and left before each session began, and the consulting neurologist and neurology resident, who would view the sessions' full files and video to provide clinical feedback, each signed a form assuring the confidentiality of participants' identities (Appendix D). In terms of the session's demands of participants, in addition to the time required (most sessions took 3 hours from start to finish, including post-session interview), placing the electrodes involved a 15-minute setup procedure by affixing electrodes to each participant's scalp by mildly abrading the skin surface and using conductive gel, which washes out. Additionally, the hospital's location and size required some travel time and parking costs for participants. Therefore participants received $20 for each session they completed in compensation for the time, effort, and costs required to participate in the study.

Equipment and Materials

The revised method included the same technical hardware as the pilot session (CD player, EEG acquisition station, digital audio recorder, computer EEG reading station), but also included a revised session script (see Appendix A) which was re-recorded and mixed with the same music used for the pilot session, then recorded onto a CD for use in the sessions.

Procedure

The procedure included the music and imagery session, the phenomenological interview of each participant's observation of the session's video recording, my analysis of the raw data, and the clinical and statistical analyses of the final data.

Data Collection/Variables

Data collected in each participant's session included:

- Video recording of the entire session
- Raw EEG data of the entire session (simultaneously recorded with video)
- Audio recording of phenomenological interview, collected after the session

Music and Imagery Session

After each participant was connected to the EEG acquisition station and the EEG technician left the room, the session began with a short preliminary discussion between the researcher and participant, followed by a directed music and imagery experience, and then a short concluding discussion. I asked each participant to first share any feelings or concerns they had going into the music and imagery experience, and also asked each participant to remain focused on each sensory modality presented in the guiding, as this would be crucial to the data analysis. I also reminded the participants to not speak during the session. When the participant was ready, I began recording EEG data on the acquisition station.

The first phase of the guiding recording contained the induction, a relaxation exercise used in GIM to guide the participant into a relaxed state. As in the pilot session, the recorded script (Appendix A) described an image of a Ball of Light which relaxes the participant progressively from head to toes. At the end of the exercise, the guiding described a specific starting image, a path emerging from a wood and leading to a house.

The next phase contained specific directions for the participant to continue imaging the path while listening to the music. Each direction guided the participant to focus on a particular type of imagery experience related to the ongoing narrative of being on a path leading to a house. The six different types of imagery experience were: Body, Visual, Kinesthetic, Interaction, Affect, and Memory. The Body category guided participants to experience imagery involving body-based sensations, including but not limited to awareness of body parts and functions (such as breathing), tactile sensations, and internal body sensations while moving or standing still. The Visual condition guided participants to experience visual awareness of their imagery, noticing what they saw including shapes, colors, and where they and/or objects were in space in relation to themselves or other objects. The Kinesthetic category guided participants to be aware of the sensations associated with moving their bodies in their imagery. During the Interaction condition, participants were guided to interact with objects or people in their imagery, whether through a form of communication, or by touching or picking up the objects. In the Affect condition, participants were guided to be aware of their emotional states within the imagery experience. The Memory condition guiding asked participants to experience memories within the context of the ongoing narrative.

I had asked the data consultants to recommend an appropriate duration of the EEG data segments for the coherence analysis, so that I could write the guiding script with the appropriate timings with the music. The consultants stated that they needed at least 5 seconds of EEG data to conduct an accurate coherence analysis, so with this in mind I listened to the music program and determined that a 10-second period after each guiding direction would fit the pacing of the music, the need for more focused guiding, and space for the participants to image in response to the guiding. Once I re-wrote the guiding script, .I recorded the new guiding directions over the ongoing music, pacing my speech and the start and ending of each direction with the music. After each guiding direction, the participant would continue to image to the music independently for 10 seconds, presumably according to the guiding directions.

Each guiding direction and subsequent 10 seconds of silent imaging to the music constituted what I called a "probe." The EEG data analysis later would focus only on each of these 10 second, music-alone periods for each probe, creating a more precise window for analysis than I had attempted in the pilot session. So each probe began with a verbal direction over the music, followed by 10 seconds of music alone. The next probe followed with the next verbal direction over the music, followed by 10 seconds of music alone. Overall, the music and imagery session experience contained 42 probes, though the number of probes in each category was unevenly distributed due to the nature of the guiding narrative. Body sensation had 14 probes, Visual had 16 probes, Kinesthetic had three probes, Affect had eight probes, Memory had three probes, and Interaction contained seven probes. While the final script was more directive than the pilot version, it still permitted participants to create original images within a given type of imagery. For instance, the opening image of a house encouraged participants to experience rich visual images, but the content of those images was left up to each participant.

When the music and imagery phase ended, the script continued with guiding alone to assist participants in returning to an alert state. I continued to collect EEG data during this phase until participants began to move and open their eyes, at which point I stopped EEG acquisition. When participants appeared ready, I asked them how they were feeling, if they needed anything, and if they wished to discuss any aspect of the imagery experience. None of the participants felt the need to immediately discuss the imagery at any length. When they were ready, I disconnected each participant from the acquisition station, and then we adjourned to a nearby reading room where the EEG data and video could be viewed in a private, comfortable setting. There we continued with the phenomenological interview about the music and imagery experience.

Reflection on Video of Session

I interviewed each participant while we viewed the acquisition station's video recording of the session. Before we began, I informed each participant that I was seeking information about their experiences immediately after each verbal direction (each probe), and that it would help if he/she could do his/her best to re-immerse into the imagery in order to vividly recall the experience of the imagery as richly as possible. Upon starting the video playback, I hid the EEG data on the screen so that it would not distract the participants from their recall of the imagery experiences. I began the playback of the session from the induction portion of the session and continued through the return to alertness phase. I asked the participant questions to help him/her describe as fully as possible what s/he was experiencing during the session. Such questions included (for example):

- What images were you experiencing?
- What senses were involved at this moment?
- How did that image come to awareness?
- What emotions were you feeling?
- What were you aware of?
- What was in the foreground of your experience, the music, the image, something else?
- What made you feel uncomfortable/comfortable?
- When did that awareness begin/end?
- In what order did you experience those images/awarenesses?
- How vivid was that image?

I paused or replayed portions of the session when necessary, in order to help the participant fully describe what was happening at a given moment. The interview portion of the sessions took between one-and-a-half and two hours to complete.

Data Analysis

Phenomenological Data

I transcribed each participant's phenomenological interview, and then according to the methodology described in Petitmengin-Peugot (1999) and Petitmengin (2006), I worked probe-by-probe, re-sequencing the participants' descriptions of their experiences into the order of internal events as they were experienced during the music and imagery session. This is because participants often recalled their experiences according to what was remembered at the moment of description during the interview, and often not in the same sequence in which the experiences occurred during the session. After I re-sequenced the data, as necessary, I checked with participants to verify that the re-sequencing matched their recollection of their music and imagery experiences.

I attempted to continue working with the Petitmengin (1999, 2006) models of creating PhCs, but found that these methods did not fit the type of data with which I was working in this study. The Petitmengin approaches focused on a singular experience (e.g., “How do you experience intuition?” in the 1999 source), whereas this study’s data concerned many different types of experiences occurring over time, with an ongoing thread connecting them. Further, given the type of data I would receive from the EEG analysis, creating complex phenomenological codes and categories would likely not be useful in interpreting differences in broad categories of brain data.

Therefore, I focused on analyzing each probe’s data according to a limited number of facets of experience that became apparent to me through the interviewing, transcribing, and re-sequencing phases of the process thus far. The coding form (Appendix E) contains all the codes used in this analysis. The main coding areas included: Type of Imagery Experience (body, visual, tactile, etc.), Imagery Vividness (the degree of richness and detail reported about the imagery, and whether the participant identified the image as being particularly vivid), Imagery Dynamics (how the imagery shifted, changed, or stayed the same during the probe), Music Awareness (the quality of awareness of the music as reported), Guiding Awareness (the quality of awareness of the guiding as reported), and Altered State Awareness (the quality of the altered state of consciousness during the probe, as reported).

As the coding form indicates, each probe image contained at least six coding areas associated with the EEG data for that probe, with varying numbers of categories contained under each coding area. Although the original analysis plan called for each image to be identified by the subjective data, these data proved to be very complex and would create too many PhCs to compare both within and across only 4 participants, making it impossible to identify any patterns of response. Whereas a pure neurophenomenological approach would require the categories of EEG analysis to be determined solely by the subjective data, it seemed this was not realistic to accomplish with these data and such a small sample size. Further, the expense of carrying out such a complex EEG analysis proved to be beyond the scope of this study.

A much more manageable EEG analysis approach, offered by data consultants hired for this study, was to utilize the initial imagery probe categories (Body, Visual, Kinesthetic, Interaction, Affect, and Memory) as the basis for the quantitative analysis. In order to remain true to the overarching principles of neurophenomenology, however, the qualitative coding data needed to be considered equivalent in value and function as the quantitative EEG data. As Thompson, et al. (2003), state:

> Neurophenomenology stresses the importance of gathering first-person data from phenomenologically trained subjects as a heuristic strategy for describing and quantifying the physiological processes relevant to consciousness. The general approach, at a methodological level, is (i) to obtain richer first-person data through disciplined phenomenological explorations of experience, and (ii) to use these original first-person data to uncover new third-person data about the physiological processes crucial for consciousness. Thus one central aim of neurophenomenology is to generate new data by incorporating refined and rigorous

> phenomenological explorations into the experimental protocols of neuroscientific research on consciousness…. The working hypothesis of neurophenomenology in an experimental context is that phenomenologically precise first-person data produced by employing first-person/second-person methods provide strong constraints on the analysis and interpretation of the physiological processes relevant to consciousness. (pp. 7-8)

Although, in this study, it would not have been possible for the first-person data to constrain the *analysis* of the EEG data, the first-person data would constrain the *interpretation* of the EEG data. The qualitative coding data would be used to explicate the EEG data, potentially uncovering “new third-person data” related to the subjective phenomena experienced in the music and imagery session. Therefore, although this approach is not a pure neurophenomenological one, it retains the integral nature of neurophenomenology’s purpose: To synthesize the subjective and objective data.

This new approach necessitated adding a seventh qualitative coding area: Congruence with Guiding. Thus, even though the EEG data would be analyzed according to an a priori probe category, the qualitative analysis would indicate whether the imagery as experienced generally matched that probe category. When the imagery and EEG data would be pulled together, it would be possible to interpret the EEG data even if the participant’s imagery did not match the sensory modality of the provided guiding.

EEG Data

For each EEG session, I marked each probe’s 10-second music-only segment for each of the 42 probes for each participant directly onto the EEG data using the laboratory’s software. I labeled each probe by its sensory category and then exported this data into a universal EEG data format for analysis by my data consultants. I asked the consultants to perform coherence analyses according to each of the six probe categories. *Coherence* "is the measure of the state in which two brain signals maintain a fixed phase relationship with each other or with a third signal that serves as a reference for each" (Buzsáki, 2006, p. 108). In other words, coherence occurs when the electrical rhythms (frequencies) of different areas of the brain synchronize. This synchronization indicates that these areas of the brain are in communication with each other, and identifying them can help identify not only which parts of the brain are active during a given task, but also the nature of the neural networks involved in that task.

An EEG data analysis service was hired to perform the coherence analyses for this study. A full technical description of the procedure they used to conduct the EEG coherence analysis can be found in Appendix F. In brief, the consultants used computer software first to filter the raw EEG data to eliminate electrical signals due to muscle movement or skin conduction, and also removed any EEG signal due to eye movements.

Then, the consultants divided each of the four participants' raw EEG data sets into seven conditions: six conditions according to the events marked on the data by guiding category (Affect, Body, Interaction, etc.), and an additional condition for each participant, the background comparison condition. This segment of EEG data was marked from the beginning of each session where participants were not following any guiding cues (participants had eyes closed, and were in a relaxed position), and served as a baseline condition for comparing the EEG data from the guiding conditions. Within each of these seven conditions, the consultants estimated coherence power spectral density. Power spectral density (PSD) describes how the power of a brain signal is distributed across the brain according to its frequency; in other words, how strong each frequency band is across different regions of the brain. These estimates were pooled into seven frequency bands conventionally used in EEG, as shown in Table 1.

Table 1.
Low and High Frequency Limits of Frequency Bands for Analysis of EEG Data

Band	Low (Hz)	High (Hz)
Delta	Near DC	4
Theta	4	8
Alpha	8	13
Beta 1	13	18
Beta 2	18	25
Gamma 1	25	35
Gamma 2	35	50

Using the PSD data, the consultants could perform calculations to determine coherence relationships among all the electrodes for each condition for each frequency. The data consultants compared each condition's average coherence for each frequency band to the background EEG condition obtained immediately prior to the start of the music and imagery script. They accomplished this by pooling together the EEG data for each participant's probe category and by examining the strength of coherence across all possible electrode pair combinations. The comparison with the background condition serves to validate that any coherence found in the data is related to the experimental condition, and is not due to a persistent brain state occurring in the participant outside of the music-imagery experience.

In order to present the PSD and coherence analysis results, the EEG consultants used the conventional 10-20 system of electrode coordinates to create a graphic representation of the brain (a topographic map) and any significant coherence connections. The PSD maps simply showed the strength of each frequency band for each guiding condition using color shading. In the coherence maps, for each electrode pair where the coherence analysis found a statistically significant relationship, the consultants drew a solid line between the relevant pair. Coherence analyses were done for each frequency band under each guiding condition, and then mapped. Thus the analysis resulted in a matrix of maps, one map for each probe category according to each of the seven frequency bands, for a total of 42 maps per participant. The consultants also pooled together all the participants' data by probe category and examined coherence relationships for all the data, resulting in another set of 42 maps ("Grand Average") for a cross-case analysis of coherence.

I took these coherence and power spectral data maps to another consultant who assisted in interpreting the significance of the coherence relationships for each condition and frequency. This consultant, an expert in EEG coherence, examined each participant's coherence data by frequency band (theta, alpha, beta, gamma) and described the meaning and practical significance of the mapped coherence relationships. This consultant also provided assistance when I came across EEG findings that seemed to contradict each other or the phenomenological data. The consultant's interpretation discarded the results from the delta frequency, as these results were not practically useful and were likely duplicated by the theta frequency results. The consultant also chose to interpret the subdivisions of both beta and gamma frequencies (that is, beta-1 and beta-2, gamma-1 and gamma-2) as single frequencies of beta and gamma; again, this was because the consultant felt the subdivision of these frequencies is also not practically useful. Therefore all the coherence results to follow will discuss only theta, alpha, beta, and gamma frequencies.

These frequencies have particular functions in the brain, which are described in basic terms in Table 2. For the purpose of his interpretation, the consultant generalized these, focusing on the core functions for each frequency, and only addressed such functions in the alpha, beta, and gamma frequencies. Thus, alpha functions were described simply in terms of relaxation and cortical idling, beta functions as ongoing attention and/or motor planning, and gamma as sharing information across the brain, making experiences coherent.

Table 2.
EEG Frequencies and Their Normal Function

Frequency	Normal function
Theta	Meditation (Cahn & Polich, 2006); memory (Klimesch, 1999) and attention (Aftanas & Golocheikine, 2001)
Alpha	Resting, relaxing; idling brain regions (Klimesch, Sauseng, & Hanslmayr 2007)
Beta	Short-term memory, ongoing, outward attention (Hammond, 2006; Egner & Guzelier, 2004); Motor planning **(**Pfurtscheller & Lopes da Silva, 1999)
Gamma	Binding sensory information; sensorimotor integration (Pfurtscheller & Lopes da Silva, 1999).

The consultant then identified several kinds of brain processes in the coherence maps according to what was detectible by the scalp EEG. These processes were limited to the functions associated with four of the five main brain regions: the frontal lobes, the temporal lobes, the central regions, and the occipital lobes. Figure 4 shows the locations of the EEG electrodes according to the 10-20 standard of electrode location, and Figure 5 shows the location of the major brain areas the electrodes are positioned to detect, except for the central region which is positioned between the frontal and parietal lobes. Table 3 describes, in broad terms, the brain functions associated with each of these major brain regions.

Table 3.
Major Brain Structures and Their Primary Processing Functions

Brain Structure	Function
Frontal lobes	Problem-solving, initiation, judgment
Central region	Motor planning
Temporal lobes	Left side: Language processing
	Right side: Memory retrieval and spatial processing
Parietal lobes	Sensory integration, visual integration (this region generally not discussed in coherence results in this study)
Occipital lobes	Visual processing

Note that some kinds of brain processes, such as emotional, auditory, or musical processing, are not associated with these major brain regions. The EEG is unable to detect these processes because of the size and/or location of the brain structures related to

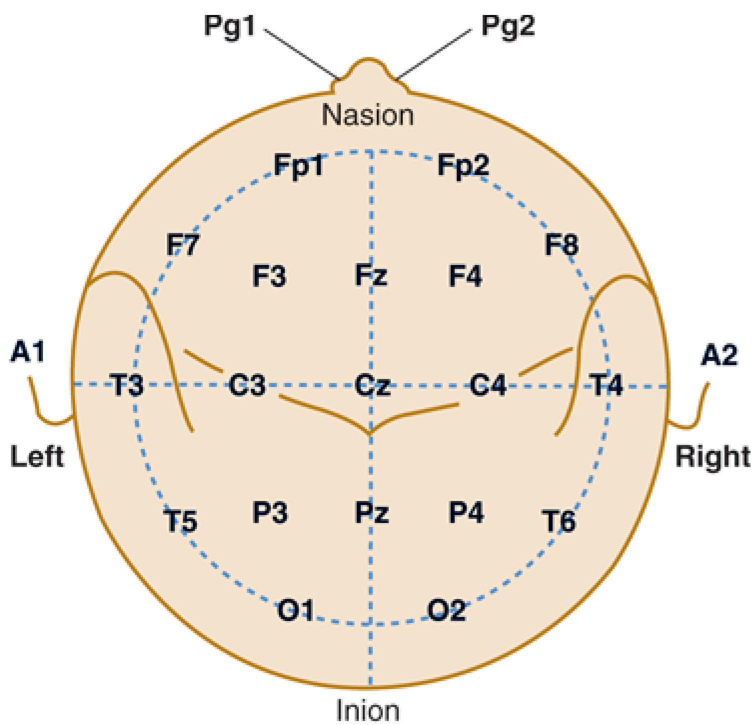

Figure 4. 10-20 Electrode Map. This diagram depicts locations for electrode placement in routine EEG recording, and all of which were used in this study. Letters correspond to regions of the brain and anatomical features: A, ear; C, central; Cz, central at zero, or midline; F, frontal; Fp, frontal pole; Fz, frontal at zero, or midline; O, occipital; P, parietal; Pg, nasopharyngeal; Pz, parietal at zero, or midline; T, temporal. In this study, additional electrodes T1 and T2 were placed on the left and right side of the head, respectively, between A1 and F7 and between A2 and F8. *Note:* From *Clinical Neuroanatomy, 26th Edition* (Figure 23-1), by S.G. Waxman, Columbus, OH: McGraw-Hill. Copyright 2010 by Grass Technologies, An Astro-Med, Inc. Subsidiary. Reprinted with permission.

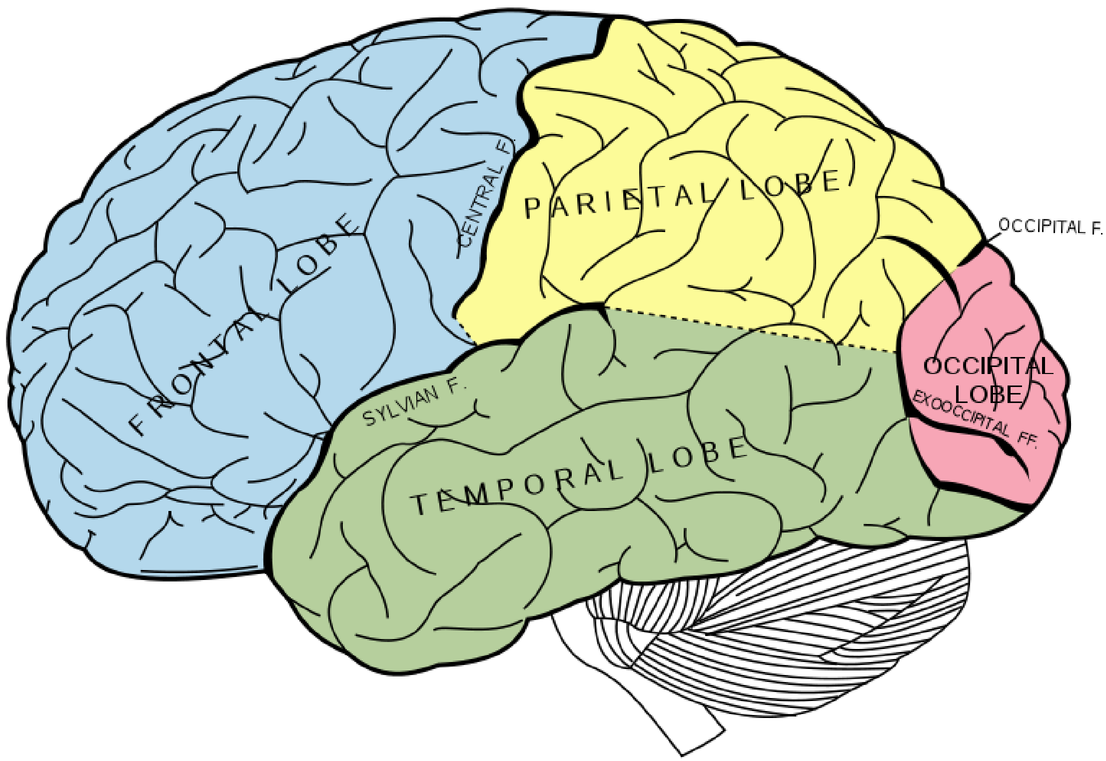

Figure 5. Principal fissures and lobes of the cerebrum viewed laterally. *Note:* Retrieved January 31, 2011 from http://commons.wikimedia.org/wiki/File:Gray728.svg. Based on the online edition of Gray's Anatomy, by Mysid [Public domain], via Wikimedia Commons. Reprinted with permission.

these functions. In the case of emotional processing, the relevant brain structures primarily responsible for emotions are located below the surface regions of the brain, in the limbic system. However, recent research has shown the involvement of the insula which is located at the boundary of the frontal and temporal lobes, and this structure has recently been implicated in emotional processing (Harrison, Gray, Gianaros, & Critchley, 2010). Thus the insula might appear in EEG results in this study, which could indicate emotional processing, though not definitively. Conversely, if the insula does not seem to be active in the EEG data, this does not exclude the possibility of emotional processing. Whereas auditory processing is located in a subsection of the temporal lobe, there are too few electrodes to pick up such localized brain activity in this study. Musical processing involves many different brain structures (Petsche, et al., 1987), so EEG is unable to definitively identify such processing in these results. Therefore, while the participants often reported these kinds of imagery (as well as others), in the following results chapters I will only discuss the types of brain processing relevant to the brain structures listed in Table 3.

Finally, I also worked with the consulting neurologist and a neurology resident at the EEG lab to identify the alertness states of each participant for each probe in order to determine, clinically, what was occurring in the brain throughout each session. Looking at each participant's EEG data for each probe, the neurologists identified where relaxed-alert, drowsy, and sleep states occurred, and I added these data to the other EEG data for each probe for further analysis in conjunction with the phenomenological data.

Within- and Cross-Case Interpretation of Analyses

After assigning pseudonyms to each participant, I began the within-case integration of the EEG and phenomenological data by first grouping each participant's probes according to the probe categories, for example, all the Visual probes together, all the Affect probes together, and so forth. Next, I created a large table where I summarized the EEG coherence data according to each guiding condition and frequency band. I then created a table for each condition summarizing the phenomenological data. Using the two tables, I first outlined the significant findings of the phenomenological data and then the EEG data for each condition. Then I integrated the EEG and phenomenological data for each condition, checking each kind of data against the other for consistencies and inconsistencies.

In order to make an accurate comparison with the different kinds of data, I usually went back to the raw phenomenological data for each probe in order to be sure I accounted for all the imagery experiences the participants reported and the kinds of processing implicated by the EEG. If the EEG data did not match the phenomenological data, or vice-versa, I sought to provide an explanation whenever possible.

Further, I examined each condition's alertness data for each category, finding patterns within the self-reports of alertness and the EEG data regarding alertness and looking to see where alertness patterns coincided or differed with the phenomenological data for that guiding category. I summarized the integration of these data and looked for relationships between general alertness states and each participant's overall imagery experience as he/she summarized it during the interview. This information is also contained in each participant's results chapter.

Once this process was completed for each individual's data, I then pooled all the data together and repeated the integrative analysis across all participants. This consisted of comparing EEG data across participants, then comparing phenomenological data across participants, then integrating the data in the same fashion as for the individual cases. The final section of the cross-case chapter examines each guiding condition's data across participants, highlighting consistencies and inconsistencies among the data.

CHAPTER 6

LINDA: RESULTS AND DISCUSSION

Introduction

At the time of this session, Linda reported that it had been seven years since her last GIM session, which was preceded by a continuous series of at least 50 sessions. Given the number of personal sessions she had undergone, along with some training to be a GIM therapist, Linda was quite experienced in GIM. In the present session, Linda revisited familiar imagery from her work during her previous series of sessions, and reported that she had advanced in her ability to experience this imagery more directly. Additionally, Linda felt she experienced more variety of imagery during this session than she typically had in past GIM work, and at times she experienced kinds of imagery that she had only encountered once or twice before. At the same time, she felt that, during this session, she had traveled in her usual manner for the most part, by mainly experiencing visual imagery. For reference, Linda's EEG maps are located in Appendix G, Figure 6.

Affect Condition

Phenomenological Data

Table 4 summarizes Linda's responses to the Affect condition, including the imagery she experienced for each probe, its congruence with the guiding condition, the qualitative coding of the imagery as well as Linda's reports on her alertness. Linda's imagery was congruent with the affective guiding for only two out of the eight probes, and these probes also contained awareness of the music, words used in the guiding, and her body sensations. For the remaining six probes that were not congruent with the

Table 4.
Affect Condition: Linda's Phenomenological Data

Probe #	Affect condition guiding direction	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
17	Be aware of how it feels to be inside the house—notice any emotions you might have being there…	Aware of mood of music upon hearing guiding word "emotions"; but not aware of any specific feelings	Yes; music, language	Stable, Music-influenced image Selectively responsive to guiding
20	Open yourself to any emotions or reactions you might have at this time…	Strong sense of smell of scene	No; olfactory	Particularly vivid, Stable image
23	As you relive the memory, open to your emotions about the experience and the person. Allow yourself to feel these emotions…	Uncomfortable feeling, body reactions to feeling in response to guiding to feel emotions	Yes; body, language	Stable image Selective response to guiding

Table 4. (continued)

Probe #	Affect condition guiding direction	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
27	Take some time now to be aware of your feelings about the person after this exchange…	No recall of imagery, but oboe line in music felt familiar	No; music	Difficulty recalling Music-influenced image
33	Become aware of any emotions or reactions you may have about being in the room with this object	Standing with object from previous probe, but otherwise no recall of change in imagery, guiding cues not familiar	No; visual	Difficulty recalling Stable imagery Disconnected from guiding
34	Stay with those feelings for a little while.	No change from previous probe	No; visual	Difficulty recalling Stable imagery

Table 4. (continued)

Probe #	Affect condition guiding direction	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
37	Be aware of any feelings you have now.	Repetitive rocking with object; uncertain if she heard guiding; felt detached from imagery	No; kinesthetic	Difficulty recalling Stable imagery Disconnected from guiding
40	Be aware of your emotions while you shut the door behind you, and leave that place.	Left house, but no recall about shutting door or about emotions	No; visual	Difficulty recalling Stable imagery Disconnected from guiding

guiding, Linda often experienced visual images (three probes), while experiencing single instances of olfactory, kinesthetic, and music awareness. Further, during the interview, Linda had difficulty recalling the imagery for five of the six incongruent probes, often saying during the replay of the session that the guiding cues were unfamiliar and/or the imagery did not seem to change in response to these cues. However, she was aware of the music for two out of the eight probes. One image was particularly vivid, but involved an olfactory sensation, and was not congruent with the guiding. When Linda could recall her imagery (seven of the eight probes), all of these images were stable in nature.

EEG Data

When Linda was guided toward an affective imagery experience, a review of her raw EEG data showed that she was awake for all of the probes in this condition.

The EEG coherence analysis revealed significant connections in the theta frequency, implicating language, spatial awareness/memory retrieval, and visual processes. Essentially, this means that when Linda was guided to have an emotional experience, her imagery required visual, language, and either spatial planning or memory retrieval processes in the brain.

The EEG coherence analysis also revealed significant connections in the gamma frequency between the visual and language centers of Linda's brain. This means that during the Affect condition, Linda's brain shared visual and language information in order to make her imagery coherent.

Integration of EEG and Phenomenological Data

In terms of alertness, the raw EEG data indicated that Linda was awake for all eight Affect condition probes; Linda made no comments about her alertness, but had difficulty recalling five of the eight images during this condition. Thus it seems that Linda's difficulty recalling these five images was related to poor focus rather than drowsiness.

Linda frequently reported visual imagery during this condition; such imagery was implicated in the theta coherence. Thus the EEG coherence reflects Linda's visual imagery.

Linda's language-based imagery in one probe was also reflected by the theta coherence due to its connection to the language centers of Linda's brain.

Linda reported emotional images in two out of eight probes, which might be reflected in the EEG coherence by a few connections between the frontal and temporal lobes, implicating the insula, in both the theta and beta maps. Thus the EEG may be reflecting Linda's reports of emotional imagery during this condition.

The kinesthetic imagery Linda reported in one image does not appear to be reflected by any of the EEG coherence patterns. Given this was a single image out of eight, it may not have generated enough brain activity in the motor-planning regions of Linda's brain to register any coherence.

The EEG coherence patterns implicated memory retrieval and/or spatial processing in the theta frequency, but Linda did not explicitly report any imagery which could involve such processing. Probe #s 23, 33, and 37 might have involved memories, as Linda was reacting to memories or objects from her past in these images. None of the images in this condition lend themselves to the possibility of spatial processing. Thus, if Linda's imagery did generate the significant coherence to the region responsible for memory retrieval/spatial processing, it probably did so through the three probes where memories may have been under-reported.

Also, the gamma coherence showed that the visual and language centers of Linda’s brain shared information during this condition; given that Linda reported language and visual imagery for at least half the condition’s probes, these functions were significant during the Affect condition, and thus it makes sense that she would make sense of her imagery through visual and language processing.

Therefore, when Linda was guided toward an affective imagery experience, the EEG and phenomenological data were consistent with regard to her lack of drowsiness. The data were also consistent with regard to her visual and language imagery, which were both reflected in the theta coherence. EEG and self-report were also consistent in terms of the significant gamma coherence, which showed visual and language areas sharing information, brain activity that is congruent with the amount of visual and language imagery Linda reported during this condition. The data were also possibly consistent regarding Linda’s reports of affective imagery; because of the theta and beta connections across the location of insula, such brain activity might indicate emotional processing.

The EEG and phenomenological data were inconsistent with regard to Linda’s kinesthetic image without any corresponding EEG coherence. This may have occurred due to the single instance of kinesthetic imagery, which may not have generated sufficient brain activity to create any coherence. The data were also inconsistent regarding the theta coherence’s implication of memory retrieval or spatial processing, without any reports of either kind of imagery. This lack of coherence may be due to Linda not fully reporting about her memories during this condition.

Body Condition

Phenomenological Data

Table 5 summarizes Linda's phenomenological data for the Body condition. This condition contained 14 total probes, nine of which occurred during the induction and involved simultaneous guiding for visual imagery. The remaining five probes (#s 14-42) occurred during the narrative portion of the session. Linda's imagery was congruent with the guiding for six of the 14 probes, and most of these images combined body imagery with visual imagery (four out of six congruent probes), cognitive responses (three out of six probes), and language-based responses (two out of six probes). The eight probes out of the total 14 that were not congruent with the guiding contained visual imagery in all eight probes, and cognitive reactions and spatial imagery in one probe each. None of the images were particularly vivid. Linda reported being fully responsive to the guiding in three of the 14 images, whereas she was selectively responsive to the guiding in one of the 14 images, and disconnected from the guiding in four of the 14 images. She did not comment on the influence of the music for any of the probes. In terms of imagery dynamics, Linda's imagery varied greatly; out of the 14 probes, nine were stable, two were shifting, two were expanding, and one was contracting. Finally, Linda commented that she was asleep in one of the 14 probes, and "out" of the ASC for the final probe (#42).

Table 5.
Body Condition: Linda's Phenomenological Data

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
1	Take a long, deep breath. Slowly take in as much as you can… and let it out. Slowly breathing in…. and out…[…]	Breathing deeply, body relaxing, aware of chair	Yes	Stable image
3	Now imagine the ball of light moving to the top of your head….and then down, around and through your head. […]	Visual sensation of colors, ball of light; see ball above head, see self from outside; felt as if going to sleep	No; visual	Shifting image Disconnected from guiding Asleep
4	Now imagine the ball of light moving around and through your neck and shoulders. […]	See self from outside, see ball moving; then disconnected from image, and then trying to reconnect by coaching self, not seeing anything	No; visual, cognitive	Expanding image Selective response to guiding

Table 5. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
5	…one ball for your right arm and hand, and one ball for your left arm and hand… […]	Very relaxed; see ball of light moving around body; focusing on relaxing forehead, coaching self to relax	Yes; visual, cognitive	Stable image
6	….imagine the ball moving around and through your torso and back… […]	Unable to sense right arm; left arm glowing and relaxing; questioning image	Yes; visual, cognitive	Stable image
7	Now the ball moves to your hips and waist... […]	See self from outside, see glowing in torso and back, no body sensation	No; visual	Shifting image Disconnected from guiding
8	Now the ball moves to your hips and waist.[…]	Reaction to sound of words used in guiding; twitching in limbs while trying to see ball around hips and waist	Yes; cognitive, language, visual	Stable image

Table 5. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
9	Now let the ball move down to your lower legs and feet… […]	See self from outside, ball of light	No; visual	Stable image Disconnected from guiding
10	Now move the ball of light wherever you need it to go … […]	Noticing back fatigue; moved ball of light to back, noticed back's reaction; ball of light still by feet	Yes	Contracting image Fully responsive to guiding
14	[…] Notice the door handle… and surface of the door. Reach out and touch the surface---what it feels like; its temperature, its texture, its size.	Try to sense temperature of door; tactile, visual sense of door	Yes; visual, tactile	Stable image Fully responsive to guiding

Table 5. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
18	[…]… slowly move around the room…noticing any sensations your body may have… […]	Imagery only on right side of body; visual image of room, objects; difficult to see details	No; spatial, visual	Stable image
35	If you wish, touch or hold the object….and bring into awareness how it feels…	Standing next to object, but no recall of physical or other awareness	No; visual	Stable image Disconnected from guiding
41	[…] return now to the path where you first began...[…] notice how your feet feel being back on the ground… […]	Blank white at end of path; sensation of body rising, then on ground when guiding said, "feel your feet on the ground"; then floated again, saw self from above	Yes; visual, language	Expanding image Fully responsive to guiding

Table 5. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
42	[…] Let the image fade while gradually allowing your awareness to return to your body…	Immediately stopped imaging; out of ASC; aware of body in chair, noises from hallway	Yes	Stable image Fully responsive to guiding “Out” of ASC

EEG Data

When Linda was guided toward a body imagery experience, a review of her raw EEG data showed that she was awake for all of the probes in this condition.

The EEG coherence analysis indicated significant connections in the theta frequency among Linda’s language, spatial/memory retrieval, and visual regions. Just as in the Affect condition, this meant that when Linda was guided to have a body-based image, her brain required visual, language, and either spatial planning or memory retrieval processes in the brain.

The EEG coherence analysis also indicated significant connections in the gamma frequency involving the visual and language centers of Linda’s brain. Thus, when Linda was guided to have a body-based image, her brain shared information between the visual and language centers in order to make the imagery coherent.

Integration of EEG and Phenomenological Data

With regard to alertness, the raw EEG data indicated that Linda was alert for all 14 probes of the Body condition, though Linda reported that she felt she was falling asleep in one probe. She also reported being "out" of the ASC in the final probe, which matched her alert brain state. Linda also stated she felt disconnected from the guiding in four of the 14 probes, and one of these four was the probe where she felt she was falling asleep. Because her brain state showed alertness throughout this condition, it appears that lack of focus, rather than drowsiness, contributed to her sense of sleepiness and disconnection from the guiding in all these instances.

The most common imagery that Linda reported during the Body condition was visual imagery; this imagery was implicated in the theta coherence, thus reflecting Linda's reports.

Linda reported a couple instances of language-based images; such brain processing was implicated in the theta coherence. Accordingly, language imagery was reflected in the EEG coherence data.

Linda also frequently reported having cognitive reactions to the imagery, but there were no corresponding coherence connections to the frontal lobe, the region responsible for decision-making and planning. Given the frequency of Linda's reports of cognition during this condition, it is surprising that there was not enough related brain activity to be reflected in the frontal lobe. Interestingly, whereas the EEG consultant did not regard the beta coherence for this condition to be significant enough to discuss, both of the beta coherence maps show several connections to the frontal lobes, which may reflect cognitive imagery.

Linda reported having one image with spatial awareness, which was implicated by the theta coherence. This region of the brain (right temporal lobe) is responsible for both spatial processing and memory retrieval; however Linda did not describe any images with memories. Thus, it appears that the spatial imagery alone was responsible for the theta coherence.

Linda also frequently reported having body-based images and one instance of tactile imagery, but as this imagery did not involve motor planning but rather body sensations and awareness, the EEG would not be able to identify such brain processes, again because the relevant structures are not detectible via scalp EEG. Therefore there is no EEG information to relate to Linda's body imagery.

The gamma coherence also showed that, when Linda was guided to have body-based imagery, her brain shared information between the visual and language centers in order to make the imagery coherent. Given the prevalence of visual and language imagery during this condition, the gamma coherence fits with Linda's reported experiences.

Therefore, when Linda was guided toward a body imagery experience, the EEG and phenomenological data were consistent with regard to the theta coherence reflecting her visual, language, and spatial imagery. They were also consistent with regard to the visual and language connections in the gamma coherence, which align with the prevalence of visual and language imagery during this condition. The EEG and phenomenological data were inconsistent with regard to Linda's perception of being asleep, whereas raw EEG data indicated she was awake during one probe. This inconsistency suggests that Linda's perception may have been due to lack of focus rather than to drowsiness. The data were also inconsistent with regard to the lack of EEG data related to cognitive imagery reported during the Body condition; however the beta coherence may have detected the relevant frontal lobe activity, just not to a significant degree.

Interaction Condition

Phenomenological Data

Table 6 summarizes Linda's responses to the guiding in the Interaction condition. Out of these seven probes, five were congruent with the guiding. These five probes contained visual, body, language, cognitive, music/auditory, and emotional imagery, with cognitive imagery being the most common (four out of the five congruent probes). The two probes (out of seven) containing imagery not congruent with the guiding involved music/auditory, emotional, and body imagery. None of the images were particularly vivid. Linda reported that she selectively responded to the guiding during three of the seven probes, whereas she fully responded to the guiding during one of the seven probes. She also stated that the music influenced her imagery during three of the seven probes. Most of the images were stable in nature (four of seven probes), however, this condition also contained contracting imagery (one of seven probes), expanding imagery (one of seven probes), and shifting imagery (one image). Linda did not report on her alertness or ASC during this condition.

EEG Data

When Linda was guided to have interactive images, a review of her raw EEG data showed that she was awake for all of the probes in this condition.

Table 6.
Interaction Condition: Linda's Phenomenological Data

Probe #	Interaction condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. Codes
10	Now move the ball of light wherever you need it to go to relax any part of your body…[…]	Noticing back fatigue, sent ball of light to back	Yes; visual, body	Contracting image Fully responsive to guiding
24	If the person has something to say, listen to it; really open to what the person is saying to you.	Disbelief at how person speaks, trying to change person's words	Yes; language, cognitive	Stable image Selectively responsive to guiding
25	If you have something to say back, take time now to say it. Speak freely to the person.	Music distracting from thoughts/imagery; responded to person, but music drowned this out	Yes; music/auditory, cognitive, language	Expanding, Music-influenced image

Table 6. (continued)

Probe #	Interaction condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. Codes
26	Listen to what the person has to say in response, and say anything else you need to say.	Music overwhelming image, could not hear person; emotional reaction to person	No; music/auditory, emotional	Stable, Music-influenced image
28	Begin to draw this interaction to a close. Say goodbye to the person and prepare to move into another room of the house.	Left scene, no goodbye with person. Body heavy, imagery slowing down, matching music	No; music, body	Stable, Music-influenced image
36	If there is something you would like to do with this object, take time now to do what you need to do	Interact with image, emotional and cognitive response to guiding	Yes; emotional, cognitive	Shifting image Selectively responsive to guiding

Table 6. (continued)

Probe #	Interaction condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. Codes
38	If you wish, you can leave the object wherever it needs to be, saying goodbye to it… or taking it with you.	Decided to not keep object, left object without goodbye	Yes; cognitive	Stable image Selective response to guiding

The EEG coherence analysis showed significant connections in the theta frequency among language, spatial/memory retrieval, and visual regions of Linda's brain. Just as in the Affect and Body conditions, this meant that when Linda was guided to have an interactive image, her brain required visual, language, and either spatial planning or memory retrieval processes.

The EEG coherence analysis also found significant connections in the beta frequency among the language and spatial/memory retrieval regions of Linda's brain, as well as with decision-making regions. Therefore, in addition to the implications made by the theta coherence, when Linda was guided to have an interactive image, her brain also utilized decision-making processes.

Finally, the EEG coherence analysis found significant connections in the gamma frequency between the visual and language centers of Linda's brain. As seen in the Affect and Body conditions, this meant that when Linda was guided to have an interactive image, the visual and language centers shared information in order to make the imagery coherent.

Integration of EEG and Phenomenological Data

In terms of alertness, the awake brain state for all seven probes aligns with the lack of any reports of drowsiness or ASC, as well as with Linda's consistent recall of the imagery and attentiveness to the guiding throughout the Interaction condition.

Linda described one visual image during this condition, and visual processing was implicated by the theta coherence. Therefore the visual imagery was reflected by the EEG data.

Linda also reported a single instance of language-based imagery, which was implicated by both the theta and beta coherence. Thus the language-based image was also reflected by the EEG data.

Linda's reports of her cognitive reactions were implicated by the beta coherence, therefore cognitive reactions were reflected by the EEG data.

Linda also reported a couple instances of emotional imagery; whereas such processing is difficult to detect via EEG, some frontal and temporal connections occurred in the theta and beta coherence, and these connections might implicate the insula, a brain region involved in emotional processing. Thus Linda's affective imagery might be reflected by the EEG data.

The beta and theta coherence implicated spatial processing and/or memory retrieval, but Linda did not report any spatial or memory imagery during the Interaction condition. A few probes (#s 24, 26, 36, and 38) might have involved memories, because they refer to a person or object familiar to Linda. If Linda experienced memories but did not report them, then such images would account for these coherence results. Otherwise, there does not appear to be any imagery that could possibly relate to spatial processing, and thus no other explanation for the presence of such coherence patterns to the region responsible for spatial processing/memory retrieval.

The gamma coherence shows that the visual and language centers of Linda's brain shared information during the Interaction condition to make the imagery coherent. This coherence pattern fits with the prevalence of visual and language imagery during the Interaction condition.

Therefore, when Linda was guided to have interactive imagery, the EEG and phenomenological data were consistent with regard to Linda's alertness, and with regard to the theta coherence reflecting her visual imagery. The data were also consistent regarding both the theta and beta coherence, reflecting Linda's reports of language-based imagery and possibly her affective imagery. The beta coherence was also consistent with Linda's reports of cognitive imagery, whereas the gamma coherence was consistent with the prevalence of visual and language-based images during this condition.

The EEG and phenomenological data were inconsistent with regard to the beta and theta coherence implicating spatial processing and/or memory retrieval, as Linda reported neither kind of imagery over the entire condition. Linda may have underreported her reliance on memory for her imagery, which could account for the EEG coherence to the relevant brain region.

Kinesthetic Condition

Phenomenological Data

Table 7 summarizes the phenomenological data for Linda's imagery during the Kinesthetic condition. Two out of the three probes contained imagery congruent with the guiding; in addition to the kinesthetic imagery Linda reported during these probes, other imagery included music awareness (probe #12) and visual imagery (probe #39). The one probe out of the three that was not congruent with the guiding contained visual imagery alone. One of the two congruent probes contained particularly vivid imagery; this probe was also influenced by the music, and Linda reported that she was fully responsive to the guiding while imaging. Linda did not otherwise report on her response to the guiding or the influence of the music on her imagery during this condition. Two of the three images were stable in nature, and the remaining image shifted from one imagery type to another during the probe. Finally, Linda did not report on her alertness or ASC during this condition.

EEG Data

When Linda was guided toward a kinesthetic imagery experience, a review of her raw EEG data showed that she was awake for all of the probes in this condition.

The EEG coherence analysis showed significant connections in the theta frequency, implicating language, spatial/memory retrieval, visual, and motor processing. Thus, when Linda was guided to have kinesthetic imagery, her brain required language, visual, motor, and either spatial or memory retrieval functions.

Table 7.
Kinesthetic Condition: Linda's Phenomenological Data

Probe #	Kinesthetic condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
12	Now feel yourself walking along the path toward the house. Notice how your feet feel as they take each step… […]	Strong walking sensation in legs, but upper body sluggish; walking with pace of music	Yes; music	Particularly vivid, Stable, Music-influenced image Fully responsive to guiding
15	Now imagine opening the door…feel the weight of the door as you open it…[…]	Door opened, but only visual awareness of this; see inside house, vague details	No; visual	Stable image
39	[…] You can walk out of the room, and out of the house… notice how your body feels as you walk…	Body heavy but only visual sense of moving out of house	Yes; visual, spatial	Shifting image

The EEG coherence analysis also indicated significant connections in the gamma frequency, which showed visual and language centers of Linda's brain shared information when Linda was guided to have kinesthetic imagery.

Integration of EEG and Phenomenological Data

With regard to alertness, the alert brain state for all three probes matches the lack of any reports of drowsiness or ASC, as well as Linda's consistent recall of the imagery and responsiveness to the guiding.

Linda reported kinesthetic imagery in two of the three probes, which was implicated by the theta coherence involving the central regions of her brain. Thus the EEG data reflected Linda's motor imagery.

Linda also described experiencing visual imagery in two of the three probes, which was also implicated by the theta coherence, which connected with the visual cortex. Therefore the EEG data also reflect Linda's visual imagery.

Linda's imagery involving spatial perception in one probe was also implicated by the theta coherence with the right temporal lobe. This brain region is also responsible for memory retrieval; however, because Linda did not report any memories during this condition, it appears that the spatial imagery is the reason for this theta connection.

The gamma coherence shows that the visual and language centers of Linda's brain shared information during the Interaction condition to make the imagery coherent. Whereas Linda's reports and the EEG coherence reflected visual imagery during this condition, there are neither reports nor EEG data reflecting any language-based imagery. Because the gamma coherence focuses on only these two regions of the brain, it seems that language must have played a role in making Linda's imagery coherent during the

Kinesthetic condition, especially given that language processing has been implicated and reported in nearly every other condition. Perhaps Linda did not fully describe how language figured in this imagery, or she used language processing without her full awareness.

Therefore, when Linda was guided toward a kinesthetic imagery experience, the EEG and phenomenological data were consistent with regard to Linda's alertness, and with regard to most of her reported imagery (kinesthetic, visual, spatial), which were all implicated by the theta coherence. The EEG and phenomenological data were inconsistent regarding the gamma coherence's implication of language processes when Linda did not report any language-based imagery, nor did the other frequencies implicate language processing. It seems reasonable that Linda either under-reported or was not fully aware of her language-based imagery during this condition because language has been reported and reflected in the EEG data for nearly all the other conditions.

Memory Condition

Phenomenological Data

Table 8 summarizes the imagery responses to the Memory condition's probes. All three images were congruent with the guiding cues to experience memories; two of the three involved visual imagery (#s 22 and 31), whereas two probes contained emotional responses (#s 22 and 32). One probe contained cognitive reactions to the imagery (#31), which led to a particularly vivid emotional reaction. Another probe contained a reaction to words in the guiding (#32). Linda reported being fully responsive to the imagery during one probe (#32), whereas another probe was influenced by the music (#31). Two of the three probes shifted from one imagery type to another (#s 31 and 32), whereas one

Table 8.
Memory Condition: Linda's Phenomenological Data

Probe #	Memory condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
22	Allow yourself to go back and remember a pleasant time with this person…Let your memory open up, and fully remember it.	Visual memory of scene with person; emotional reaction to memory	Yes; visual, emotional	Expanding image
31	Open to any memories you have about the object, or about anything or anyone the object reminds you of… […]	Awareness of music's mood; memory of object and house from past; cognitive reaction to image	Yes; visual, cognitive	Shifting, Music-influenced image
32	[…] now you are in a room from your past… Be aware of whatever is familiar to you in this place from the past.	Panicked reaction to guiding to see room from past, image already in past; coaching self to relax and return to image	Yes; emotional, language	Particularly vivid Shifting image Fully responsive to guiding

probe expanded from one imagery type into multiple types (#22). Linda did not report on her alertness or ASC for any of these probes.

EEG Data

When Linda was guided toward imagery involving memories, a review of her raw EEG data showed that Linda was awake for all of the probes in this condition.

The EEG coherence analysis for the Memory condition indicated significant connections only in the theta frequency, implicating language, spatial/memory retrieval, visual, and motor processes. This meant that, when Linda was guided to have imagery involving memories, her brain required language, visual, motor, and either spatial or memory retrieval functions.

Integration of EEG and Phenomenological Data

With regard to alertness, the awake brain state for all three probes matches with the lack of any reports of drowsiness, as well as with Linda's consistent recall of the imagery and responsiveness to the guiding.

Linda reported experiencing memories in her images for all three probes in this condition. Memory retrieval was implicated in the theta coherence, thus the EEG data reflected Linda's memories.

Linda also reported having visual imagery in two of the three probes; such processing was also implicated in the theta coherence, and accordingly the EEG data aligned with Linda's visual imagery.

During one probe, Linda reported having a language-based image in response to the guiding; such processing was also implicated by the theta coherence, thus the EEG also reflected Linda's language-based image.

However, though Linda described affective imagery in two probes, there is no indication of the involvement of the insula in the coherence results. Therefore, the EEG data cannot add any more information to Linda's reports of emotional imagery for this condition.

Linda also described having cognitive reactions to the imagery during one probe, but none of the coherence patterns connected with the regions responsible for planning or decision-making (the frontal lobes). Therefore the EEG data do not align with Linda's cognitive images during the Memory condition. There does not seem to be a clear explanation for why this occurred.

The theta coherence also implicated motor processing, but Linda did not report having any kinesthetic imagery during this condition. Consequently the EEG data and Linda's reports do not match in this case. None of the imagery seems to lend itself to any under-reported motor imagery, so this inconsistency is puzzling.

Therefore, when Linda was guided to experience memories, the EEG and phenomenological data were consistent with regard to Linda's alertness, as well as the theta coherence's reflection of Linda's memories and visual and language-based imagery.

The EEG and phenomenological data during the Memory condition were inconsistent with regard to Linda's reports of cognitive imagery, which was not reflected in the theta coherence, and the theta coherence implicating motor processing, which Linda did not report experiencing. There is no clear explanation for the lack of coherence related to Linda's reports of cognitive processing, nor for the lack of motor imagery despite the EEG implication of motor processing. However, given the proximity of the central brain region to the frontal lobes, it may be that the EEG is actually detecting frontal lobe activity rather than central activity, which would explain both of these inconsistencies by providing coherence for Linda's reports of cognitive processing, and by doing away with EEG activity that does not match any of the imagery reports.

Visual Condition

Phenomenological Data

Table 9 summarizes Linda's responses to the Visual condition's guiding. This condition contained 16 total probes, the first nine during the induction (eight of these combining both body and visual guiding cues), and the remaining seven probes during the narrative portion of the session. When guided to have a visual image, Linda responded with congruent imagery for 15 out of the 16 probes. Many of these probes involved additional imagery including cognitive reactions (five out of 15 probes), body/tactile sensations (three out of 15 probes), spatial awareness (four out of 15 probes), and language-based images (three out of 15 probes). One of the 16 images was particularly vivid (#11). Linda reported fully responding to the guiding during five of the 16 probes, selectively responding to the guiding during one of the 16 probes, and feeling disconnected from the guiding during three of the 16 probes. Most of the images were stable in nature (11/16), whereas three of the 16 images shifted from one modality to another, one out of 16 images expanded into multiple modalities, and one out of 16 images contracted in number of imagery modalities. Finally, Linda did not report on her alertness or ASC for any of the probes during the Visual condition.

Table 9.
Visual Condition: Linda's Phenomenological Data

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
2	Now imagine a ball of light forming in the darkness... […]	Visual sensation of colors, ball of light; see ball above head, see self from outside	Yes	Stable image Fully responsive from guiding
3	[…] and as the light moves, imagine that all of your head begins to glow… […]	See self from outside, see ball moving; then disconnected from image, and then trying to reconnect by coaching self, not seeing anything	Yes; cognitive	Shifting image Disconnected from guiding Asleep
4	[…]Neck and shoulders glowing in the light…[…]	Very relaxed; see ball of light moving around body; focusing on relaxing forehead, coaching self to relax	Yes; cognitive	Expanding image Selective response to guiding
5	[…] and as the lights move, your arms and hands begin to glow…	Unable to sense right arm; left arm glowing and relaxing; questioning image	Yes; cognitive	Stable image

Table 9. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
6	[…]as it moves around and through your torso and back, they begin to glow…	See self from outside, see glowing in torso and back, no body sensation	Yes	Stable image
7	[…] As it moves, your hips and waist begin to glow… […]	Reaction to sound of words used in guiding; twitching in limbs while trying to see ball around hips and waist	Yes; cognitive, body, language	Shifting image Disconnected from guiding
8	[…]Upper legs and knees glowing in the light […]	See self from outside, ball of light	Yes	Stable image
9	[…]lower legs and feet glowing in the light, feeling more and more relaxed.	Noticing back fatigue	No; body	Stable image; disconnected from guiding

Table 9. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
10	[…]…notice that wherever you move the light, your body begins to glow…[…]	Moved ball of light to back, noticed back's reaction; ball of light still by feet	Yes; body	Contracting image Fully responsive to guiding
11	[…] Look around you and see what surrounds the house, the colors and shapes and features of the landscape. […]	Vivid visual details of house, moving toward house then pausing in response to guiding	Yes; spatial, language	Particularly vivid, Stable image Fully responsive to guiding
13	[…]take in everything you see, the roof, the windows, the outside walls….[…]	Touching door in response to "notice the texture"; visual details of house; awareness of closeness to house	Yes; tactile, spatial, language	Stable image Fully responsive to guiding

Table 9. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
16	[…] ….Notice the lay-out of rooms…the light…the space…and the things around you.	Visual sense of room, but difficulty seeing details	Yes	Stable image
19	[…]…and notice any objects in the room that draw your attention…Look at it closely. […]	Visual details of feature of room; picked up an object, but only visual sense of this	Yes	Stable image
21	[…] Take time to notice the person's face and appearance…[…]	Moments of uncertainly about what to image; visual image of room, significant person; spatial sense of location of objects and self	Yes; cognitive, spatial	Shifting image Fully responsive to guiding

Table 9. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
29	As you enter the next room, look around and take in everything you see.	Visual details of room, object, spatial awareness of self and object in room	Yes; spatial	Stable image
30	[…]….take some time to look closely at [an object]…[…]	Visual details of familiar object	Yes	Stable image

EEG Data

When Linda was guided toward a visual imagery experience, a review of her raw EEG data showed that she was awake for all of the probes in this condition.

The EEG coherence analysis showed significant connections in the theta frequency, implicating language, spatial/memory retrieval, cognitive, and visual brain processes. As seen in the Affect, Interaction, and Body conditions, this means that when Linda was guided to have visual imagery, her brain utilized language, visual, cognitive, and either spatial or memory retrieval functions.

The EEG coherence analysis also found significant connections in the beta frequency, implicating language and cognitive processing as well as spatial processing and/or memory retrieval. This coherence pattern reinforces the theta frequency connections with the language and spatial/memory retrieval areas of Linda's brain during the Visual condition.

Finally, the EEG coherence analysis also found significant connections in the gamma frequency, indicating that Linda's brain shared information between the visual and language centers of her brain during the Visual condition.

Integration of EEG and Phenomenological Data

In terms of alertness, the raw EEG indicated that Linda was awake for all 16 probes, though she reported feeling asleep and disconnected from the guiding during one probe (the same induction probe discussed in the Body condition). She also felt disconnected from the guiding for an additional two probes (out of the 16). Given that Linda's brain showed it was alert throughout this condition, it seems that lack of focus, rather than drowsiness, contributed to her perception of sleepiness and disconnection from the guiding during the Visual condition.

Linda reported experiencing visual imagery in all but one of the 16 probes; such processing was implicated by the theta coherence, thus reflecting Linda's visual imagery.

Linda also described imagery involving spatial awareness (four of 16 probes), which was implicated by both the theta and beta coherence. Therefore this spatial awareness was also reflected in the EEG data.

Linda described language-based imagery in three of 16 probes; the beta and theta coherence both implicated language processing, and thus reflected Linda's reports.

Linda stated she experienced cognitive reactions to the imagery in five out of 16 probes; the beta and theta coherence also both implicated cognitive processing, reflecting Linda's reports.

Finally, the Gamma band contained significant connections linking visual and language centers of Linda's brain; this means that, when Linda was guided to have visual imagery, her brain shared visual and language information in order to make the imagery coherent. Given the high incidence of visual and language-based imagery during this condition, the gamma results fit Linda's reports.

Therefore, when Linda was guided toward a visual imagery experience, the EEG and phenomenological data were consistent with regard to the significant theta coherence and Linda's reports of visual imagery, and the significant theta and beta coherence and Linda's reports of language-based imagery, cognitive processes, and spatial awareness. The data were also consistent regarding the gamma coherence and Linda's frequent reports of visual and language-based imagery.

The EEG and phenomenological data were inconsistent with regard to Linda's perception of sleepiness whereas the raw EEG data indicated alertness during one probe. Linda's perception of being sleepy during this probe (which was also discussed in the Body condition) is likely due to lack of focus rather than to drowsiness.

Summary of Linda

EEG Coherence Findings across Conditions

Linda's EEG data on theta coherence showed consistent interactions between the temporal lobes and with the visual cortex in all conditions except Memory; this activity implicated language, spatial processing/memory retrieval, and visual processing in nearly all of Linda's imagery. The Memory and Kinesthetic conditions had additional connections to the central region of the brain, implicating motor activity.

Linda's EEG data on alpha coherence showed similar patterns as those seen in the theta condition; such patterns would indicate that these brain regions are turned "off," which does not match Linda's reports or the other frequencies' coherence results indicating that these regions were active. Therefore, the EEG consultant felt that Linda's alpha coherence may not really be reflecting alpha-related brain activity, and thus all of Linda's alpha coherence data for this session were ignored. However, the Power Spectral Density map for the alpha frequency did appear to be valid, and it did not show much cortical idling for the occipital (visual) region, suggesting that Linda was not relaxed in any of the conditions.

Linda's EEG data on beta coherence showed significant interactions during the Interaction and Visual conditions; these interactions involved the temporal and frontal lobes, implicating language, spatial processing/memory retrieval, and decision-making functions. The remaining conditions' beta coherence (Affect, Body, Kinesthetic, and Memory) had no significant beta activity, suggesting that, during these conditions, Linda rarely experienced motor imagery if not specifically guided to do so, and that Linda was not fully attentive to, engaged, or involved in the imagery during these conditions.

Linda's EEG data on gamma coherence indicated consistent connections between the visual and language centers of the brain across all conditions except Memory. This suggests that Linda's brain consistently shared information between the language and visual centers in order to make her imagery congruent.

Response to Guiding Across Conditions

Table 10 shows the extent to which Linda's imagery responses were consistent with the guiding conditions. Based on this table, it appears that Linda's preferred modalities for responding to the guide were visual imagery and memories; however she reported memories only during the Memory condition, and not at any other time. When not responding to the guide, Linda again preferred imaging in a visual modality.

Table 10.
Linda's Imagery Responses to Guiding Conditions

	# Probes Presented	# Responses as Guided	# Responses Unguided	Total Responses
Body Imagery	14	9	3	12
Affective Imagery	8	2	4	6
Visual Imagery	16	13	23	36
Interaction	7	5	4	7
Memories	3	3	0	3
Kinesthetic Imagery	3	2	1	3

Linda most frequently reported feeling disconnected from the guiding for three probes during the induction (which occurred over the first 10 probes, most of which involved both Body and Visual conditions). She also reported feeling disconnected from the guiding during the Affect condition for two out of eight probes. These feelings of disconnection from the guiding at these times suggest that Linda may have had difficulty relaxing and following the induction cues, as well as difficulty following the guiding to experience emotion.

Linda also reported her selective responses to the guiding most often during the Interaction condition, for three out of seven probes. These images concerned Linda's attempts to change what the person in her image was saying, rather than fully listen to the person, and then in two related probes, adapting the guiding to make sense in how she would interact with an object. Linda also selectively responded to the guiding for two out of eight probes during the Affect condition; both of these images involved reactions to being guided to experience emotions. In the first of these images, Linda stated she was not aware of having any "specific" emotions, but rather she heard the mood of the music. The second image involved uncomfortable reactions to prompts to experience emotions, with Linda wanting to "shut down" the feelings. In all these images, Linda's selective responses to the guiding seemed to demonstrate ways she could manage the imagery and/or her own responses so that she would feel more comfortable or would not feel threatened.

Linda commented in the interview that she was aware that the guiding encouraged different kinds of imagery experiences, and she expressed fascination that she was able to have new kinds of imagery in this session rather than have her usual experience of limited kinds of imagery. At the same time, Linda stated that her style of traveling during this session was typical for her, and that she has always tended to experience her imagery primarily in a visual sense. Linda's perceptions are borne out by the frequency of her visual imagery, which far exceeds the frequency of any other imagery type she experienced over the session.

Vividness of Imagery

Table 11 shows the relative vividness of various types of imagery reported by Linda. Based on this table, Linda most frequently experienced vivid imagery that was kinesthetic in nature, though in practical terms she only had single instances of each type of her vivid images. She also had a vivid olfactory image, which is not presented in this table. As Linda only identified three vivid images across the whole session, it is difficult to identify patterns of response, other than that each vivid image involved different types of imagery. Thus Linda's vivid imagery was not limited to a particular modality.

Table 11.
Proportion of Vivid Imagery to Total Instances of Imagery Modality

	# Images Reported	# Vivid Images	% Vivid
Body Imagery	12	0	0%
Affective Imagery	6	1	16%
Visual Imagery	36	1	3%
Interaction	7	0	0%
Memories	3	0	0%
Kinesthetic Imagery	3	1	33%

Alertness

Linda reported feeling sleepy in one probe during the induction, and "out" of the ASC for the final probe; the raw EEG data showed that Linda was alert throughout the entire session, and she was the only participant to not show any drowsy brain states in this study. Additionally, the Power Spectral Density map for the alpha frequency confirmed the raw EEG findings that Linda was not relaxed in any of the guiding conditions.

Linda rarely reported on her perceived alertness or ASC for any of the conditions. Though she attributed her difficulty recalling the imagery in one probe to feeling sleepy, it appears that this difficulty was really due to lack of focus rather than drowsiness. Additionally, her report of a quick return to alertness out of the ASC during the final probe suggests that she may not have been in a very deep ASC from the beginning. Altogether, then, Linda's reports and the EEG data confirm that she was alert throughout the session and did not enter a deep ASC.

Response to Music

Linda reported some kind of response to the music in five probes across the entire session. Two of these probes occurred during the Affect condition, two more occurred during the Interaction condition, and one occurred during the Kinesthetic condition; thus there were no clear patterns of music awareness in terms of frequency within guiding conditions. In two instances the music directly affected Linda's imagery, and in both cases it did so in a body or kinesthetic sense. In these images, Linda felt her body's movement was either driven by the tempo and sound of the music (probe #12), or that her body was weighted down by the slowing pace of the music (probe #28). In another probe where the music did not directly affect the image, Linda reported that the music was highly distracting and reflected the cognitive dissonance she was experiencing in regard to her image. In this case, the music was frustrating to Linda and she had difficulty working with it. In the remaining two images where music did not affect the imagery, Linda simply reported that she was aware of the music, but that it either did not reflect the imagery (probe #17), or the music existed alone, without any other imagery (probe #27). Both of these images occurred during the Affect condition. Linda also commented during the interview that she was aware of her "music relation issues" and that, if she began another series of GIM sessions, she would need to explore her relationship to the music. Therefore, during this session Linda was able to integrate the music into her imagery only in a body or kinesthetic sense, but she was unable to utilize the music when experiencing confusion, or when she was guided to experience emotion.

Difficulty Recalling Imagery

All five images that were difficult for Linda to recall occurred during the Affect condition. Linda reported that in three of these five images she felt disconnected from the guiding, yet in another probe she was aware of the music, but of nothing else. Linda stated during the interview that the guiding cues for all five of these probes were unfamiliar, and thus she could not recall the imagery at all or in any great detail. Generally, Linda's affective imagery was somewhat guarded. For example, the only emotional image that was vivid occurred during a probe where the guiding asked Linda to turn her image into one involving a room from her past; Linda panicked, because she was already experiencing a room from her past prior to that cue, and she was surprised that the guide would already know what she was experiencing (despite her knowing that the guiding was pre-recorded). She said she needed to cognitively calm herself down in order to return to the imagery, but that this reaction was the strongest emotional reaction of the session. Further, the affective images that Linda could recall contained somewhat superficial experiences of affect: for example, her amusement in response to the guiding (probe #36), and a brief emotional reaction to the person (probe #22) which was soon overwhelmed and blocked out by the volume and texture of the music (probe #26). Unfortunately, the EEG data are unable to provide much information about Linda's brain during any affective imagery, due to the location of brain regions responsible for emotional processing. Therefore, given the superficiality of Linda's emotional imagery throughout the session, and the degree of disconnection from the guiding during probes asking her to experience emotions, plus Linda's guardedness during the image she rated as the most affective of the session, Linda's difficulty recalling imagery during this session appears to be directly related to any guiding or music that asked her to experience affect.

Significance of Imagery Experience

This session did not seem to be particularly significant to Linda. The interaction with the person in her imagery was stilted, and because of this, Linda felt that this image might be a point of further exploration in future GIM sessions if she chose to pursue them. She also revisited images from her previous GIM work, and in this session managed to experience more of these images than she ever had in the past. However, Linda did not state that she gained a great deal of meaning from this session, and though she felt she had made some personal progress in regard to her ability to image and especially in regard to the content of her familiar imagery, this progress was not surprising or eye-opening for Linda.

Consistency between EEG and Phenomenological Data across Conditions

The EEG and phenomenological data were consistent across all conditions regarding Linda's persistently alert state. Both the alpha Power Spectral Density maps and the raw EEG data showed that Linda was awake through every probe, while she reported feeling sleepy only in one probe.

Across all conditions, the theta coherence consistently showed a pattern which implicated visual, language, and spatial and/or memory retrieval processes; Linda’s reports corroborated all of these connections except for the spatial and/or memory retrieval in the Affect and Interaction conditions. However, it is possible these processes were under-reported in those conditions. Otherwise, this consistent pattern in EEG coherence and imagery type demonstrates that Linda primarily experienced most of her imagery using visual, language, and either spatial and/or memory retrieval modalities.

The EEG and phenomenological data were also consistent across conditions regarding the visual and language connections in the gamma coherence, which fit with the amount of visual and language imagery Linda reported in all the conditions. These data suggest that Linda used visualization and words to help her make sense of her imagery.

The EEG and phenomenological data were inconsistent across all conditions regarding the alpha coherence and Linda’s reports of visual, language, and memory retrieval/spatial processing. The alpha coherence maps showed connections that were very similar to the theta maps, implicating the same brain regions; however, alpha coherence indicates which regions were turned “off,” which would contradict the theta coherence results. Because the theta (and often other frequencies’) coherence corroborated Linda’s reports, the alpha coherence results were disregarded by the EEG consultant, who felt that, for unknown reasons, these alpha coherence results were not reflecting true alpha phenomena (that is, indicating regions of the brain that are idling).

Across all conditions, the EEG and phenomenological data were also inconsistent regarding some reports without corresponding coherence, though there are probable explanations for each inconsistency. Linda reported kinesthetic imagery during the Affect condition, but there was no related EEG coherence. She also reported cognitive processing in both the Body and Memory conditions, but again there was no related EEG coherence. Regarding the inconsistency between the kinesthetic imagery and no EEG coherence, this single instance of kinesthetic imagery (one out of eight probes) may not have produced enough brain activity to generate any coherence during the Affect condition. With regard to the lack of coherence related to cognitive processing, the EEG may have been inaccurate in the Memory condition, whereas there may be relevant coherence in the beta frequency for the Body condition; however, the beta coherence was not initially reported during that condition because it was regarded as nonsignificant. Also, as discussed above, the converse situation (significant coherence, but no matching imagery) occurred where Linda did not report any imagery that would match the spatial processing or memory retrieval implicated by the theta coherence in the Affect or Interaction conditions. However, Linda's descriptions during these probes suggest she may have under-reported imagery that was potentially relevant to these coherence results. Overall, given these explanations, the EEG data and Linda's reports generally match across all conditions.

CHAPTER 7

LARRY: RESULTS AND DISCUSSION

Introduction

Larry was an advanced trainee in the GIM therapist program and an experienced GIM traveler. He has already experienced 25 personal sessions and is now engaged in a series of sessions. He stated that at the beginning of this session's induction he was concerned with his ability to relax and freely image, though he reported that he felt he fell asleep at a few different points of the session. This sleepiness (and the imagery he experienced during it) led to a refreshed physical state. This refreshed state and a meaningful message from a significant person were the dominant features and benefits of the session for Larry.

A technical problem occurred during this session which may have led to discrepancies in the data. At the beginning of the session, one of the electrodes (P3, on the left side near the visual cortex) lost contact with Larry's scalp. While the data consultants attempted to correct for this lost connection in the analysis, the Power Spectral Density maps for Larry show EEG activity only around this lost electrode for nearly every frequency in every condition. While most of the EEG coherence data appear to be fine, some discrepancies occurred, particularly regarding the alpha and theta coherence and visual processing, and these could be explained by this EEG problem. However, in the following text, other potential explanations for these discrepancies are offered first, then revisited at the end of the chapter along with the electrode problem. Larry's EEG coherence maps are located in Appendix G, Figure 7.

Affect Condition

Phenomenological Data

Table 12 presents Larry's responses to the Affect condition, including the imagery he experienced for each probe, its congruence with the guiding condition, the qualitative coding of the imagery, as well as Larry's reports on his alertness. Out of eight images, five were congruent with the guiding to experience affect, though of these five images, three also contained visual imagery, while one more contained awareness of the music and language-based imagery. The images not congruent with the guiding (three out of eight) involved body-based and visual imagery. Two of the incongruent images were particularly vivid, both with body sensations, and one also with visual imagery. In two out of the three incongruent images, Larry had difficulty recalling the imagery while he felt disconnected from the guiding. He also reported feeling like he was asleep in a different pair of incongruent images. In terms of imagery dynamics, Larry's imagery varied from incomplete imagery (one out of eight probes), to stable imagery (three out of eight probes), to expanding imagery (four out of eight probes).

EEG Data

When Larry was guided to have an affective experience, a review of his raw EEG data indicated that he was drowsy for the last two probes of this condition (#37 and 40) out of the eight total probes.

The EEG coherence analysis found significant connections in the alpha frequency between the visual and decision-making regions. These connections indicate that Larry's brain did not engage in visual or decision-making processes while responding to the guiding during the Affect condition.

Table 12.
Affect Condition: Larry's Phenomenological Data

Probe #	Affect condition guiding direction	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
17	Be aware of how it feels to be inside the house—notice any emotions you might have being there…	Conflicted, image not settled between two houses, concerned about being in unfamiliar house	Yes; visual	Incomplete, Stable image
20	Open yourself to any emotions or reactions you might have at this time…	"open" in guiding led to change in image into new object; visual details, emotional response	Yes; visual, language	Expanding image Fully responsive to guiding
23	As you relive the memory, open to your emotions about the experience and the person. Allow yourself to feel these emotions…	Aware of emotions as younger self in memory	Yes; memory	Stable image Fully responsive to guiding

Table 12. (continued)

Probe #	Affect condition guiding direction	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
27	Take some time now to be aware of your feelings about the person after this exchange…	Emotional response to significant person's words; music matching emotions; body sensation of emotion	Yes; music, language	Expanding, Music-influenced image
33	Become aware of any emotions or reactions you may have about being in the room with this object	Chewing object from memory	No; body, memory	Particularly vivid, Stable image Disconnected from guiding
34	Stay with those feelings for a little while.	Feel asleep; chewing, visual image of painting related to chewing; satisfying feeling	No; body, visual	Particularly vivid, Expanding image Asleep

Table 12. (continued)

Probe #	Affect condition guiding direction	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
37	Be aware of any feelings you have now.	No imagery recalled, feel as if asleep	No	Difficulty recalling imagery Disconnected from guiding Asleep
40	Be aware of your emotions while you shut the door behind you, and leave that place.	Positive emotions, rejuvenated feeling; see outside landscape of home reflecting feelings	Yes; visual, memory	Expanding image

The EEG coherence analysis showed significant connections in the theta frequency between the visual and memory retrieval/spatial processing regions. These connections indicate that, while Larry was guided to experience emotion, his brain engaged in visual and memory retrieval and/or spatial processing.

The EEG coherence analysis also showed significant coherence in the beta frequency involving the entire brain, including decision-making, language, spatial processing/memory retrieval, motor processing, and visual regions. Because of the large number and widespread nature of these connections, this kind of pattern is generally interpreted to mean that a great deal of motor planning and/or ongoing attention to the imagery occurred during this condition, rather than that each region indicated by the coherence pattern was involved in motor planning and/or ongoing attention.

Integration of EEG and Phenomenological Data

In terms of alertness, Larry stated he felt sleepy in two of the eight probes, and could not recall the imagery of one of these probes (#34). The EEG identified Larry's brain state during the second of these probes (#37) as being drowsy. Therefore Larry's perception of sleepiness preceded the EEG indication of drowsiness by one probe. In addition to having difficulty recalling the imagery during probe #34, Larry acknowledged that he was straying from the guiding direction while having a vivid image that was not congruent with the guiding. Thus Larry's sleepiness may have prevented him from attending to the guiding and the narrative direction of his imagery.

Larry described emotional images in five of the eight Affect condition probes, but any EEG reflection of these images is weak. The beta coherence maps contain only one direct connection between the frontal and temporal lobes (where the insula is located), so the EEG does not clearly indicate emotional processing, and thus cannot add any information to Larry's affective imagery.

Larry also reported memories in three of the eight images, which were reflected by the theta coherence, implicating memory retrieval and/or spatial processing. None of Larry's images seem to relate to spatial processing, so it is most likely that his memories were responsible for this coherence result.

Larry reported visual images in three of the eight probes, but the alpha coherence shows visual processing as idling during the Affect condition while the theta coherence shows visual processing as active. While such contradictory activity occurring simultaneously would be quite unusual, there are potential explanations: Larry's eyes were not closed throughout the condition, which would activate the visual cortex; or perhaps Larry's imagery reports were inaccurate and he did not experience visual imagery. Regardless, the corroboration of the theta coherence and Larry's reports of visual imagery indicate that the alpha data regarding the visual processing is inaccurate for this condition.

The alpha coherence map also indicated that the decision-making regions of the brain were idle during this condition, and none of Larry's images involved any cognitive processing. Thus the alpha coherence regarding decision-making matches Larry's imagery reports.

Larry also described having vivid body-based imagery in two of the eight probes. This imagery could be reflected by the theta coherence involving the central region of Larry's brain, which is responsible for body movement/motor planning.

Larry described having a language-based image in probe #20, however, the EEG did not indicate involvement of the brain region responsible for processing language. It is likely that this single response to a word during one out of eight probes was not enough to generate such activity in the brain.

The many and widespread beta coherence results suggest that motor planning may have been prevalent throughout Larry's imagery. The only probes where Larry described physical movement of any kind were during the images which contained the repetitive chewing sensation, which appeared to have produced significant theta coherence to the brain region responsible for motor planning. Therefore, this chewing sensation may have also produced beta coherence related to motor planning. The beta coherence could also indicate ongoing attention to the imagery, which seems to fit most of the images except for the same images where Larry felt disconnected from the guiding and at times could not recall his imagery – because of his chewing imagery. Larry could recall all the other (non-chewing) five images in detail, and these images fit into an ongoing narrative that suits the processing characteristic of beta coherence. Together, the chewing imagery and the ongoing focus on the remaining imagery appear to be responsible for the widespread beta coherence during the Affect condition.

In summary, when Larry was guided toward an affective imagery experience the EEG and Larry's reports were consistent regarding the visual and body imagery reflected in the theta coherence, the lack of decision-making imagery reflected in the alpha coherence, and the body imagery and ongoing focus combining to create strong beta coherence.

The EEG data and imagery reports were inconsistent regarding the alpha coherence, indicating that the visual cortex was idling while Larry reported visual imagery, and regarding Larry's reports of language-based images without any corresponding EEG data. The alpha coherence result concerning the visual cortex appears to be inaccurate given the significant theta coherence to the same region, along with Larry's reports of visual imagery. And the lack of EEG coherence reflecting the single language-based image could be due to the small amount of such imagery within this condition. Therefore not enough relevant processing occurred to create any coherence.

Body Condition

Phenomenological Data

Table 13 summarizes Larry's phenomenological data for the Body condition probes. The Body condition contained 14 total probes, nine of which occurred during the induction and involved simultaneous guiding for visual imagery, and the remaining five of which occurred during the narrative portion of the session. All but one of the 14 were congruent with the guiding, and seven of these 13 images also contained visual imagery, while a few others also contained cognitive and emotional reactions, as well as language-based imagery. None of the images were particularly vivid, but Larry had difficulty recalling two images out of the 14. He also felt disconnected from the guiding during these two images plus an additional image. He also reported feeling he was asleep during the two images where he reported being disconnected from the guiding. Larry stated he was "in" the ASC and fully responsive to the guiding during a different two images (out of the 14), and fully responsive to the guiding without any mention of ASC in another

Table 13.
Body Condition: Larry's Phenomenological Data

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
1	Take a long, deep breath. Slowly take in as much as you can… and let it out. Slowly breathing in…. and out…[…]	Used words from guiding to focus attention on body; body awareness, some self-coaching to relax	Yes; cognitive, language	Shifting imagery Fully responsive to guiding
3	Now imagine the ball of light moving to the top of your head….and then down, around and through your head. […]	Ball of light scanning body; view from outside, feeling sensation inside	Yes; visual	Expanding image
4	Now imagine the ball of light moving around and through your neck and shoulders. […]	Continued from previous probe, moving to neck and shoulders	Yes; visual	Stable image

Table 13. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
5	…one ball for your right arm and hand, and one ball for your left arm and hand… […]	Cognitive reaction to ball splitting; brief disconnect with image, then reconnected; body sense only, feeling more distant	Yes; visual	Contracting image Fully responsive to guiding “In” ASC
6	….imagine the ball moving around and through your torso and back… […]	Began to feel sleepy, attending to sounds of guiding, noticing body areas, slowing down	Yes	Contracting image Selective response to guiding Asleep
7	Now the ball moves to your hips and waist... […]	Almost asleep; aware of body parts; losing awareness of guiding, sense of time	Yes	Difficulty recalling Stable imagery Disconnected from guiding Asleep

Table 13. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
8	Now the ball moves to your hips and waist.[…]	Aware of words in guiding; no visual of ball, only body parts; pacing of imagery very slow, opening self to see what will happen	Yes	Stable image Disconnected from guiding “In” ASC
9	Now let the ball move down to your lower legs and feet… […]	No recall of guiding to feet; moving ball to other parts of body, scanning body; no visual of ball	Yes	Stable image Disconnected from guiding
10	Now move the ball of light wherever you need it to go … […]	Moving ball before being prompted; visual and body awareness of ball; responded to prompts to relax and allow image to glow	Yes; visual, language	Contracting image Fully responsive to guiding “In” ASC

Table 13. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
14	[…] Notice the door handle… and surface of the door. Reach out and touch the surface---what it feels like; its temperature, its texture, its size.	Reaching for and touching door; emotional response to house; see details of house; wonder how to get inside	Yes; emotional, visual, cognitive	Stable image
18	[…]… slowly move around the room…noticing any sensations your body may have… […]	See details of objects, room; emotional and body detachment from objects in room;	Yes; emotional, visual	Stable image Fully responsive to guiding
35	If you wish, touch or hold the object….and bring into awareness how it feels…	Chewing sensation; might be asleep, difficulty remembering imagery	Yes	Difficulty recalling Stable image Disconnected from guiding Asleep

Table 13. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
41	[…] return now to the path where you first began...[…] notice how your feet feel being back on the ground… […]	Visual sense of walking, aware of colors and details of surroundings	No; visual	Stable image
42	[…] Let the image fade while gradually allowing your awareness to return to your body…	Aware of words in guiding; noticing body sensations; return to alertness	Yes; language	Shifting image

two images. He did not mention being influenced by the music in any of the images. The dynamics of Larry's imagery again varied somewhat: out of the 14 total images, he reported having eight stable images, two shifting images, one expanding image, and three contracting images.

EEG Data

When Larry was guided to have body-based imagery, a review of his raw EEG data indicated that Larry was alert for all of the 14 probes.

The EEG coherence analysis showed that only one frequency, alpha, had significant coherence for this condition, which indicated that visual and decision-making processes were idle; that is, when Larry was responding to guiding to have a body-based image, these regions of the brain were turned “off.”

The EEG coherence analysis also showed that there was no beta coherence for the Body condition; this was the only condition for Larry that lacked any significant beta connections. Beta coherence generally concerns motor planning and/or ongoing attention to tasks, so the absence of beta coherence may indicate an absence of these kinds of processing during this condition.

Integration of EEG and Phenomenological Data

While Larry reported feeling sleepy during two images, the raw EEG data showed that he was awake throughout this condition. Larry also stated he felt disconnected from the guiding and had difficulty recalling the imagery in one of the two images where he felt sleepy, and that he selectively responded to the guiding but could recall the imagery in the other image. Altogether the data concerning Larry’s alertness suggest that Larry’s disconnection with the guiding and imagery were due to a lack of focus rather than to drowsiness.

Larry reported visual imagery during the Body condition (seven of the 14 probes) while the corresponding alpha coherence indicated that the visual cortex was idle. When the visual cortex is idle, Larry’s brain should not be processing any visual information–whether externally perceived or internally generated. The coherence maps in the other frequencies for the Body condition do not indicate any activity in the visual cortex, so the EEG data are consistent in terms of the lack of visual processing. It seems that, despite the amount of visual images Larry reported throughout the Body condition, his visual imagery did not generate enough brain activity to produce any detectible EEG connections to the visual cortex. Because Larry reported visual imagery quite frequently during this condition, this discrepancy is puzzling. It suggests that either Larry's reports of visual imagery were exaggerated, or the EEG did not detect the activity Larry's brain generated related to this imagery.

Larry described responding to specific words in the guiding during three of the 14 probes during the Body condition, potentially implicating language processing. However, there is no EEG reflection of any language processing. As with Larry's reported visual imagery, it seems that Larry's language-based images also did not generate enough brain activity to produce detectible coherence relationships to the language centers of his brain. Because Larry reported language-based images in only three out of the 14 probes, it is possible that brain processing related to this imagery was minimal, and therefore not detectible by the EEG.

Larry also described having some cognitive reactions during the first probe, however, the alpha coherence connections to the frontal lobes indicated that such processing was turned "off" during the Body condition. Given that only one probe out of 14 contained any decision-making or cognitive reactions, it seems that for most of the Body condition Larry's brain did not engage in any further frontal lobe activity after the first probe. Therefore the alpha coherence generally reflects Larry's imagery reports.

One of Larry's images contained emotional content, but there were no EEG indications of emotional processing during this condition. Thus, the EEG data cannot provide any information regarding Larry's affective imagery.

A unique aspect of Larry's images during the Body condition was that there were no beta coherence connections, which at the least means that there was no EEG evidence of motor planning or ongoing attention to, and engagement in, the imagery during this condition. With regard to motor planning, Larry's description of his images during the induction portion of the Body condition did not involve motor planning as much as it involved experiencing the movement and sensation of the ball of light in different parts of his body. Larry frequently stated that he was tuning into his inner awareness of these images, and that his relaxed state was deepening throughout the induction. He also stated he was feeling sleepy during some of these probes. Likewise, during the narrative probes Larry's imagery focused on his body sensations, and did not involve planning movements. In terms of ongoing attention, most of the images during the Body condition did not seem to link together as part of an ongoing narrative; rather, the images were at times independent of the narrative and mainly described as sensations. Further, Larry had difficulty recalling three of the 14 images because he felt drowsy. This drowsiness could have affected his attention on the ongoing narrative. Thus the mainly sensory and disconnected images during the Body condition appear to explain the lack of beta coherence.

In summary, when Larry was guided toward a body-based imagery experience the EEG and Larry's reports are consistent regarding the alpha coherence and the overall lack of cognitive processing during this condition. The data were also consistent regarding the lack of beta coherence and the lack of any motor imagery or evidence of ongoing focus on the imagery throughout the Body condition. This conclusion matches well with the data regarding Larry's alertness, which involve one of the inconsistencies between the

EEG and phenomenological data: Larry reported feeling sleepy in three probes, but the raw EEG showed that his brain was awake. Larry's disconnection with the guiding and imagery during those probes was likely due to lack of focus rather than drowsiness. This lack of focus, therefore, supports one of the conclusions regarding lack of beta coherence translating into a lack of ongoing attention. The EEG and phenomenological data were also inconsistent regarding Larry's reports of visual and language-based imagery while the EEG coherence showed no connections related to visual and language processing regions. Because Larry reported language-based imagery in a small number of probes, this discrepancy may not be significant. However, the lack of EEG coherence related to visual activity is more significant, given the amount of visual imagery Larry reported. For now, the only explanations for this incongruence are that Larry exaggerated the amount of visual imagery he had, or that the EEG did not detect the brain activity Larry's brain generated to produce his visual images.

Interaction Condition

Phenomenological Data

Table 14 summarizes Larry's phenomenological data for the seven Interaction condition probes. Out of the seven total probes, four contained imagery congruent with the guiding, and all four contained multiple kinds of imagery such as emotions, body-based and language-based images, music awareness, and visual imagery. Three of the seven probes contained imagery that was incongruent with the guiding, including one probe where Larry could not recall any imagery, and two probes where Larry reported he felt he was asleep. During both of these latter probes he also reported feeling disconnected from the guiding. In contrast, Larry identified three of the seven probes as

Table 14.
Interaction Condition: Larry's Phenomenological Data

Probe #	Interaction condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
10	Now move the ball of light wherever you need it to go to relax any part of your body…[…]	Moving ball before being prompted; visual and body awareness of ball; responded to prompts to relax and allow image to glow	Yes; visual, body, language	Contracting image Fully responsive to guiding "In" ASC
24	If the person has something to say, listen to it; really open to what the person is saying to you.	Message from significant person; emotionally calming; could not recall exact words	Yes; language, emotional	Stable image
25	If you have something to say back, take time now to say it. Speak freely to the person.	Emotional expression to person, then hearing reassurance in response; aware of music texture, reflecting initial emotions	Yes; language, emotional, music	Particularly vivid, Expanding, Music-influenced image Fully responsive to guiding

Table 14. (continued)

Probe #	Interaction condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
26	Listen to what the person has to say in response, and say anything else you need to say.	Continued conversation from previous probe	Yes; language, emotional	Particularly vivid, Stable image
28	Begin to draw this interaction to a close. Say goodbye to the person and prepare to move into another room of the house.	Did not say goodbye; went into familiar room from past, vivid scene; feel self is younger	No; visual, memory	Particularly vivid, Stable, Music-influenced image Selective response to guiding
36	If there is something you would like to do with this object, take time now to do what you need to do	Asleep, imagery focused on chewing sensation alone	No; body	Difficulty recalling Stable image Disconnected from guiding Asleep

Table 14. (continued)

Probe #	Interaction condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
38	If you wish, you can leave the object wherever it needs to be, saying goodbye to it... or taking it with you.	No recall of image	No	Difficulty recalling image Disconnected from guiding Asleep

being very vivid, and that the music influenced two of these images. He was also fully responsive to the guiding during one of these images, plus an additional image where he felt he was “in” the ASC. Four of the seven images were stable in nature. Larry also reported one contracting image and one expanding image.

EEG Data

When Larry was guided to have an interactive image, a review of his raw EEG data indicated that he was drowsy during one probe (#36).

The EEG coherence analysis indicated that, when Larry was guided to have body-based imagery, the theta frequency showed significant connections between the regions responsible for visual and memory retrieval and/or spatial processing. This means that, while Larry was responding to guiding to have an interactive image, his brain engaged in visual and memory retrieval and/or spatial processing.

The EEG coherence analysis also found that the alpha frequency showed significant connections between the regions responsible for visual processing and decision-making. These connections mean that, when Larry was guided to have an interactive image, these regions were turned "off."

The EEG coherence also indicated that both the beta and gamma frequencies had widespread connections. The beta frequency's connections were more concentrated in the central region, implicating motor planning, while the total number of connections indicates that the whole brain may be involved in motor planning in a general sense, along with attention to the imagery. The gamma coherence during this condition is all over the brain and yet does not contain many connections. Thus, while the whole brain is involved in sharing information in a general sense, not much volume of information is being shared in order to make the imagery coherent.

Integration of EEG and Phenomenological Data

In terms of alertness, the EEG data showed that Larry was awake for the six of the seven probes, while he reported feeling asleep for two probes, #36 and #38. Larry's perception of being asleep in one of these probes coincided with the EEG showing a drowsy brain state (#36). Larry had difficulty recalling the imagery for both probe #s 36 and 38. Given that Larry's brain showed he was drowsy during one of these two probes, and that the probes are close to each other in sequence, his difficulty recalling the imagery and his disconnection from the guiding for both probes may be related to drowsiness during this condition.

Larry reported experiencing dialogue or language-based imagery in three of the seven probes, however, the EEG does not show any significant coherence with the region responsible for language processing. While Larry described having a conversation, he could not recall the exact words from this conversation. This lack of specific language may explain the lack of EEG coherence with the language centers of Larry's brain during this condition.

Larry also reported having visual images in two of the seven probes, however the EEG data is contradictory regarding the visual cortex's engagement during this condition. The theta coherence shows that the visual cortex was active, while the alpha coherence shows it was idle. Larry's descriptions of his imagery indicate that the visual image in one probe was vivid (#28), with a great deal of visual detail. The other visual image was focused on only body and visual imagery during that probe, as it was the final probe of the induction. Both of these images make the case that the theta coherence is more accurate than the alpha coherence. Therefore, just as in the Affect and Body conditions, the theta coherence rather than the alpha coherence reflects Larry's visual imagery.

Larry reported a vivid memory in one probe, which seems to be reflected by the theta coherence involving the right temporal lobe. This region is also responsible for spatial processing, which does not seem to be significant in any of the images during this condition. Therefore this memory appears to be responsible for the theta coherence.

While Larry described experiencing emotions in three of the seven probes, there are no coherence connections implicating the insula. Therefore the EEG cannot provide any information regarding Larry's emotional images during this condition.

The alpha coherence shows that the frontal lobes, regions responsible for decision-making, were idle during the Interaction condition. None of Larry's imagery suggests that he engaged in any decision-making. Therefore, the alpha coherence with regard to decision-making fits with Larry's reports.

The beta coherence indicated that Larry's whole brain engaged in memory maintenance and/or motor planning during the Interaction condition. The only imagery that relates to body movement is the chewing sensation in probe #36, which might relate to motor planning. However, Larry also had three vivid images close together, two of which continued from one probe into another and involved an ongoing interaction with a significant person. Even though Larry would later have difficulty recalling two probes' images, it appears that his ongoing attention from the earlier probes likely produced the significant beta coherence across his brain, while his chewing imagery could have also contributed to the total beta coherence due to its use of motor planning.

The gamma coherence also connected most of Larry's brain, though with a few number of connections. Larry reported that the interactions with the significant person were the most meaningful images of the session (involving three of the seven probes), which matches the gamma coherence results, especially since these gamma connections are the most widespread out of all of the conditions, suggesting a greater amount of meaning-making.

In summary, when Larry was guided to have interactive imagery, the EEG and phenomenological data were consistent regarding his perception of drowsiness, his difficulty recalling imagery, and his drowsy brain state, as well as regarding his visual imagery and memories which were reflected by the theta coherence. The EEG data and reports were also consistent regarding the widespread beta coherence and Larry's attentiveness to several vivid images along with motor planning during other images, as well as the gamma coherence and the meaningfulness of the imagery. Also, the alpha coherence was consistent with the lack of decision-making made throughout the condition's imagery.

The EEG and phenomenological data were inconsistent regarding Larry's reports of dialogue without any corresponding coherence, and with regard to the alpha coherence's indication that Larry's visual cortex was idling while Larry reported visual imagery. The inconsistency related to Larry's language-based images may be the result of the lack of words Larry experienced during the image, which would not have directly required language processing. With regard to the alpha coherence and Larry's visual imagery, it appears that this EEG data may be inaccurate because the theta coherence indicated that Larry's visual cortex was active, which corroborates Larry's visual imagery.

Kinesthetic Condition

Phenomenological Data

Table 15 summarizes Larry's phenomenological data for the Kinesthetic condition. Out of the three total probes, two of the images were congruent with the guiding, though each of these two also contained different types of imagery in addition to the kinesthetic imagery (cognitive and music in one probe, visual and body in the other). The incongruent probe shifted from one imagery modality into others, including visual, cognitive, and emotional imagery. During this image, Larry reported he selectively responded to the guiding, and the image did not form completely. Finally, Larry did not report feeling drowsy in any of this condition's probes, nor did he comment on his ASC.

Table 15.
Kinesthetic Condition: Larry's Phenomenological Data

Probe #	Kinesthetic condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
12	Now feel yourself walking along the path toward the house. Notice how your feet feel as they take each step… […]	Visual awareness of path, feet, still trying to focus imagery by coaching self, emotional reaction to need to coach self	No; visual, cognitive, emotional	Incomplete, Shifting image Selective response to guiding
15	Now imagine opening the door…feel the weight of the door as you open it…[…]	Pinching to open door, wondering how to enter house; aware of music dynamics and mood	Yes; cognitive, music	Shifting, Music-influenced image
39	It's now time to leave this place. You can walk out of the room, and out of the house… notice how your body feels as you walk…	Walking out of house; View of neighborhood outside own house, feeling rejuvenated	Yes; visual, body	Stable image

EEG Data

When Larry was guided to have a kinesthetic image, a review of his raw EEG data showed that Larry was drowsy for one of the three probes (# 12).

The EEG coherence analysis showed that only the beta frequency had any significant coherence involving only a few significant connections that were widespread across the brain (visual, central, language, and memory retrieval/spatial processing). The Kinesthetic condition contained the fewest number of beta connections out of all the conditions, indicating that while Larry's brain engaged in general motor planning and/or memory maintenance, it did fewer of these functions compared to the other conditions.

Integration of EEG and Phenomenological Data

Regarding Larry's alertness during this condition, Larry did not report on his ASC or alertness. However he did state that he was having difficulty focusing and fully entering his image during the probe where the raw EEG identified his drowsiness (#12). In this probe, it appears that drowsiness impaired Larry's ability to focus and engage the imagery fully.

Though Larry reported having kinesthetic, cognitive, visual, emotional, body-based, and music imagery, there were no EEG coherence results implicating any of these areas specifically. The only significant coherence found in this condition was a limited number of beta connections spread across several areas of the brain. These connections reflect the motor planning aspect of two of the three images, as well as Larry's clear recollection of all three images and their role in the ongoing narrative of his session.

The lack of coherence regarding Larry's reported imagery modalities may be due to the wide range of these modalities, often occurring simultaneously, across a small number of probes. Such a wide range of many different kinds of imagery would lead to a small amount of brain processing for each type of image, therefore, not enough brain activity may have been generated to produce any coherence. Besides, the EEG would not be able to corroborate Larry's emotional, body-based, and music imagery, because it cannot detect activity in the structures responsible for these processes.

Therefore, when Larry was guided to have interactive imagery, the EEG and phenomenological data were consistent regarding Larry's drowsiness and his difficulty in focusing on the imagery in one probe, and regarding the beta coherence and Larry's kinesthetic imagery and attention to the imagery narrative on an ongoing basis. The data were inconsistent regarding the lack of coherence related to the many different types of imagery Larry reported; this may be due to many different types of imagery occurring over a small number of probes, leading to little brain activity generated by each type of image, and thus no coherence.

Memory Condition

Phenomenological Data

Table 16 summarizes the phenomenological data for the Memory condition. Two of the three images (#22 and #31) were congruent with the guiding. Both of these images also contained visual imagery, though 1 of these images (#22) also contained interactive imagery involving language while Larry was fully responsive to the guiding. Both of these probes had different imagery dynamics, with one involving shifting imagery and the other stable imagery. Probe #31's imagery was particularly vivid. One image (#32)

Table 16.
Memory Condition: Larry's Phenomenological Data

Probe #	Memory condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
22	Allow yourself to go back and remember a pleasant time with this person…Let your memory open up, and fully remember it.	Shift between different memories; see self and significant person in both memories; interacting with person in one	Yes; visual, interaction/ language	Shifting image Fully responsive to guiding
31	Open to any memories you have about the object, or about anything or anyone the object reminds you of….. Allow the memories to become clear and vivid.	Noticing details of object from past	Yes; visual	Particularly vivid, Stable image
32	Now you notice that the scene has shifted around you… […] now you are in a room from your past… […].	Not awake, difficulty attending to guiding	No	Difficulty recalling image Asleep

was incongruent with the guiding, and Larry reported that he felt he was asleep and therefore could not recall the imagery nor did he think he was aware of the guiding during this probe. Larry did not otherwise report on his ASC during this condition.

EEG Data

When Larry was guided to experience memories, a review of his raw EEG data showed that Larry was drowsy for one of the three probes (# 22).

The EEG coherence analysis showed that the theta coherence had significant connections involving the regions responsible for visual and memory retrieval/spatial processing. This meant that when Larry was guided to have memories, his brain required visual and memory retrieval and/or spatial processing.

The EEG coherence analysis indicated that the alpha coherence had significant connections involving the visual and decision-making regions. This result indicated that, when Larry was guided to have memories, the regions responsible for visual and decision-making processes were turned "off."

The EEG coherence analysis also showed significant beta coherence connecting widespread networks across the entire brain; these results indicate that Larry's whole brain engaged in memory maintenance and/or motor planning while being guided to experience memories.

The EEG coherence analysis indicated significant gamma coherence involving a widespread network across much of Larry's brain, though with a connection hub near the visual cortex. This coherence pattern suggests that Larry's entire brain, but particularly the visual region, shared information in order to make the images during the Memory condition coherent.

Integration of EEG and Phenomenological Data

With regard to alertness, Larry reported that he felt he was asleep during probe 32, but the EEG data showed he was awake. In this case it seems he lacked focus on his imagery and thus reported his difficulty attending to the guiding. On the other hand, during probe #22 the raw EEG data showed that Larry was drowsy, while he fully responded to the guiding during an image that was shifting between different memories. Larry did not state he felt drowsy or in an ASC during this image, nor does his report indicate any disconnection from the guiding or lack of focus on the imagery. Neither was this image particularly vivid. Thus the meaning of the drowsy brain state in conjunction with this imagery report is unclear; Larry may have been in an ASC, or he may have been genuinely drowsy, but was not aware of his drowsiness or he did not report on it. Together both of these cases offer conflicting information about Larry's alertness during this condition; during one probe where he thought he was sleepy, he was unaware of the imagery and guiding while the EEG showed he was awake, yet during another probe where he thought he was awake, he was aware of the imagery while the EEG showed drowsiness.

Larry reported having memories in his imagery for two of the three probes, with one of these images being particularly vivid. Meanwhile, the theta coherence implicated memory retrieval, thus the EEG data reflected Larry's memories.

Just as in the Affect, Body, and Interaction conditions, the theta and alpha coherence results contradicted each other with regard to Larry's reports of visual imagery. Larry described having visual imagery in two out of the three probes during the Memory condition, while the theta coherence indicated a significant connection with the visual cortex. However, the alpha coherence indicated that the visual cortex was idling during this condition, contradicting both the theta coherence and Larry's reports. Because Larry's visual images were quite detailed and included one vivid image, and because the theta coherence matches Larry's reports regarding both the visual imagery and his memories, it appears that the alpha coherence is inaccurate regarding visual imagery. And just like the Affect, Body, and Interaction conditions, the theta coherence seems to more accurately reflect the reports of visual imagery.

The alpha coherence also indicated that the frontal lobes, which are responsible for decision-making, were idle during this condition. This particular result seems to fit with Larry's imagery during this condition, as he did not report any cognitive processing.

The beta coherence showed that Larry's entire brain was connecting during the Memory condition, indicating that the whole brain engaged in either motor planning or was attentive to the task of imaging. Though none of the images indicate that Larry engaged in motor planning, his attention during the first two images may have produced the beta coherence, as he recalled both images with a great deal of detail and one of these was vivid.

The gamma coherence also involved most of the areas of Larry's brain during this condition, though his visual cortex seemed to be the hub for most of the connections. This fits with Larry's visual memories and specifically the vivid memory of a significant object in probe #31, where he recalled many visual details as well as history about this object. The information sharing required in this image involved at least visual and memory processing, and helped to make this image vivid and meaningful for Larry.

Therefore, when Larry was guided to have memories, the EEG and phenomenological data were consistent regarding: 1) Larry's reports of visual imagery and the related theta coherence, 2) the alpha coherence indicating a lack of decision-making with the lack of cognitive processing in the imagery, 3) the wide-ranging beta coherence with the ongoing attention in the imagery, and 4) the wide-ranging gamma coherence with the visual and meaningful imagery.

The EEG and phenomenological data were inconsistent in terms of Larry's alertness. His report of drowsiness did not coincide with the raw EEG, which said he was awake, and Larry did not state he was drowsy or sleepy during the probe for which the raw EEG showed drowsiness. In the former probe, Larry may have simply been unfocused and felt disconnected from the imagery as a result. But in the latter case, it is unclear if Larry was in an ASC or genuinely drowsy. At this time the EEG cannot distinguish between drowsiness or ASC.

The EEG and phenomenological data were also inconsistent regarding Larry's reports of visual imagery and the alpha coherence indicating that the visual cortex was idle during these images. This alpha coherence appears to be inaccurate given the theta coherence, which corroborates Larry's imagery reports.

Visual Condition

Phenomenological Data

Table 17 presents Larry's phenomenological data for the Visual condition. During this condition (16 total probes), the first nine probes during the induction portion of the session included eight probes which combined visual and body sensory guiding. In the

EEG analysis, both sets of these visual and body-guided probes were analyzed separately in the Visual and Body conditions, respectively. Twelve out of the 16 probes were congruent with the guiding cues, and half of these 12 also contained body-based images; a few others also involved spatial, language, cognitive processing, and memories. One congruent image was also particularly vivid, and Larry stated he felt he was “in” the ASC during this probe. Larry stated he also felt “in” the ASC for three other probes (out of the 16), one of which was not congruent with the guiding. Ten of the images were stable in nature, three were contracting images, and two were expanding images.

EEG Data

When Larry was guided to have visual imagery, a review of his raw EEG data showed that Larry was awake for all 16 probes.

The EEG coherence analysis indicated that the alpha frequency had significant connections between the visual cortex and frontal lobes, indicating that during this condition Larry’s brain did not engage in visual processing or decision-making, because these regions of his brain were idle.

The EEG coherence analysis indicated that the theta frequency had significant coherence, implicating visual and memory retrieval and/or spatial processing. Thus, when Larry was guided to have visual imagery, his brain utilized visual processing as well as reminiscing and/or spatial processing.

The coherence analysis also showed that the beta coherence had significant connections involving a widespread network of several connections. This kind of activity

Table 17.
Visual Condition: Larry's Phenomenological Data

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
2	Now imagine a ball of light forming in the darkness... […]	Clear image of light, colors	Yes	Stable image
3	[…] and as the light moves, imagine that all of your head begins to glow… […]	Ball of light scanning body; view from outside, feeling sensation inside	Yes; body	Expanding image
4	[…]Neck and shoulders glowing in the light…[…]	Continued from previous probe, moving to neck and shoulders	Yes; body	Stable image
5	[…] and as the lights move, your arms and hands begin to glow… […]	Cognitive reaction to ball splitting; brief disconnect with image, then reconnected; body sense only, feeling more distant	Yes; body	Contracting image Fully responsive to guiding "In" ASC

Table 17. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
6	[…]as it moves around and through your torso and back, they begin to glow…	Began to feel sleepy, attending to sounds of guiding, noticing body areas, slowing down	No; body	Contracting image Selective response to guiding Asleep
7	[…] As it moves, your hips and waist begin to glow… […]	Almost asleep; aware of body parts; losing awareness of guiding, sense of time	No; body	Difficulty recalling Stable imagery Disconnected from guiding Asleep
8	[…]Upper legs and knees glowing in the light […]	Aware of words in guiding; no visual of ball, only body parts; pacing of imagery very slow, opening self to see what will happen	No; body	Stable image Disconnected from guiding “In” ASC

Table 17. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
9	[…]lower legs and feet glowing in the light, feeling more and more relaxed.	No recall of guiding to feet; moving ball to other parts of body, scanning body; no visual of ball	No; body	Stable image Disconnected from guiding
10	[…]…notice that wherever you move the light, your body begins to glow…[…]	Moving ball before being prompted; visual and body awareness of ball; responded to prompts to relax and allow image to glow	Yes; body, language	Contracting image Fully responsive to guiding "In" ASC
11	[…] Look around you and see what surrounds the house, the colors and shapes and features of the landscape. […]	Image of familiar house, but tried to change image in response to guiding to see "new" house; difficulty settling on a house	Yes; cognitive, memory, language	Incomplete, Shifting image Fully responsive to guiding

Table 17. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
13	[…]take in everything you see, the roof, the windows, the outside walls….[…]	Flipping through different house styles, finally settle on miniature, simple house	Yes	Stable image
16	[…] ….Notice the lay-out of rooms…the light…the space…and the things around you.	Entryway of "new" house merging with familiar house; see details of entryway, spatial sense of house	Yes; spatial	Stable image
19	[…]…and notice any objects in the room that draw your attention…Look at it closely. […]	Noticing details of unfamiliar objects; holding one carefully	Yes; body	Stable image

Table 17. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
21	[…] Take time to notice the person’s face and appearance…[…]	Enter familiar room, see significant person in detail	Yes; memory	Stable image
29	As you enter the next room, look around and take in everything you see.	See details of different familiar room, noticing objects, colors, features; memories of objects; comfortable, more altered	Yes; memory, body	Particularly vivid, Expanding image “In” ASC
30	[…]….take some time to look closely at [an object]…[…]	Focusing on one familiar object, seeing details and recalling memories of object	Yes; memory	Stable image

suggests that Larry's entire brain (including regions responsible for decision-making, language, spatial processing/memory retrieval, motor planning, and visual processing) was involved in maintaining ongoing awareness to the imaging task and/or motor planning.

Integration of EEG and Phenomenological Data

Larry reported being asleep in two probes during the induction (#6 and 7). As discussed in the Body condition, Larry's disconnection with the guiding and imagery during these probes seems to be related to his lack of focus rather than drowsiness, because the EEG showed that Larry was alert during both probes. Larry also stated he was "in" the ASC for four of the 16 probes, two of which also occurred during the induction. One of these probes involved very vivid imagery. However, the raw EEG showed that Larry was awake for all of the Visual condition probes, so the EEG did not detect a different brain state for these probes where Larry felt he was in the ASC. Therefore the EEG cannot provide any more information about Larry's perception about being in the ASC for this condition.

Larry's memories in three different probes were also reflected by the significant theta coherence with the right temporal lobe; this connection implicates memory retrieval and/or spatial planning. Larry also reported a spatially-related image in one probe, which may have contributed to the significant coherence to this region of his brain.

Larry reported having many visual images during this condition, while the theta coherence showed significant coherence with the visual cortex, matching Larry's reports. However, as seen in all the other conditions except Kinesthetic, the alpha coherence also indicated that the visual cortex was idling, contradicting Larry's reports of visual imagery and the theta coherence indicating visual processing. Again, it appears that the alpha coherence with the visual cortex is inaccurate, whereas the theta coherence more accurately reflects Larry's reports of visual imagery. Going by the theta coherence, the EEG reflects Larry's visual imagery.

The alpha coherence also indicated that the frontal lobes, responsible for decision-making, were idling during this condition. Larry reported some cognitive processing in one probe (out of 16), but even if this processing activated the frontal lobes, such activity may not have been enough to affect any of the coherence results. Therefore, the alpha coherence matches Larry's lack of cognitive processing during this condition.

Larry described having one each of language-based and cognitive imagery during this condition, however, there was no corresponding EEG coherence for either kind of image. Because there was only one kind of each out of 16 probes, it is likely that neither image could have generated enough brain activity to produce significant coherence.

Larry also reported body imagery in a significant number of probes during this condition. Whereas imagery involving body sensations would be difficult for EEG to detect, imagery involving body movement (that is, motor planning) would be easier for EEG to detect. The beta coherence shows widespread connections which suggest that Larry's entire brain engaged in motor planning and/or ongoing attention to tasks. Though most of Larry's images during this condition do not lend themselves to body movements, it may be possible that these images led to generalized motor planning activity. If so, then the EEG reflects this body-based imagery through the widespread beta coherence.

The widespread beta coherence may also indicate Larry's ongoing attention to his imagery during this condition, and Larry reported all of his images with detail in nearly every probe (15 out of 16). This focus would explain the beta coherence, while it could also add to any beta coherence generated by any motor planning during Larry's body-based images.

In summary, when Larry was guided toward a visual imagery experience, the EEG and phenomenological data were consistent regarding his visual images and memories along with the significant theta coherence. The EEG and imagery reports may also be consistent regarding the widespread beta coherence and possible motor planning during Larry's body imagery, as well as Larry's ongoing focus over the entire condition.

The EEG and phenomenological data were inconsistent regarding Larry's reports of sleepiness, which were not corroborated by the raw EEG. Larry may have been in an ASC during these probes, but the EEG is not able to indicate ASC. The data were also inconsistent regarding Larry's single reports of language-based and cognitive imagery, which were not matched by any related EEG coherence. These inconsistencies may be due to the small amount of each kind of imagery out of a large number of probes, and therefore not enough brain activity for each image was generated to produce any coherence. The data were again inconsistent regarding the alpha coherence indicating that the visual cortex was idling while Larry reported experiencing visual imagery, and the theta coherence corroborated this imagery. As discussed in the Affect, Body, Interaction, and Memory conditions, it appears that the alpha coherence was inaccurate regarding visual processing.

Summary of Larry

EEG Coherence Findings across Conditions

Larry's EEG data showed a consistent pattern of theta coherence involving the visual cortex and right temporal lobe for the Interaction, Memory, and Visual conditions. These connections implicate visual processing and memory retrieval/spatial processing,

Larry's EEG data on alpha coherence varied somewhat from condition to condition, but usually involved the visual cortex and frontal lobes in some configuration. These connections suggest that visual and decision-making processes were turned "off" in most conditions. However, the connections to the visual cortex contradict the theta coherence patterns for the Affect, Body, Interaction, Memory, and Visual conditions. The phenomenological data suggest that in these cases, the alpha data regarding the visual cortex is inaccurate, because Larry's reports involve significant amounts of visual imagery; therefore the visual cortex is not "off." However, the difficulty with discounting alpha activity in the visual cortex is that such activity would also indicate relaxation, and relaxation would be a desired brain state for a GIM session. The Power Spectral Density maps (not shown) are not helpful in settling this discrepancy, because they show little to no variation in activity between frequencies or between conditions, and show activity only around the site of an electrode near the visual cortex that lost its contact with Larry's scalp during the session. While the data consultants attempted to work around this missing electrode, this problem may have prevented accurate acquisition of the EEG data, particularly regarding the alpha frequency and visual processing, and thus caused these discrepancies between the EEG and phenomenological data. This explanation seems more plausible when compared to the consistency between the other connection frequently shown in the alpha coherence – the frontal lobes – and the few instances of cognitive processing across conditions. Because the problematic electrode was at the back of the head, far from the frontal lobes, it is logical that coherence implicating the frontal lobes would be unaffected.

Larry's EEG data on beta coherence consistently show several connections across Larry's entire brain, involving all the functional areas (visual, decision-making, language, memory retrieval/spatial processing, and motor planning), though these connections are limited for the Kinesthetic and Memory conditions. All these functions indicate that Larry's entire brain engaged in motor planning and/or ongoing attention to the imagery. Additionally, many of the beta connections across conditions radiate from the central region, indicating that motor planning may be especially implicated.

Larry's EEG data on gamma coherence show only a few, but widespread, connections across Larry's brain for the Memory and Interaction conditions. Both of these connection patterns also involve the visual cortex, meaning that Larry's brain shared information with many different regions, but usually the visual cortex, while it was making meaning out of the imagery.

Response to Guiding Across Conditions

Table 18 shows the extent to which Larry's responses to the imagery were consistent with the guiding conditions. Based on this table, it appears that Larry preferred responding to the guide during body-based guiding, whereas he preferred imaging in a visual modality when not responding to the guide.

Table 18.
Larry's Imagery Responses to Guiding Conditions

	# Probes Presented	# Responses as Guided	# Responses Unguided	Total Responses
Body Imagery	14	13	7	20
Affective Imagery	8	5	6	11
Visual Imagery	16	12	17	29
Interaction	7	4	1	5
Memories	3	2	5	7
Kinesthetic Imagery	3	2	0	2

Larry remarked that the guiding helped him during the induction and again during the final probe guiding him back to alertness. During these probes he focused his attention on the words used in the guiding in order to help him bring more awareness to his body. This seemed to serve two functions: to help him relax and let go of his wandering thoughts during the induction, and then to bring him out of the imagery and back to his body during the return.

Larry only occasionally struggled with the guiding cues. One difficulty was at the very beginning of the narrative probes where he wanted to continue with an image of a familiar house that had initially come to him, but wanted to also follow the guiding to imagine a house that was unfamiliar. This caused him to waver between the familiar house and his creation of a new house for several probes. A similar situation happened later when he was asked to imagine a specific memory about the person in his imagery, but he was conflicted over which memory to image. However, this did not cause any further conflicts beyond that probe. Otherwise, Larry had no particular comments about the guiding, though for the last third of the session he did not follow the guiding very closely. In terms of EEG, the beta coherence suggests that Larry was somewhat attentive to the imagery throughout the session (though perhaps not the guiding), while the raw EEG indicates that he was not as drowsy as he thought he was. Therefore, despite his intention to follow the guiding throughout the session, Larry's attention wavered from the guiding from time to time, and this was likely a problem of focus rather than drowsiness, given the EEG data.

Vividness of Imagery

Table 19 shows the relative vividness of various types of imagery reported by Larry. Based on this table, Larry most frequently experienced vivid imagery during visual images, yet a larger proportion of his imagery involving memories was vivid. But these reports of vivid imagery center around only three images that overlapped several probes each. Two of the images—the memory of Larry's childhood room and the chewing sensation—both had feelings of relaxation in common, where Larry first felt able to fully relax and enter his imagery deeply when he saw his room, and then the chewing sensation itself led to even more relaxation. In contrast, the remaining image, where Larry interacted with a significant person, was primarily emotional and meaningful for Larry. Features common to all three images were familiarity and safety; Larry knew each of the vivid images very well, and none of them were threatening. These characteristics of the images may have helped him relax and open up to the experience of each image. Larry himself categorized his vivid images by modality: his interaction with a significant person was the most vivid in terms of personal meaning; the childhood room was most vivid in visual sense; and the chewing sensation was the most vivid in a body sense.

Table 19.
Proportion of Vivid Imagery to Total Instances of Imagery Modality

	# Images Reported	# Vivid Images	% Vivid
Body Imagery	20	2	1%
Affective Imagery	11	1	1%
Visual Imagery	29	4	14%
Interaction	5	1	20%
Memories	7	2	29%
Kinesthetic Imagery	2	0	0%

In terms of EEG data, the types of imagery containing vivid images (body, affect, visual, interaction, and memories) matches the respective guiding categories which contained a consistent coherence pattern in the theta frequency. This pattern implicated visual processing and memory retrieval and/or spatial processing, but the integration of the EEG and imagery data in these conditions showed that most of the time the coherence corresponded with visual imagery and memories. Thus Larry had a persistent pattern of imaging and processing, during which he experienced his most vivid imagery.

Alertness

Table 20 shows the frequency of images with drowsy brain states along with the number of vivid images for each type of imagery and the number of images for each imagery type that were classified as both vivid and drowsy.

Table 20.
Frequency of Imagery with Drowsy Brain States, Vivid Imagery, and Vivid and Drowsy Imagery

	# Drowsy Images	# Vivid Images	# Vivid and Drowsy Images
Body Imagery	1	2	0
Affective Imagery	2	1	0
Visual Imagery	3	4	0
Interaction	1	1	0
Memories	0	2	0
Kinesthetic Imagery	0	0	0

According to this table, drowsiness and imagery vividness are not related for Larry's imagery.

Larry reported feeling sleepy in eight probes, but the EEG data coincided with these reports for only two probes (#36 and #37), while the EEG identified drowsy brain states in a total of seven other probes. Several of Larry's reports of sleepiness and the two probes with drowsy brain states occur during a series of probes where Larry began to have his chewing imagery. This series is shown in Table 21.

Table 21.
Probe #s 34-36: Alertness States and Image Characteristics

Probe #	Raw EEG	Larry's Report	Image characteristics
34	Awake	Asleep	Vivid
35	Awake	Asleep	Difficult to recall Disconnected from guiding
36	Drowsy	Asleep	Difficult to recall Disconnected from guiding
37	Drowsy	Asleep	Difficult to recall Disconnected from guiding
38	Awake	Asleep	Difficult to recall Disconnected from guiding

:

Suddenly, in probe #39, Larry could recall the imagery, while the raw EEG continues to show he is awake. Thus, drowsiness may have been related to Larry's reports of sleepiness, even though these data do not perfectly coincide. Additionally, drowsiness for Larry (whether perceived or as a brain state) leads to difficulty recalling imagery and attending to the guiding.

Larry also stated he felt he was "in" the ASC for five probes, however, none of these reports coincided with anything but alert brain states in the EEG. These images have few characteristics in common other than that Larry felt relaxed and focused on his images. For Larry then, relaxation and focus are distinguishing features of an ASC, however, the EEG cannot add any information about Larry's brain state related to being in an ASC.

Response to Music

Larry reported that the music influenced his imagery in only three probes: an expanding image in the Affect condition, (#27), a shifting image in the Kinesthetic condition (#15), and a vivid, expanding image in the Interaction condition (#25). In all three probes, the music matched the emotional content of the image, and the music also appeared to either expand or shift the image from one modality to another or to multiple modalities. None of these images had any EEG data related to alertness in common, and the beta coherence suggests that Larry was generally attentive to the task of imaging across conditions. So Larry may have been more aware of the music than he reported, or his attention on the imagery did not include the music very frequently. Therefore, for the three probes where Larry addressed the role of the music in his imagery, his awareness of the music was not related to his alertness, and the music matched Larry's emotion and shifted the imagery into different modalities.

Difficulty Recalling Imagery

Larry had difficulty recalling his imagery in seven probes, which were evenly distributed across all of the conditions except Kinesthetic. As discussed previously in the Alertness section, several of these probes occurred over a series of images where Larry felt he was drowsy, and the EEG identified drowsy brain states for two of these probes. No other difficult-to-recall imagery coincided with drowsy brain states, but Larry felt he was drowsy or asleep during all of the difficult-to-recall imagery.

Larry commented during the interview that, while struggling to recall imagery around probe #36, he thought that dialoguing during the session would help him remember his imagery better. This may indicate that Larry was aware of his lack of focus and that he needed to report his imagery in the moment in order to maintain attention on it. Altogether, the data indicate that Larry's difficulty recalling his imagery in most cases was more due to lack of attention rather than actual drowsiness.

Significance of Imagery Experience

This session was not particularly significant for Larry, though he said it was very relaxing and he experienced very satisfying body imagery. Larry did have one image which was meaningful for him, where he interacted with a significant person, but this image was an independent experience, one of many separate images without any ongoing narrative. The gamma coherence across conditions contained limited connections, and was only significant for the Memory and Interaction conditions, both of which related to the meaningful image that overlapped several probes. Thus, the gamma coherence reflected the one meaningful image Larry reported; otherwise, the gamma coherence also reflected the overall lack of meaning for the rest of the session.

Consistency between EEG and Phenomenological Data across Conditions

Across all the conditions, the EEG and phenomenological data were consistent regarding the theta coherence, which reflected Larry's reports of visual imagery and memories in the Body, Interaction, Memory, Affect, and Visual conditions. The data were also consistent regarding the widespread beta coherence and Larry's general attentiveness to the imagery across conditions. Finally, the data were also consistent in terms of the gamma coherence, reflecting the information-sharing and meaning-making that occurred during the Memory and Interaction conditions, and the lack of information sharing and meaning-making during the remaining conditions.

Across all the conditions, the EEG and phenomenological data were inconsistent regarding Larry’s reports of drowsiness. Often these data did not align, though Larry appeared to be drowsy and had difficulty recalling his imagery when he thought he was sleepy. However, it appears that in most of these cases Larry’s perceived sleepiness was likely due to a lack of focus on his imagery rather than drowsiness. The EEG and phenomenological data were also inconsistent regarding the alpha coherence, which showed that the visual cortex was idling during the Affect, Body, Interaction, Memory, and Visual conditions; yet Larry reported visual imagery, while the theta coherence indicated that the visual cortex was active in these same regions. This discrepancy may have occurred due to technical problems acquiring the EEG data. Ultimately, the alpha coherence related to the visual cortex is not accurate for these conditions, given the congruence between the theta coherence and imagery reports.

Finally, the EEG and phenomenological data are unclear regarding the nature of Larry’s ASC. Larry clearly identified probes where he felt he was in an ASC, however, there was no raw EEG data distinguishing these probes from any other probe. If Larry achieved an ASC during this session, the EEG was unable to identify its corresponding brain state.

CHAPTER 8

DAPHNE: RESULTS AND DISCUSSION

Introduction

Daphne was an experienced GIM traveler, having been through a total of over 70 sessions, and was also an advanced trainee in the GIM therapist training program. She had last undergone a personal session two years prior to this session. Daphne appeared to be a little nervous about the EEG setup at the start of the session, and she reported that during the induction she was concerned about disturbing the electrodes when she had a tickle in her throat and needed to cough. However, after the induction, she reported only about her imagery and thus seemed to have forgotten about the electrodes until after her imagery had ended. Daphne's imagery revisited several childhood scenes and relationships, and was very exploratory in nature. During the interview, Daphne often found that her imagery represented aspects of her way of living or perceiving the world, thus she found a great deal of meaning and insight in her imagery immediately after the session. At the end of the session, she expressed her surprise at the depth of her travel, saying that she was not expecting a research session using pre-recorded guiding to evoke such intense imagery. She even said that she had "real GIM imagery" during this session, and that she traveled as she normally does during a usual GIM session. Daphne's EEG coherence maps are located in Appendix G, Figure 8.

Affect Condition

Phenomenological Data

Table 22 presents Daphne's responses to the Affect condition, including the imagery she experienced for each probe, its congruence with the guiding condition, the

Table 22.
Affect Condition: Daphne's Phenomenological Data

Probe #	Affect condition guiding direction	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
17	Be aware of how it feels to be inside the house—notice any emotions you might have being there…	Emotions about being in unfamiliar house; after cue to be aware of emotions, noticed mood of music and corresponding body feeling	Yes; music, body	Stable, Music-influenced image Fully responsive to guiding
20	Open yourself to any emotions or reactions you might have at this time…	Feelings related to objects from childhood and visual memories about them	Yes; visual, memory	Stable image Fully responsive to guiding
23	As you relive the memory, open to your emotions about the experience and the person. Allow yourself to feel these emotions…	Auditory and visual memories of significant person; related emotions; feel self as child	Yes; auditory, visual	Expanding image

Table 22. (continued)

Probe #	Affect condition guiding direction	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
33	Become aware of any emotions or reactions you may have about being in the room with this object	Feelings related to significant object; visual, emotional and auditory memories tied to object	Yes; memory, visual, auditory	Particularly vivid, Shifting image
34	Stay with those feelings for a little while.	More emotions related to object	Yes	Particularly vivid, Stable image
37	Be aware of any feelings you have now.	Feeling of connection and shared experience with object	Yes; interaction	Particularly vivid, Stable image
40	Be aware of your emotions while you shut the door behind you, and leave that place.	Strong body sensations related to difficulty leaving house, awareness of body parts; upon cue to leave house, suddenly had different body sensations	Yes; body, visual	Expanding image Fully responsive to guiding

qualitative coding of the imagery, as well as her reports on her alertness. All of the imagery in this condition was congruent with the guiding, though most probes also involved other kinds of imagery such as body sensation, memories, auditory and visual awareness, and interactions. Three of the eight images were particularly vivid. Daphne said the music influenced her imagery in one probe, while she fully responded to the guiding for this and two other probes. Five of the images were stable in nature, whereas two images expanded into more modalities, and one shifted in modality. Daphne did not comment on her alertness or ASC for any of this condition's probes.

EEG Data

When Daphne was guided toward an affective imagery experience, a review of her raw EEG data showed that she was drowsy during six of the eight probes (all but #17 and 34).

The EEG coherence analysis showed significant theta coherence involving both the left and right temporal regions. These connections implicate language processing and memory retrieval and/or spatial processing. Thus, when Daphne was guided to have an emotional image, her brain engaged in language and either memory retrieval and/or spatial processing.

The EEG coherence analysis also showed significant connections in the beta frequency across both temporal lobes, as well as widespread connections over most of her brain. These connections again implicate language and memory retrieval/spatial processing, while also indicating that Daphne's whole brain (adding visual, decision-

making, and motor planning) was involved in ongoing attention to the imagery and/or motor planning as she responded to guiding to experience affect. Finally, the EEG coherence analysis showed widespread interactions in the gamma frequency, indicating that all of Daphne's brain (including visual, decision-making, motor planning, language, and memory retrieval/spatial processing) shared information in order to make the imagery during this condition coherent.

Integration of EEG and Phenomenological Data

According to the raw EEG, Daphne was drowsy for ¾ of this condition's probes, yet she did not report feeling drowsy, nor did she report on her ASC. She had no difficulty describing any of her images, in addition, three of the eight images during the Affect condition were quite vivid (though the EEG showed she was alert for one of these, #34). Consequently, she did not appear to be truly drowsy during any of these probes. Daphne may have been in an ASC but did not explicitly identify being in such a state during this condition. Thus there may be a relationship between the drowsiness shown in the raw EEG and Daphne's ASC during the Affect condition.

Daphne reported visual imagery in over half the images during the Affect condition, while the beta coherence shows connections with the visual cortex, implicating visual processing. Therefore the beta coherence matches with Daphne's visual imagery.

Daphne also reported experiencing memories in two out of the eight probes. The theta and beta coherence both implicate memory retrieval via their connections with the right temporal lobe. This brain region is also responsible for spatial processing, but none of the Affect condition images involve such imagery. Therefore, Daphne's memories are most likely related to the beta and theta coherence to the right temporal lobe.

Daphne's reports of her body-based images involve a combination of body sensations (probe #17) and sensations related to—but not primarily caused by—body movement. EEG coherence cannot detect brain activity related to body sensations, but it can detect activity related to body movement, in terms of motor planning. There are a couple of beta coherence connections to the central areas of Daphne's brain which could be related to the body-based imagery during this condition, but if so they would likely reflect the imagery specifically related to body movement.

Daphne reported experiencing affective imagery during this condition, but the EEG does not indicate any involvement of the insula, therefore, the EEG cannot provide any information regarding Daphne's affective imagery.

The theta and beta coherence implicate language processing during the Affect condition, but Daphne did not report any imagery involving language processing. There are at most two images where Daphne might have experienced words in her imagery, either in the form of a cognitive reflection of her image or as an image that was secondary to another kind of sensory modality. If these images did contain language-based imagery, then they would be responsible for the beta and theta coherence to the left temporal lobe.

The beta coherence also indicated, through its widespread and many connections, that Daphne's brain engaged in generalized motor planning and/or ongoing attention during this condition. Though very few images relate to motor planning, all of the images follow a coherent narrative, demonstrating that Daphne maintained ongoing attention to her imagery throughout this condition. Thus Daphne's focus on the imagery reflects the widespread beta coherence.

The gamma coherence also showed widespread connections which indicated a great deal of information-sharing and meaning-making during this condition. Daphne's imagery was very meaningful for nearly all the probes in the Affect condition. The images not only related to significant people, things, and events in her past, but, according to Daphne, the images also reflected her current behaviors or worldviews. Therefore the gamma coherence matches the meaningfulness of the Affect condition images.

Therefore, when Daphne was guided toward an affective imagery experience, the EEG and phenomenological data were consistent regarding: the visual and body-based imagery and the related beta coherence; Daphne's memories and both the beta and theta coherence; the widespread networks in the beta coherence and Daphne's ongoing attention to the imagery; and the widespread networks in the gamma coherence and the meaningfulness of the imagery.

When Daphne was guided toward an affective imagery experience, the EEG and phenomenological data were inconsistent regarding the drowsy brain states during images where Daphne did not appear to be drowsy. This inconsistency might be an example of Daphne's ASC. The EEG and phenomenological data were also inconsistent regarding the significant beta and theta coherence implicating language processing, while Daphne did not report any language-based imagery. It is possible such imagery was not fully reported, as there were two possible images where Daphne may have experienced language.

Body Condition

Phenomenological Data

Table 23 summarizes Daphne's responses to the Body condition. This condition contained 14 total probes, nine of which occurred during the induction and involved

Table 23.
Body Condition: Daphne's Phenomenological Data

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
1	Take a long, deep breath. Slowly take in as much as you can… and let it out. Slowly breathing in…. and out…[…]	Relaxed but also aware of tickle in throat; tried to imagine throat free of tickle while breathing to relax	Yes	Shifting imagery Selective response to guiding
3	Now imagine the ball of light moving to the top of your head….and then down, around and through your head. […]	Visual image of ball of light with sensation of energy in body; distracted by throat	Yes; visual	Shifting imagery
4	Now imagine the ball of light moving around and through your neck and shoulders. […]	Visual and physical sensation of ball of light moving to neck and shoulders	Yes; visual	Stable image

Table 23. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
5	…one ball for your right arm and hand, and one ball for your left arm and hand… […]	Visual and physical sensation of balls of light down arms and hands; then throat tickle became overwhelming	Yes; visual	Contracting image Fully responsive to guiding
6	….imagine the ball moving around and through your torso and back… […]	Coughing during guiding, then concerned about missed cues, moving too much to disturb electrodes, getting re-oriented to induction	Yes; visual, cognitive	Incomplete, Shifting image Disconnected from guiding
7	Now the ball moves to your hips and waist... […]	Intermittent worry about coughing again, bringing out of ASC, then trying to attend to induction again via body awareness	Yes; cognitive	Incomplete, Shifting image “Out’ of ASC

Table 23. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
8	Now the ball moves to your hips and waist.[…]	More relaxed, no more distractions, but still out of ASC; trying to follow guiding	Yes	Incomplete, Stable image Selectively responsive to guiding "out" of ASC
9	Now let the ball move down to your lower legs and feet… […]	More aware of body via feet, sensation and glowing of ball of light; relaxed	Yes; visual	Stable image
10	Now move the ball of light wherever you need it to go … […]	No tension in body, but moved ball to torso to address missed guiding from before	Yes; interaction	Stable image

Table 23. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
14	[…] Notice the door handle… and surface of the door. Reach out and touch the surface---what it feels like; its temperature, its texture, its size.	See door of house in detail, tactile sense of its surface	Yes; tactile, visual	Expanding image
18	[…]… slowly move around the room…noticing any sensations your body may have… […]	See room from childhood in detail, then see object in detail	No; visual, memory	Stable image
35	If you wish, touch or hold the object….and bring into awareness how it feels…	Tactile and visual sense of important object, with memories and emotions about object	Yes; tactile, memory	Particularly vivid, Expanding image; Fully responsive to guiding

Table 23. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
41	[…] return now to the path where you first began...[…] notice how your feet feel being back on the ground… […]	Sensation of physical lightness while moving away from house	Yes; visual	Stable image
42	[…] Let the image fade while gradually allowing your awareness to return to your body…	Awareness of irritation in throat again, with heaviness in body, which stopped when music stopped; moving body to bring it back to alertness; reflection on depth of session	Yes; cognitive	Shifting, Music-influenced image "Out" of ASC

simultaneous guiding for visual imagery. The remaining five probes (#s 14-42) occurred during the narrative portion of the session. All but one of the images during this condition were congruent with the guiding (13 out of 14), and most of the images occurred with at least one other kind of imagery. Visual imagery was most common, appearing in nine out of the 14 probes. Other imagery included memories, and tactile, body, interactive, and cognitive images. One image (out of the 14) was particularly vivid, whereas two others did not form completely. Daphne reported that, out of the 14 probes, the music influenced one image, whereas she selectively responded to the guiding in two probes, and fully responded to the guiding in two more probes. Six of the images were stable, four of the images shifted modalities, two of the images expanded modalities, and one image contracted modalities. Daphne reported that she felt “out” of the ASC in three out of the 14 probes, but she did not comment about being drowsy at any time during this condition.

EEG Data

When Daphne was guided to have body-based experiences, a review of her raw EEG data revealed that she was drowsy for six out of the 14 probes.

The EEG coherence analysis indicated that the theta frequency had significant connections implicating language and memory retrieval/spatial processing. Just like the Affect condition, this meant that when Daphne was guided to experience body sensations, her brain engaged in language and memory retrieval and/or spatial processing.

The EEG coherence analysis showed that the beta coherence for the Body condition had fewer connections than beta coherence in the other conditions. These connections involve language and spatial planning/memory retrieval, motor planning, and visual centers, whose connections implicate these same processes while Daphne was guided to experience body sensations. Compared to the coherence patterns for the other conditions, fewer beta connections implies that Daphne's imagery required less motor planning and/or ongoing engagement during the Body condition.

The EEG coherence analysis also showed gamma coherence involving a few connections covering nearly all of Daphne's brain (visual, decision-making, language, memory retrieval/spatial processing, motor planning). Even though only a few connections occurred, their widespread nature still indicates whole-brain involvement in making Daphne's imagery during the body condition coherent. However, the amount of information shared among different regions of the brain is less than in some other conditions in Daphne's session.

Integration of EEG and Phenomenological Data

In terms of alertness, Daphne's reports of being "out" of the ASC matched with the raw EEG data showing she was awake during these probes. Of the six images with drowsy brain states, one included a vivid image, whereas the remaining five images had no particularly distinguishing imagery, and three of the six had stable images, whereas one contained contracting imagery and one shifted from one modality to another. Interestingly, the raw EEG indicated drowsiness during probe #s 3 and 5, immediately prior to Daphne's coughing that disturbed her attention to the induction, and the EEG again showed drowsiness during probe #s 9 and 10, two probes where Daphne described a transition back into relaxation after this disruption. In probe #s 18 and 35 (the vivid image), the raw EEG showed drowsiness while Daphne described childhood scenes and objects in great detail, while also saying she felt as if she was a child in these images. In none of these images do Daphne's reports indicate drowsiness or lack of awareness of her imagery. The personal significance of the latter images, along with the EEG data, also suggests the possibility that Daphne was in an ASC during all or most of these probes. Therefore, the EEG and phenomenological data might reflect Daphne's ASC during the induction and again during two narrative probes, whereas her reports of being "out" of the ASC match with EEG indicators of alertness.

Daphne described having body-based imagery for all but one of the probes. However, most of this imagery included body sensations whose activity cannot be detected by the EEG. One probe, #41, contained imagery that might involve motor planning, which could be responsible for the connections to the central region of the brain in the beta frequency, as well as the widespread nature of the connections in that frequency. But there are very few connections, either to the central region or across the brain, indicating that only a little motor planning occurred. This would match Daphne's reports of body movement during this condition.

Daphne reported two memories out of the 14 probes, and one of these was particularly vivid. Meanwhile, the theta and beta coherence showed connections with the right temporal lobe, which is responsible for memory retrieval. Thus the theta coherence reflects Daphne's memories.

The theta and beta connection with the right temporal lobe could also implicate spatial processing, which Daphne did not explicitly report, but could have experienced in her imagery. For instance, during the induction, the movement of the ball of light over different parts of the body could involve spatial planning, as well as her impressions of her childhood room in probe #18, and the movement away from the house in probe #41.

Therefore, Daphne may have under-reported her spatial awareness in these probes, and this imagery may have contributed to the significant coherence to the right temporal lobe.

Daphne also reported having visual imagery during this condition, while the beta coherence shows only a single connection to the visual cortex, implicating some visual processing. This beta coherence therefore reflects Daphne's visual imagery.

Daphne's reports of cognitive imagery, which occurred in three out of the 14 probes, does not seem to have any matching EEG coherence, as there are no connections to the frontal lobes in either the theta or beta frequencies. This lack of coherence may be due to a small amount of cognitive processing relative to all the other kinds of imagery, thus not producing enough brain activity in the frontal lobes to produce any detectible coherence.

The theta and beta coherence implicated language processing during this condition; however, Daphne did not report any language-based images. There are a few probes which might involve the use of language in the imagery, such as the probes where Daphne was distracted by the tickle in her throat, which might have involved some self-talk to soothe the tickle. She may also have focused on the words in the guiding to focus on different parts of her body, particularly as she was re-orienting herself to the induction after coughing. In probe #35 she immediately responded to the guiding to touch or hold the object in her image, perhaps indicating strong attention to the words of the guiding. Overall, Daphne may have under-reported her attention to language throughout this condition, but this attention seems to be responsible for the theta and beta connections to the language region of her brain.

The widespread beta connections indicate that either general motor planning and/or ongoing attention to the imagery occurred during this condition; however, Daphne’s imagery lacked much, if any, motor planning, while her reports depict a clear narrative throughout her imagery, suggesting that she maintained ongoing attention to her imagery during all the Body condition probes. Therefore, even though the beta coherence in this condition is weaker compared to other conditions (due to the fewer number of connections), Daphne’s attention is mirrored by the widespread nature of the coherence pattern.

Like the beta coherence, the gamma coherence for the body condition contained few widespread connections across the brain. Daphne’s imagery during this condition involved one vivid and meaningful image (#35), but otherwise her reports mainly described sensory experiences, which at times related to significant objects and people. This moderate degree of meaning-making while imaging seems to be reflected by the limited number of widespread connections in the gamma frequency, which shows a limited amount of information sharing across Daphne’s brain.

When Daphne was guided toward a body-based imagery experience, the EEG and phenomenological data were consistent regarding the reports of motor and visual imagery and beta coherence, reports of memories and beta and theta coherence, the widespread beta coherence and Daphne’s attention to her imagery, and the widespread gamma coherence and the limited degree of meaning-making in Daphne’s imagery.

The EEG and phenomenological data were inconsistent regarding Daphne’s apparent drowsy brain state in particular probes where she did not report feeling drowsy, nor did her imagery descriptions indicate drowsiness. These cases might reflect

Daphne's ASC. The data were also inconsistent regarding Daphne's reports of cognitive imagery, but no related EEG. This discrepancy could be due to insufficient cognitive processing relative to all the other kinds of imagery. Finally, the data were also inconsistent regarding the beta and theta coherence implicating language processing, while Daphne did not report any language-related imagery. There are some probes where Daphne may have under-reported the influence of language on her imagery, and these experiences would have contributed to the EEG connections to the left temporal lobe, which is responsible for language processing.

Interaction Condition

Phenomenological Data

Table 24 summarizes Daphne's responses to the Interaction condition. This condition contained seven probes, the first of which was the final induction probe and was combined with the Body and Visual probes; all remaining probes occurred during the narrative portion of the session. All of Daphne's images were congruent with the guiding to interact with another person or with objects in her imagery. As part of these interactions, most of her images involved several sensory images, such as visual, affective, body, and tactile. Daphne reported that, out of the seven probes, the music influenced the images in two probes, whereas she fully responded to the guiding in one probe. Four of the seven images were stable in nature, two of the seven shifted modalities, and one of the seven expanded modalities. Daphne did not report on her ASC or alertness for any of this condition's probes.

Table 24.
Interaction Condition: Daphne's Phenomenological Data

Probe #	Interaction condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
10	Now move the ball of light wherever you need it to go to relax any part of your body…[…]	No tension in body, but moved ball to torso to address missed guiding from before	Yes; body	Stable image
24	If the person has something to say, listen to it; really open to what the person is saying to you.	Had conversation with significant person	Yes; language	Stable image
25	If you have something to say back, take time now to say it. Speak freely to the person.	Expressed feelings about this person to him, while being aware of expressive nature of music	Yes; language, emotion, music	Expanding, Music-influenced image
26	Listen to what the person has to say in response, and say anything else you need to say.	Heard person's response and engaged in conversation again, still aware of own feelings and music	Yes; language, emotion, music	Shifting, Music-influenced image

Table 24. (continued)

Probe #	Interaction condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
28	Begin to draw this interaction to a close. Say goodbye to the person and prepare to move into another room of the house.	Said goodbye to person and moved to different part of house, see room's features and colors	Yes; language, visual	Shifting image Fully responsive to guiding
36	If there is something you would like to do with this object, take time now to do what you need to do	Touch significant object to express feelings to it, looking at it	Yes; emotion, visual, tactile	Particularly vivid, Stable image
38	If you wish, you can leave the object wherever it needs to be, saying goodbye to it... or taking it with you.	Touch object again, then set it down in room of house, aware of feelings toward object	Yes; visual, emotion	Stable image

EEG Data

When Daphne was guided to interact with her imagery, a review of her raw EEG data indicated that she was drowsy during four of the seven Interaction probes.

The EEG coherence analysis showed significant beta coherence across Daphne's entire brain, indicating that all of the functional areas (decision-making, language and spatial planning/memory retrieval processing, motor planning, and visual processing) were involved in motor planning and/or ongoing attention to the imagery.

The EEG coherence analysis also indicated widespread gamma coherence with many connections across most of Daphne's brain. This means that of the functional areas, all except decision-making were called upon to make the imagery during the Interaction condition coherent.

Integration of EEG and Phenomenological Data

The raw EEG showed that Daphne was drowsy in four out of seven probes, but she did not report feeling drowsy or comment on her ASC during this condition. Two of the four probes were close together (#s 24 and 26), and concerned Daphne's interaction with a significant person. The imagery in one of these was influenced by the music. Probe #38 involved imagery about a significant object related to the person in the images during probe #s 24 and 26. Thus these three probes concerned past relationships and objects that were very important to Daphne. Like the drowsy images during the Body condition, Daphne had drowsy brain states while having detailed and memorable images about people and things from her past, and the imagery reports do not seem to reflect true drowsiness. Therefore, these particular probes may be examples of Daphne's ASC.

Daphne also reported visual imagery in a few probes during this condition; this imagery is again reflected by the beta coherence, which also connects with the visual cortex.

Daphne’s reports of affective imagery might be reflected by a single connection between the right frontal lobe and the left temporal lobe in the beta frequency. This connection could indicate the involvement of the insula, which assists in processing emotions. Therefore the EEG might reflect the emotional imagery that Daphne reported during this condition.

According to the beta coherence involving many connections across the brain, a great deal of motor planning and/or ongoing attention to the imagery occurred during the Affect condition. Though the reports indicate little (if any) motor planning, the imagery descriptions show a clear narrative thread connecting the images in this condition, particularly during the probes where Daphne’s conversation with the significant person occurred. This ongoing attention therefore matches the widespread coherence in the beta frequency.

The gamma coherence also involved widespread connections across Daphne’s brain, indicating that these regions shared information in order to make meaning of the imagery. Daphne’s imagery, including the conversation, involved several combined sensory modalities that made the imagery meaningful and multisensory. Thus the gamma coherence matches the meaningfulness of this condition’s imagery.

Therefore, when Daphne was guided to have an affective experience, the EEG and phenomenological data were consistent regarding the reports of visual and language-based imagery and the beta coherence, and the widespread beta coherence and Daphne’s ongoing attention to the imagery. The data might also be consistent regarding Daphne's reports of affective imagery and the possible indication that the insula was involved in the beta coherence. Finally, the EEG and phenomenological data were consistent regarding the widespread gamma coherence and the meaningfulness in this condition's data.

The EEG and phenomenological data were inconsistent regarding the raw EEG's indications of drowsiness in several probes where Daphne's reports indicated full awareness of her imagery, the music, and the guiding. Thus these probes may be examples of Daphne's ASC.

Kinesthetic Condition

Phenomenological Data

Table 25 summarizes the phenomenological data from the three probes during the Kinesthetic condition. Whereas two of the three images were congruent with the guiding and were primarily kinesthetic in nature, probe #12 and probe #39 also involved some cognitive reactions to the imagery. Probe #12 also contained awareness of the music and spatial relationships in the imagery, as well as and emotional reactions to the situation. Probe #15 contained multiple senses, such as visual, olfactory, and spatial awareness. Daphne stated she was fully responsive to the guiding in two of the three probes, even though one of these (#12) was an incomplete image; the other was a stable image. Probe #15 was particularly vivid, and expanded in imagery modalities. Daphne did not report on her ASC or alertness for any of the three probes.

EEG Data

When Daphne was guided to have kinesthetic imagery, a review of her raw EEG indicated that she was drowsy during one of the three probes during this condition (#15).

Table 25.
Kinesthetic Condition: Daphne's Phenomenological Data

Probe #	Kinesthetic condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
12	Now feel yourself walking along the path toward the house. Notice how your feet feel as they take each step… […]	Confusion regarding spatial relationship to house and in how to walk to house; some difficulty matching walking tempo to music, some frustration with this	Yes; spatial, visual, music	Incomplete, Stable, Music-influenced image Fully responsive to guiding
15	Now imagine opening the door…feel the weight of the door as you open it…[…]	House's smell, along with seeing layout of house and impressions of its décor	No; visual, olfactory, spatial	Particularly vivid, Expanding image
39	It's now time to leave this place. You can walk out of the room, and out of the house… notice how your body feels as you walk…	Coaching self to be more aware of body, strong physical experience of difficulty moving body	Yes; cognitive, emotion	Stable image Fully responsive to guiding

The EEG coherence analysis showed that the theta frequency had one connection involving the regions responsible for language and memory retrieval and/or spatial processing. Thus, when Daphne was guided to experience body movement, her brain engaged in language and memory retrieval and/or spatial processing.

The EEG coherence analysis indicated widespread beta connections, though there were fewer connections in this condition compared to other conditions. The beta connections involved the regions responsible for language and memory retrieval/ spatial processing, motor planning, and visual processing. All of these brain functions occurred when Daphne was guided to experience kinesthetic imagery. Additionally, the fewer number of connections in the beta frequency implies that Daphne's imagery required less motor planning and/or ongoing engagement compared to other conditions. The EEG coherence analysis also indicated a few widespread connections in the gamma frequency. This coherence result involved the visual, motor planning, language and memory retrieval/spatial planning regions, indicating that, while Daphne responded to the guiding during the Kinesthetic condition, these regions shared information in order to make the imagery coherent. However, the fewer number of connections compared to the other conditions suggests that less meaning-making occurred during this condition.

Integration of EEG and Phenomenological Data

Daphne did not comment on her alertness or ASC during this condition, but the raw EEG indicated she was drowsy during the one probe (out of the three) with imagery that was particularly vivid. This image also involved olfactory imagery, which Daphne said was a rare kind of imagery experience for her. As seen in the Affect, Body, and Interaction conditions, Daphne easily recalled her imagery during this probe where the

EEG identified drowsiness, and thus she did not seem to be truly drowsy. The combination of rare sensory imagery, ease of recall, and vividness in the imagery along with the drowsy brain state suggests that this probe could be an example of Daphne's ASC.

Daphne reported kinesthetic imagery during two out of the three probes, while the beta coherence shows one connection with the central region of the brain. This region is responsible for motor planning, therefore, the beta coherence reflects Daphne's kinesthetic images.

Daphne also reported visual imagery in two out of the three probes, and this processing is also reflected by the beta coherence via a connection to the visual cortex.

Daphne's reports of cognitive imagery in one probe do not appear to match any of the coherence results, as neither the theta or beta frequencies show any connections to the frontal lobes. However, this one report of cognitive processing describes a brief self-coaching image that was secondary to the more dominant kinesthetic imagery. Therefore, there may not have been enough cognitive processing from this one image to produce any significant coherence.

The report of affective imagery in one image does not have any corresponding coherence with the insula. Therefore, the EEG cannot provide any further information about Daphne's affective imagery during this condition.

Language processing was implicated by the theta and beta coherence; however, Daphne did not specifically describe any imagery that would involve language. During probe #s 12 and 39 Daphne may have engaged in some self-talk to be more attentive to the guiding and to her body, which might have produced coherence with the left temporal lobe. If so, then Daphne's under-reported language imagery is reflected by this theta and beta coherence to the region responsible for language processing.

The theta and beta coherence also implicated either memory retrieval and/or spatial processing (in the right temporal lobe) during this condition, but Daphne reported none of these kinds of imagery. She may have experienced a memory during probe #15, as the olfactory image of an old house was quite vivid. Memories might also have been involved during probe #39, as Daphne stated she had been through a similar kinesthetic experience in her past. There may also have been under-reported images involving spatial processing, occurring in probe #15 where Daphne entered the house and had a sense of the spatial layout, and in probe #39 where she was leaving the house. Thus these images, combined with any under-reported memories, would contribute to the processing implicated by the theta and beta coherence in the right temporal lobe.

The widespread beta coherence indicated that either motor planning and/or ongoing attention to the imagery occurred during this condition. Motor planning did occur in two out of the three images, though Daphne also showed her attention to the imagery by describing her response to each probe in detail. Therefore both of these processes in the imagery contributed to the widespread beta coherence.

The gamma coherence for this condition crossed both hemispheres of Daphne's brain, involving several regions but with only a few connections. Meanwhile, Daphne's imagery, while vivid at times, was primarily sensory and did not involve a great deal of meaning-making, relative to the other conditions. Therefore the limited amount of gamma coherence reflects the minimal amount of meaning-making that occurred in the Kinesthetic condition's imagery.

Therefore, when Daphne was guided to have a kinesthetic experience, the EEG and phenomenological were consistent regarding the congruence between the beta coherence and the reports of kinesthetic and visual imagery, as well as the widespread beta coherence and the amount of motor planning and ongoing attention that occurred during this condition. The EEG and phenomenological data were also consistent regarding the few connections in the gamma coherence and the minimal amount of meaning-making that occurred during this condition.

The EEG and phenomenological data were inconsistent regarding the raw EEG showing drowsiness during a probe where Daphne did not appear to be drowsy; rather, she was alert and attentive to the imagery. This incongruence may actually be an example of Daphne's ASC. The EEG and phenomenological data were also inconsistent regarding Daphne's report of cognitive imagery in one probe, while there was no corresponding coherence. This may be due to not enough cognitive processing to produce the relevant coherence, as this image occurred only once and was secondary to the kinesthetic image during that probe. Finally, the EEG and phenomenological data were inconsistent regarding the theta and beta coherence which implicated memory retrieval and/or spatial processing, while Daphne had made no reports of either kind of imagery. It is likely that both kinds of imagery were under-reported, as several potential examples of each can be identified. This under-reported imagery would likely be responsible for the theta and beta coherence to the right temporal lobe, which processes memory retrieval and spatial processing.

Memory Condition

Phenomenological Data

Table 26 summarizes Daphne's phenomenological data for the Memory condition, which contained three probes. All of Daphne's images were congruent with the guiding to experience memories, and many of these images contained other imagery such as visual and affective (both of these in all three images). Daphne stated the music influenced the imagery in one image, and she was fully responsive to the guiding in a different image. All three images were stable in nature. Daphne did not report any awareness of her ASC or alertness for any of the three probes.

EEG Data

When Daphne was guided to experience memories, a review of the raw EEG data indicated that she was drowsy during one of the Memory condition probes (#31)

The EEG coherence analysis showed significant beta connections involving Daphne's whole brain. This means that all of the functional areas (decision-making, language and spatial planning/memory retrieval processing, motor planning, and visual processing) were involved in motor planning and/or ongoing attention to the imagery.

In addition, the EEG coherence analysis indicated significant gamma coherence spread out across much of Daphne's brain, though with the fewest number of connections compared to the gamma coherence in all the other conditions. All of the functional areas except for those responsible for decision-making contributed to making the Memory condition images coherent. The fewer number of connections suggests that not as much information-sharing between regions of the brain occurred during this condition compared to other conditions.

Table 26.
Memory Condition: Daphne's Phenomenological Data

Probe #	Memory condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
22	Allow yourself to go back and remember a pleasant time with this person…Let your memory open up, and fully remember it.	Trying to recall memory with significant person, experiencing memory visually and emotionally	Yes; visual, language	Stable image Fully responsive to guiding
31	Open to any memories you have about the object, or about anything or anyone the object reminds you of….. Allow the memories to become clear and vivid.	Recalling memories about important object; emotions and visual details of object	Yes; emotion, visual	Stable image
32	Now you notice that the scene has shifted around you… […]….but now you are in a room from your past… […]	Visual details of room from past, awareness of how music fits the colors of room, emotional awareness	Yes; visual, music	Stable, Music-influenced image

Integration of EEG and Phenomenological Data

Daphne did not report on her alertness or ASC during the Memory condition, yet the raw EEG identified one probe where she was drowsy (#31). Daphne described the imagery in this probe as primarily emotional, as she reconnected with a significant object from her past and memories of a significant person associated with the object. The imagery was stable in nature, but Daphne did not offer any responses she had about the music, the guiding, or the image's vividness. Yet her description of the image was detailed while her imagery was congruent with the guiding, and thus Daphne did not appear to be drowsy during this image. Her imagery combined with the raw EEG data suggests that this probe may be an example of her ASC.

Daphne described having memories in all three probes during this condition. Meanwhile, the beta coherence indicated significant connections to the right temporal lobe, the region responsible for memory retrieval as well as spatial processing. Therefore the beta coherence reflects Daphne's memories during this condition.

Daphne also reported visual imagery in all three probes, while the beta coherence also showed connections with the visual cortex. Therefore the beta coherence also reflects the visual imagery during this condition.

Daphne described having one language-based image, and the beta coherence also showed a connection with the left temporal lobe, implicating language processing. Thus, the beta coherence also reflects the language-based image during this condition.

There was one image involving emotion; however, the coherence analysis did not show any activity that would indicate involvement of the insula. Therefore there is no EEG information available about the affective image in this condition.

The widespread beta coherence also involved many connections, which indicates a great deal of motor planning and/or ongoing attention to the imagery occurred during this condition. Though none of the images involve any body movement, all three images contribute to an ongoing narrative which Daphne described in detail. Therefore Daphne's ongoing focus and attention to the imagery appears to be related to the beta coherence with widespread, numerous connections.

The gamma coherence indicated that Daphne's entire brain engaged in meaning-making during this condition, while Daphne's imagery involved significant people, objects, and memories through several different imagery modalities. All of these images contributed to the meaning Daphne gained from this session. Therefore, the gamma coherence reflects the meaning-making which occurred during this condition.

Therefore, when Daphne was guided to have memories, the EEG and phenomenological data were consistent regarding the memories and the visual and language processing which were reflected in the beta coherence, as well as the widespread beta coherence coinciding with Daphne's ongoing attention to the imagery, and the widespread gamma coherence reflecting all the meaning-making that occurred during the imagery. The EEG and phenomenological data were inconsistent regarding the raw EEG data indicating drowsiness during a probe where Daphne seemed to be alert. This meaningful, detailed image, therefore, may be an example of Daphne's ASC.

Visual Condition

Phenomenological Data

Table 27 summarizes Daphne's responses during the Visual condition. This condition contained 16 total probes, the first nine during the induction (eight of these

Table 27.
Visual Condition: Daphne's Phenomenological Data

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
2	Now imagine a ball of light forming in the darkness... […]	See ball of light's color, size, movement	Yes	Stable image
3	[…] and as the light moves, imagine that all of your head begins to glow… […]	Visual image of ball of light with sensation of energy in body; distracted by throat	Yes; body	Shifting imagery
4	[…]Neck and shoulders glowing in the light…[…]	Visual and physical sensation of ball of light moving to neck and shoulders	Yes; body	Stable image
5	[…] and as the lights move, your arms and hands begin to glow… […]	Visual and physical sensation of balls of light down arms and hands; then throat tickle became overwhelming	Yes; body	Contracting image Fully responsive to guiding

Table 27. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
6	[…]as it moves around and through your torso and back, they begin to glow…	Coughing during guiding, then concerned about missed cues, moving too much to disturb electrodes, getting re-oriented to induction	Yes; body, cognitive	Incomplete, Shifting image Disconnected from guiding
7	[…] As it moves, your hips and waist begin to glow… […]	Intermittent worry about coughing again, bringing out of ASC, then trying to attend to induction again via body awareness	Yes; body, cognitive	Incomplete, Shifting image “Out’ of ASC
8	[…]Upper legs and knees glowing in the light […]	More relaxed, no more distractions, but still out of ASC; trying to follow guiding	No; body	Incomplete, Stable image Selectively responsive to guiding “out” of ASC

Table 27. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
9	[…]lower legs and feet glowing in the light, feeling more and more relaxed.	More aware of body via feet, sensation and glowing of ball of light; relaxed	Yes; body	Stable image
10	[…]…notice that wherever you move the light, your body begins to glow…[…]	No tension in body, but moved ball to torso to address missed guiding from before	No; visual, interaction	Stable image
11	[…] Look around you and see what surrounds the house, the colors and shapes and features of the landscape. […]	Respond to specific guiding to see unfamiliar house by checking initial house image; see details of this house	Yes; cognitive	Stable image Fully responsive to guiding

Table 27. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
13	[…]take in everything you see, the roof, the windows, the outside walls….[…]	See house from side, details of exterior, tactile sense of surfaces	Yes; tactile	Expanding image
16	[…] ….Notice the lay-out of rooms…the light…the space…and the things around you.	See room in house, details of light and furnishings, including colors, objects, and mood	Yes; emotion	Expanding image
19	[…]…and notice any objects in the room that draw your attention…Look at it closely. […]	Hold an object, see details of it and another important object from memory	Yes; memory, tactile	Particularly vivid, Expanding image
21	[…] Take time to notice the person's face and appearance…[…]	See significant person's face and clothing in detail	Yes; memory	Particularly vivid, Stable image

Table 27. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
29	As you enter the next room, look around and take in everything you see.	See details in another room in house, colors, objects, furnishings.	Yes	Stable image
30	[…]….take some time to look closely at [an object]…[…]	See significant object in detail, experience memories it which shifted into another object; chose to focus on first object	Yes; memory	Shifting image Fully responsive to guiding

combining both body and visual guiding cues), and the remaining seven probes during the narrative portion of the session. All but two of the 16 images were congruent with the guiding. Most of the induction probes also contained body-based imagery (seven out of 16), whereas the narrative probes also contained memories and emotions. Daphne also reported a few instances of cognitive reactions, tactile imagery, and interaction. Two of the images were particularly vivid. She did not indicate any influence of the music in any of these probes, but stated that, out of the 16 probes, she was fully responsive to the guiding in three probes, selectively responsive to the guiding in one probe, and disconnected from the guiding in one more probe. In this latter probe, Daphne stated that the imagery was incomplete; she reported two more incomplete images, and during both of these she said she was "out" of the ASC. Seven of the 16 images were stable in nature, four of the images shifted in modality, two images expanded modalities, and one image contracted modalities.

EEG Data

When Daphne was guided to experience visual imagery, a review of the raw EEG data showed that she was drowsy in eight of the 16 probes during the Visual condition.

The EEG coherence analysis indicated significant theta coherence in one connection between the language and memory retrieval/spatial processing regions in the temporal lobes. This connection indicates that, while responding to guiding to have visual imagery, Daphne's brain required language and memory retrieval and/or spatial processing.

The EEG coherence analysis also showed significant alpha coherence involving connections with the visual cortex and left temporal lobe, meaning that visual and language processes were turned “off” while Daphne responded to guiding to experience visual imagery.

The EEG coherence analysis showed significant beta coherence involving Daphne’s entire brain. These connections indicate that all the functional areas of the brain (visual, motor planning, language, memory retrieval/spatial processing, decision-making) contributed to ongoing attention to the imagery and/or motor planning during the Visual condition.

Finally, the EEG coherence analysis indicated significant, widespread gamma coherence involving all of the functional areas except those responsible for decision-making. These connections indicate that most of Daphne’s brain shared information in order to make the imagery during the Visual condition more coherent.

Integration of EEG and Phenomenological Data

Other than the two probes during the induction where she felt she was “out” of the ASC, Daphne did not report on her alertness or ASC during the Visual condition. These two “out” induction probes were previously discussed in the Body condition, along with the four probes where Daphne’s brain showed it was drowsy. The probes with drowsy brain states seemed to coincide with Daphne’s depth of relaxation during the induction, though Daphne did not seem to be drowsy during these probes. The four remaining probes with drowsy brain states (out of the eight) occurred in the narrative probes of the Visual condition. Two of these probes contained particularly vivid imagery, one with expanding imagery and one with stable imagery. Both of these images plus one more “drowsy” image had content relating to the significant person and/or significant objects from Daphne’s past. The last image with drowsy brain activity related to a visual image of a room in the house, but not a familiar room or one with any particular significance (as far as Daphne reported). Again, Daphne did not seem to be truly drowsy for any of these probes; she recalled the imagery easily and with great detail, and some of the images were quite vivid, often involving significant memories, people, or objects. She did not report feeling disconnected from the guiding during any of these probes. Therefore, Daphne's reports combined with the raw EEG suggest that these images may be examples of Daphne's ASC.

Daphne's reports of visual imagery in 14 out of the 16 probes initially seem to be reflected by the beta coherence indicating a connection with the visual cortex. However, the alpha coherence also shows a connection with the visual cortex, which instead indicates that this region is turned "off" during this condition. Given the prevalence of Daphne's visual imagery, along with the significant beta coherence involving the visual cortex, plus the fact that the alpha coherence has been nonsignificant for all the other conditions while showing a few, weak connections for this condition, it appears that the alpha coherence is not accurate in this case. Therefore, the beta coherence reflects Daphne's visual imagery during the Visual condition.

Daphne also reported having body-based images in many probes along with a tactile image in one probe; two connections with the central region of the brain in the beta coherence would reflect only motor imagery during this condition, which is not apparent in any of Daphne's imagery. The EEG cannot detect body imagery that is sensory in nature, including tactile imagery, as these processes occur in structures that are out of reach for the EEG. Most of the body imagery involves sensory experiences rather than body movement, though perhaps the images during the induction somehow involved motor processing while Daphne followed the guiding to focus on different body parts. Therefore the EEG may be reflecting whatever aspect of Daphne's imagery involved motor planning, but otherwise the EEG has no information to add to the body-based imagery for this condition.

Daphne frequently reported experiencing memories during this condition, which seems to be reflected in both the theta and beta frequencies. These coherence patterns connect with the right temporal lobe, implicating memory retrieval. Therefore the theta and beta coherence reflect Daphne's reports of memories during the Visual condition.

Daphne also reported having cognitive processing during a few images, which appears to be reflected by the beta frequency, whose coherence pattern connects with the frontal lobes. Thus Daphne's cognitive images were also reflected by the beta coherence.

Though Daphne described having affective imagery in one probe (out of 16), the coherence patterns across frequencies do not indicate any involvement of the insula. Thus, the EEG has no information to add to the affective imagery during this condition.

The theta and beta coherence implicate language processing during the Visual condition; however, the alpha coherence shows that the same brain region is turned "off." At the same time, Daphne did not report any language-based images during this condition. Given that the alpha coherence appears to be inaccurate regarding the visual imagery in this condition, it is more likely that it is also inaccurate regarding the language processing for the same condition. Further, eight of the 16 probes' imagery were also analyzed with the Body condition, and the Body condition also showed language processing while Daphne reported no language-based imagery. Some of the induction probes shared by the Body and Visual condition contained images which may have required language processing, though Daphne did not explicitly report such imagery. Consequently, just as in the Body condition, the theta and beta coherence reflect under-reported language-based imagery during the Visual condition.

The widespread beta coherence with many connections indicates that this condition's imagery involved a great deal of motor planning and/or ongoing engagement. Though the imagery does not indicate much motor planning, Daphne demonstrated consistent attention to her imagery throughout the condition, following the ongoing narrative with little difficulty. Therefore the overall beta coherence reflects Daphne's ongoing attention during the Visual condition.

The gamma coherence showed many connections across the brain, indicating a great deal of meaning-making and information sharing among the brain regions during this condition. Several of Daphne's images, particularly from probe #19 onward, involved significant people, objects, and memories, and also involved many different imagery modalities. Thus the gamma coherence reflects the meaningfulness and multisensory nature of these images in the Visual condition.

Therefore, when Daphne was guided to have a visual experience, her EEG and phenomenological data were consistent regarding the reports of cognitive imagery and frontal lobe connections in the beta coherence, and the small degree of motor imagery and a couple of central brain connections in the beta coherence. The EEG and phenomenological data were also consistent regarding the overall beta coherence and Daphne's ongoing attention to the imagery, as well as the widespread connections in the gamma coherence and this condition's imagery, which was meaningful and multisensory.

The EEG and phenomenological data were inconsistent regarding the raw EEG data showing drowsiness during several probes, while Daphne's reports indicated alertness and focus on her imagery. These probes may therefore be examples of Daphne's ASC. The EEG and phenomenological data were also inconsistent regarding the alpha coherence's contradiction of Daphne's reports of visual imagery and the beta coherence's connection with the visual cortex. This discrepancy may be due to weak or inaccurate data in the alpha frequency, given the lack of significant alpha coherence across all the other conditions, and the few connections in the alpha coherence in this condition. The alpha coherence was also inconsistent with the theta and beta coherence regarding language-base imagery, though Daphne did not report having any such imagery. A similar situation occurred in the Body condition, so it appears that Daphne may have under-reported imagery using language processing, and this processing was reflected in the theta and beta coherence. Meanwhile, the alpha coherence again seems to be inaccurate.

Summary of Daphne

EEG Coherence Findings across Conditions

Daphne's EEG data on theta coherence showed consistent connections in both the left and right temporal lobes, implicating language and memory retrieval and/or spatial processing. These patterns occurred in all conditions except Memory and Interaction.

Daphne's EEG data on alpha coherence showed significant connections in only the Visual condition; these connections indicated that language and visual processing were idle (or, "off") when Daphne was guided to experience visual images.

Daphne's EEG data on beta coherence indicated numerous connections spread across Daphne's brain in most conditions, particularly Affect, Interaction, Memory, and Visual. Additionally, the beta coherence included a pattern of several connections across both temporal lobes, indicating particularly strong links between the language and memory retrieval/spatial processing regions. In addition to consistent language and memory retrieval/spatial processing, the widespread networks indicate that Daphne's brain actively engaged in motor planning and/or ongoing attention to the imagery in most of the conditions.

Daphne's EEG data on gamma coherence showed numerous and widespread connections in most conditions, but especially in the Interaction, Memory, and Visual conditions. This suggests that Daphne's brain actively worked to make the imagery meaningful and coherent, by engaging every functional area of the brain the EEG can detect, including: decision-making, language and spatial processing, memory retrieval, motor planning, and visual processing.

Response to Guiding Across Conditions

Table 28 shows the extent to which Daphne's responses to the imagery were consistent with the guiding conditions. Based on the information in this table, it appears that Daphne's preferred modalities for responding to the guide were affective imagery and memories, because she reported imagery congruent with the guiding for 100% of each condition's probes. She preferred imaging in a visual modality when not responding to the guide.

Table 28.
Daphne's Imagery Responses to Guiding Conditions

	# Probes Presented	# Responses as Guided	# Responses Unguided	Total Responses
Body Imagery	14	13	7	20
Affective Imagery	8	8	8	16
Visual Imagery	16	13	23	36
Interaction	7	6	2	8
Memories	3	3	7	10
Kinesthetic Imagery	3	2	0	2

Daphne mentioned during the interview that she is a "compliant" traveler, which is reflected in the degree of congruence between her imagery and the guiding conditions. This was despite the expectations Daphne had that the guiding would be more supportive in nature and would not encourage exploration of emotional or provocative material.

Though the guiding did not explicitly demand such exploration, it was possible to engage in that kind of travel, and Daphne chose to do so. In terms of EEG, Daphne's willingness to travel in this manner may be reflected by the beta and gamma coherence patterns, as they indicated Daphne's consistent focus on the imagery as well as the great deal of meaning she attributed to the imagery.

Vividness of Imagery

Table 29 shows the relative vividness of various types of imagery reported by Daphne. Based on the information in this table, Daphne most frequently experienced vivid imagery in the visual modality, while the greatest proportion of her vivid imagery occurred in her memories. Additionally, most of Daphne's vivid imagery occurred during probes where the raw EEG showed drowsy brain activity. As discussed previously in each of the different conditions, Daphne's reports did not indicate drowsiness for any of these probes; to the contrary, she indicated focused attention throughout these probes.

Table 29.
Proportion of Vivid Imagery to Total Instances of Imagery Modality

	# Images Reported	# Vivid Images	% Vivid
Body Imagery	20	3	15%
Affective Imagery	16	4	25%
Visual Imagery	36	5	14%
Interaction	8	2	25%
Memories	10	3	33%
Kinesthetic Imagery	2	0	0%

This consistent focus was also reflected in the widespread beta coherence across most conditions. Altogether, then, Daphne's most vivid imagery involved focused attention along with drowsy brain states, and often involved memories or visual imagery.

Alertness

Table 30 shows the frequency of images with drowsy brain states, along with the number of vivid images for each type of imagery and the number of images for each imagery type that were classified as both vivid and drowsy. According to the information in this table, Daphne experienced drowsiness most frequently while having visual imagery. The visual imagery also had the highest incidence of vividness with drowsy brain states. Additionally, all of Daphne's vivid images involving memories occurred during drowsy brain states. Daphne did not state she felt drowsy in any of the probes, nor did she indicate when she thought she was in the ASC. During all of the probes with drowsy brain states, Daphne reported her imagery in detail and was attentive to the guiding,

Table 30.
Frequency of Imagery with Drowsy Brain States, Vivid Imagery, and Vivid and Drowsy Imagery

	# Drowsy Images	# Vivid Images	# Vivid and Drowsy Images
Body Imagery	7	3	2
Affective Imagery	9	4	2
Visual Imagery	16	5	4
Interaction	4	2	1
Memories	8	3	3
Kinesthetic Imagery	0	0	0

and often times to the music as well. All of these features of her vivid and "drowsy" probes suggest that Daphne was not truly drowsy during any of these probes; rather, she may have been in an ASC that helped her have vivid imagery.

Response to Music

Daphne referred to the role of the music in her imagery at least once in every guiding condition; this is the highest rate of reports about the music out of all the participants in this study. Additionally, Daphne's reports about the influence of the music often involved intense emotional imagery or insights about the imagery that occurred after the session. Though the EEG cannot specifically detect brain processes related to music perception, the ongoing attention required to attend to the music may be reflected by the widespread beta coherence seen in almost all the guiding conditions.

Difficulty Recalling Imagery

Daphne recalled all of her imagery in every condition. Her only report of feeling disconnected from the guiding occurred during the induction, and only due to coughing that caused her to not be able to hear the guiding cues. Her consistent attention to the imagery is reflected in the beta coherence pattern, with widespread connections seen in almost all the guiding conditions.

Significance of Imagery Experience

During the interview, Daphne occasionally and spontaneously identified insights into her way of living based upon the imagery she experienced during this session. She also expressed surprise at the kind of imagery she experienced, which involved many important memories about significant people and objects from her life. The significance of this session appears to be reflected in the gamma coherence, which shows a great deal of information-sharing and meaning-making in most of the guiding conditions.

Consistency between EEG and Phenomenological Data across Conditions

Across all the conditions, the EEG and phenomenological data were consistent regarding the widespread beta coherence and Daphne's ongoing attention to the imagery, which led to detailed imagery and awareness of the music. The EEG and phenomenological data were also consistent regarding the widespread gamma coherence and meaningfulness of Daphne's imagery. This relationship reflected the exploration of significant memories and personal relationships that Daphne undertook during this session.

Across all the conditions, the EEG and phenomenological data were inconsistent regarding several instances of brain processes implicated by the EEG which were not corroborated by reports of related imagery. In nearly every case it appears that Daphne probably under-reported the imagery related to these processes. If so, the EEG detected nearly all of the brain activity related to Daphne’s imagery.

The EEG and phenomenological data were also inconsistent in the Visual condition regarding the alpha coherence’s contradiction of visual and language processing that matched Daphne’s image reports and which were corroborated by the theta and beta coherence. Because the alpha coherence was nonsignificant for all the other conditions, and it had very few connections, it appears that the alpha coherence was inaccurate in this case.

Finally, the EEG and phenomenological data across conditions were unclear regarding drowsy brain states and their relationship with Daphne’s vivid imagery. Although Daphne consistently demonstrated focus and attention while also often reporting vivid imagery during all of the probes with drowsy brain states, the EEG cannot distinguish between true drowsiness and an ASC. Neither did Daphne indicate whether she felt she was ever in an ASC during the session. So for now the EEG and phenomenological data cannot indicate whether Daphne experienced an ASC during this session.

CHAPTER 9

CRAIG: RESULTS AND DISCUSSION

Introduction

Craig came to his session with a great deal of GIM experience, as he had undergone a total of over 60 personal sessions, though the last one occurred eight years ago. He was also an experienced GIM Fellow who maintains an active private practice. Because it had been some time since his last session, Craig explained that he very intentionally sought to transition into this session's GIM experience while the EEG technician was placing the electrodes on his head. He did this by closing his eyes, relaxing himself, and not engaging in conversation, all in order to prepare to be in the ASC. He was the only participant to do so; all the other participants chatted with the researcher and the EEG technicians during this phase of the session.

Afterward, Craig characterized this session as being very personally meaningful to him, as the imagery involved significant people in his life and addressed important events in his past and present. However, during the interview he had some difficulty recalling the sequence of the imagery, often because he could not recall his experience of the music or guiding and how these related to his imagery experience. At times, particularly during the induction and the opening narrative probes, he was annoyed by the guiding, and wanted it to closely match his internal awareness rather than experience his imagery in a different sensory modality. Despite these difficulties, however, Craig stated he was very satisfied with the session and felt it was a complete and full GIM experience. Craig's EEG coherence maps can be found in Appendix G, Figure 9.

Affect Condition

Phenomenological Data

Table 31 summarizes Craig's responses to the Affect condition, including the imagery Craig experienced for each probe, its congruence with the guiding condition, the qualitative coding of the imagery as well as Craig's reports on his alertness. Craig's imagery was generally congruent with the Affect condition guiding cues (six out of eight images involved affective content), though most of the images involved other types of imagery such as body awareness, memories, visual images, music awareness, and language awareness. Four of the images were particularly vivid, while Craig had difficulty recalling one image. And nearly all of the images (seven out of eight) were stable in nature. Craig did not report on his alertness or ASC for this condition's probes.

EEG Data

When Craig was guided toward an affective imagery experience, a review of the raw EEG data revealed that Craig was drowsy for six out of eight affective probes, making this the "drowsiest" condition of the session.

The EEG coherence analysis found that the only significant connections involving sensory functions occurred in the theta frequency, and connected the visual and language centers of the brain. So, according to the EEG, when Craig was guided to have an emotional image, his experiences involved some kind of language processing (either speaking or responding to words) along with a visual image.

The EEG coherence analysis also found that Craig's brain had many connections across the entire brain in the gamma band, indicating that all the functional areas of his

Table 31.
Affect Condition: Craig's Phenomenological Data

Probe #	Affect condition guiding direction	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
17	Be aware of how it feels to be inside the house—notice any emotions you might have being there…	Emotional image, including anticipation of upcoming imagery	Yes; language	Stable imagery Fully responsive to guiding
20	Open yourself to any emotions or reactions you might have at this time…	No imagery recalled	No	Difficulty recalling imagery
23	As you relive the memory, open to your emotions about the experience and the person. Allow yourself to feel these emotions…	Emotional sense of memories with a significant person; and a body-based experience of those feelings	Yes	Particularly vivid Stable imagery
27	Take some time now to be aware of your feelings about the person after this exchange…	Emotional response to a significant person	Yes; music awareness	Particularly vivid Stable imagery Influenced by music

Table 31. (continued)

Probe #	Affect condition guiding direction	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
33	Become aware of any emotions or reactions you may have about being in the room with this object	Emotions around memories of another significant person;	Yes; memory	Particularly vivid Stable imagery
34	Stay with those feelings for a little while.	(More) emotions around memories of another significant person;	Yes; memory	Stable imagery
37	Be aware of any feelings you have now.	Body sensation of anticipation of a memory	No; body, memory	Particularly vivid Stable imagery
40	Be aware of your emotions while you shut the door behind you, and leave that place.	Emotional sense of closure of imagery experience, with a visual image of the door closing	Yes; visual	Stable imagery

brain (visual, language, spatial processing/memory retrieval, decision-making, motor planning) contributed to making his imagery during the Affect condition meaningful and coherent.

Integration of EEG and Phenomenological Data

In terms of alertness, Craig was so drowsy he was unable to later fully recall his imagery for two probes during the interview, and yet he was also drowsy during all four of the "particularly vivid" images during this condition. Therefore, either drowsiness in itself did not impede Craig's ability to have vivid imagery during this condition, or Craig's imagery was not as vivid as he reported.

In this condition, Craig reported having mainly affective experiences; however, these were not clearly reflected in the EEG, due to a lack of activity around the insula. Therefore the EEG has no information to add to Craig's reports of affective imagery during this condition.

Visual processing was implicated by the theta coherence pattern even though Craig reported having only a few visual images during this condition. Most of his images were emotional and body-based experiences, and in one case he even stated that the experience was emotional and not visual. One image, where Craig was anticipating a body-based memory, might have involved a visual memory (this was identified as a particularly vivid image), and the final image contained a visual sense of the house's door closing. Perhaps these images were more vivid than Craig reported, which would account for the theta connections to the visual cortex, or perhaps Craig had more visual imagery that he did not fully describe, and these images together produced the coherence connections to the visual cortex.

Language processing was also implicated in the theta coherence pattern, yet Craig's only reported image involving language occurred in probe #17, where Craig had an emotional reaction to the guiding cues ("How does it feel to be there?"). This one probe out of eight may not have been enough to produce a significant connection in the coherence results. Given this EEG result along with his difficulty recalling the imagery sequence at times, it seems likely Craig may have underreported any imagery that would have involved language processing. For example, probe #s 23 and 27 may have involved unreported dialogue with the significant person with whom Craig was interacting around that time in the imagery narrative. If they occurred, such language-based images would account for these language connections in the theta coherence map.

Craig's brain also registered many widespread connections in the gamma band during the Affect condition, suggesting that many different brain regions shared information in order to make his imagery coherent. While these regions included nearly every functional area identifiable in scalp EEG, Craig's imagery seemed to involve a limited number of various kinds of imagery, namely emotional, visual, and language imagery. The other functional areas implicated by the gamma coherence (motor, spatial, memory, decision-making, etc.) may have been involved with this imagery in some way, perhaps unconsciously and/or in an ongoing manner, in order to make the whole imagery experience coherent. However, the large number of gamma connections over both hemispheres and across the whole brain indicates the general strength of the gamma frequency under the Affect condition, and therefore may not literally translate into specific brain regions involved in information sharing. Therefore, the EEG coherence indicates that Craig's Affect condition imagery was very meaningful and coherent, which fits with his imagery descriptions for this condition.

In summary, when Craig was guided toward an affective imagery experience the EEG and Craig's reports are consistent in showing that the Affect condition imagery contained visual and language-based images, though both kinds of images occurred to a stronger degree than Craig reported. Also, the EEG and Craig's reports were consistent in terms of the high degree of the imagery's meaningfulness. Because Craig did not describe his alertness states during this condition, the EEG and phenomenological data comparisons are not focused on consistencies so much as the revealed patterns between alertness and imagery vividness. Two probes identified as drowsy by raw EEG coincided with Craig's reports of difficult-to-recall imagery, while four probes identified as drowsy by raw EEG coincided with all four images Craig identified as being particularly vivid for this condition. Therefore it may be that Craig's perception of very vivid imagery was inaccurate (perhaps affected by drowsiness) or conversely, the drowsiness did not affect his ability to have vivid imagery during this condition.

Body Condition

Phenomenological Data

Table 32 summarizes Craig's responses to the Body condition. This condition contained 14 total probes, nine of which occurred during the induction and involved simultaneous guiding for visual imagery. The remaining five probes (#s 14-42) occurred during the narrative portion of the session. All but one of the images (probe #6) were

Table 32.
Body Condition: Craig's Phenomenological Data

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
1	Take a long, deep breath. Slowly take in as much as you can… and let it out. Slowly breathing in…. and out…[…]	Heavy body, but aware of trying to experience body	Yes; cognitive awareness	Incomplete, Stable image Fully responsive to guiding
3	Now imagine the ball of light moving to the top of your head….and then down, around and through your head. […]	Difficulty with visual cues combined with physical; relaxed body	Yes; visual	Incomplete, Stable image Fully responsive to guiding
4	Now imagine the ball of light moving around and through your neck and shoulders. […]	Disregarding some visual cues; body relaxed	Yes; cognitive	Stable image Selective response to guiding
5	…one ball for your right arm and hand, and one ball for your left arm and hand… […]	Disregarding visual cues; body relaxed, sense movement of ball	Yes	Stable image Selective response to guiding

Table 32. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
6	….imagine the ball moving around and through your torso and back… […]	No imagery recalled	No	Disconnected with guiding
7	Now the ball moves to your hips and waist... […]	Disregarding visual cues; body relaxed, sense movement of ball	Yes	Particularly vivid Selective response to guiding
8	Now the ball moves to your hips and waist.[…]	Ignored cues, legs very heavy, relaxing more	Yes	Particularly vivid Stable image Selective response to guiding
9	Now let the ball move down to your lower legs and feet… […]	Energy in feet, sensation of "glowing," no visual	Yes	Stable image Selective response to guiding
10	Now move the ball of light wherever you need it to go … […]	Whole body relaxed, vague visual image of body	Yes; visual	Stable image Selective response to guiding

Table 32. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
14	[…] Notice the door handle… and surface of the door. Reach out and touch the surface---what it feels like; its temperature, its texture, its size.	Visual and tactile awareness of door knob, and cognitive reaction to pacing of guiding	Yes; visual, cognitive	Incomplete, Stable image Fully responsive to guiding
18	[…]… slowly move around the room…noticing any sensations your body may have… […]	Visual of moving into different room of house, emotional anticipation of upcoming imagery, and awareness of mood of music	Yes; visual, emotional, music	Expanding imagery Image influenced by music
35	If you wish, touch or hold the object….and bring into awareness how it feels…	Tactile sensation of significant object	Yes; memory	Stable image

Table 32. (continued)

Probe #	Body condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
41	[…] return now to the path where you first began...[…] notice how your feet feel being back on the ground… […]	Sensation of walking leading to visual image of familiar space and corresponding emotional reaction	Yes; visual, memory, emotional	Particularly vivid, Expanding image Fully responsive to guiding
42	[…] Let the image fade while gradually allowing your awareness to return to your body…	Heavy body sensation, emotional satisfaction and resistance to returning to alertness	Yes; cognitive	Imagery shift "In" ASC

congruent with the body-based guiding; Craig could not recall this particular probe's imagery, and he stated that he lost track of the guiding during the probe. During the induction probes (#1-10) the imagery was generally only body-based, but during the narrative probes (#14-42) the imagery involved other types of imagery such as visual, cognitive, emotional, memories, and music awareness. Three of the 14 images were vivid, and all three were body-based images. Craig reported that he felt he was still "in" the ASC during the final probe, where he was being guided to return to alertness. He otherwise did not identify any awareness of his alertness for any other Body condition probes.

EEG Data

When Craig was guided toward a body imagery experience, a review of the raw EEG data revealed that Craig's brain demonstrated drowsiness during three of the five narrative probes, and sleep during one of nine induction probes (#5, a combined Body-Visual probe). The "asleep" probe was the only instance of sleep detected in the entire study.

The EEG coherence analysis found that, when Craig was guided to have body-based imagery, only the gamma frequency indicated any significant patterns. These patterns involved multiple widespread connections that indicated Craig's entire brain shared information during the Body condition imagery in order to make it coherent. Just as in the Affect condition, the regions included all the functional areas of the brain, such as decision-making, language, spatial processing/memory retrieval, motor planning, and visual. While such widespread activity seems to reflect varied types of imagery in the

Body condition, the question remains why this activity does not also show up in the other frequency bands. If, as in the Affect condition, widespread gamma coherence is an indicator of the strength of general information-sharing across the brain, and does not necessarily indicate specific regions of brain activity, then the gamma coherence here suggests a great deal of meaning-making occurring during the Body condition, while not implicating any specific kinds of brain processes. Therefore the gamma coherence connections need not also occur in the other frequencies, because such widespread connections only relate to the degree of meaning-making over the condition. Accordingly, the EEG data are not necessarily contradictory in this guiding condition.

Integration of EEG and Phenomenological Data

In terms of alertness or ASC, Craig's report of being "in" the ASC during the final probe (#42) coincided with the raw EEG indication of drowsiness. Otherwise Craig made no other reports about his alertness that aligned with the EEG alertness data during the other 14 body condition probes. Two out of the three remaining narrative probes identified as "drowsy" by the raw EEG involved one incomplete, multisensory image with a cognitive reaction to the guiding (#14) and one tactile, stable image (#35). There were a few particularly vivid images in this condition, and Craig was awake for all of these. Additionally, this condition contained the only probe in the entire study where the participant fell asleep, showing just how drowsy he was. Thus it is possible that drowsiness interfered with Craig's ability to experience more vivid body-based images.

No brain regions related to sensory functions were implicated in the EEG coherence results for the Body condition. This contradicts Craig's reports that his images during this condition also involved visual images, language, cognition, emotions, and memories. However, his body-based imagery simultaneously involved singular or few instances of the other types of imagery (e.g., visual, language, cognitive, etc.) across all 14 probes. Thus, the wide variety of Craig's reported imagery over the entire condition may have dissipated the brain activity related to the imagery across several brain regions, leading to few EEG coherence patterns.

On the other hand, the gamma coherence results indicate widespread brain interactions involved in making Craig's Body condition imagery coherent and meaningful. Several of Craig's images during the Body condition were imbued with layers of meaning, even before they fully emerged. Probe #18 is an example in which Craig anticipated the content of his upcoming imagery, and engaged visual, emotional, and musical awareness to identify the significance of what was to come. Probe #s 35 and 41 had similar personal significance while also involving multiple types of imagery. Thus these images match the implicated high degree of meaning-making of the gamma coherence findings.

When Craig was guided toward a body-based imagery experience, the EEG and phenomenological data were consistent in terms of the amount of meaningfulness of the imagery reported by Craig for the Body Condition. However, the EEG coherence and phenomenological data were inconsistent regarding which types of imagery Craig experienced during the Body condition. In particular, visual, cognitive, and memory processing, which are detectible via EEG and reported by Craig, had no EEG coherence during this condition. This could be due to the wide variety of imagery Craig reported over many (14) probes, which might not generate enough brain activity for each kind of imagery to be found by the EEG coherence analysis. The EEG data and phenomenological data were also inconsistent in terms of alertness; Craig's perception of being "in" an ASC matched only one out of three of the probes identified as "drowsy," plus one probe identified as "sleepy" by the raw EEG data. Either Craig could not differentiate between drowsiness and an ASC, or the drowsiness evidenced in EEG data suggests varying levels of ASC. Because Craig was awake for all of the very vivid images (according to the raw EEG), but also was very drowsy at times, it seems that Craig's drowsiness may have interfered with his ability to experience more vivid images during this condition.

Interaction Condition

Phenomenological Data

Table 33 summarizes Craig's responses to the Interaction condition. This condition contained seven probes, the first of which was the final induction probe and was combined with the Body and Visual probes; all remaining probes occurred during the narrative portion of the session. Three of the seven probes were congruent with the guiding, as they involved dialogue or some kind of interaction with a person or object in the imagery. For the remaining four probes, Craig did not interact with anything in his images, and had visual, body, emotional, or memory-based imagery. Two of the seven images were particularly vivid, though only one of these vivid images was congruent with the Interaction condition. Craig stated that he selectively responded to the guiding in two out of the seven probes, and that the music influenced the image in one probe. Most of the images (five out of seven) were stable in nature, yet one of these stable images was difficult to recall. Craig did not comment on his alertness for any of the Interaction probes.

Table 33.
Interaction Condition: Craig's Phenomenological Data

Probe #	Interaction condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
10	Now move the ball of light wherever you need it to go to relax any part of your body…[…]	Opening up to feeling entire body, allowing it to relax, with visual sense of outline of body	No; body, visual	Stable image Selective response to guiding
24	If the person has something to say, listen to it; really open to what the person is saying to you.	Unclear memory of dialogue with significant person	Yes	Difficulty recalling image Stable image
25	If you have something to say back, take time now to say it. Speak freely to the person.	Dialogue again with same person	Yes	Stable image
26	Listen to what the person has to say in response, and say anything else you need to say.	Affective communication with same person	Yes; emotional	Particularly vivid, Stable image

Table 33. (continued)

Probe #	Interaction condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
28	Begin to draw this interaction to a close. Say goodbye to the person and prepare to move into another room of the house.	Sense of connection with same person, but no dialogue, then moving into next room of house	No; emotional; visual	Imagery shift Selective response to guiding
36	If there is something you would like to do with this object, take time now to do what you need to do	Waiting for significant event from his memory to happen, feeling anticipation	No; emotional, memory	Contracting image Image influenced by music
38	If you wish, you can leave the object wherever it needs to be, saying goodbye to it... or taking it with you.	Letting go of anticipation as music was not going to facilitate event's occurrence; feeling "okay."	No; emotional	Particularly vivid, Stable image

EEG Data

When Craig was guided toward interactive imagery experiences, a review of the raw EEG data showed that Craig was drowsy in five of the seven Interaction condition probes (all but #s 10 and 38).

The EEG coherence analysis indicated that, when guided to interact with his imagery, Craig's brain showed only significant gamma coherence. Just like the gamma coherence of the Affect and Body conditions, the gamma coherence for the Interaction condition shows many widespread connections across Craig's brain, involving all the functional areas (decision-making, language, spatial processing/memory retrieval, motor planning, and visual). This means that all of these areas shared information during this condition to make Craig's imagery coherent. However, as explained for the Affect and Body conditions, these widespread interactions in the gamma band do not necessarily indicate that each of these functional areas were heavily involved in the imagery experience; rather, they may simply indicate very strong gamma activity across the entire brain, and therefore that a great deal of meaning-making occurred when Craig was guided to interact with his images.

Integration of EEG and Phenomenological Data

The EEG and phenomenological data concerning Craig's alertness during the Interaction condition showed interesting patterns concerning drowsiness, imagery recall, and imagery vividness. Four out of the five images showing drowsy brain states were adjacent to one another in the middle of the session, during the section where he was being guided to interact with a significant person. In the first of these, #24, Craig could not recall the dialogue in detail, yet soon afterward in probe #26, Craig reported having a very vivid, emotional interaction with this person. Craig had another very vivid, emotional (not interactive) image during probe #38, during which the raw EEG identified drowsy brain activity again. In most cases, drowsiness (as identified by the EEG) did not detract from the congruence, vividness, or meaningfulness of images in the Interaction condition, though it may have caused Craig to have difficulty recalling the imagery in one probe and to not follow the guiding cues in another probe.

Just as in the Body condition, Craig's reports of many kinds of imagery were not reflected in the EEG coherence results. Though imagery such as language-based images, visual images, emotions, and memories occurred during this condition, it is possible that the wide range and few instances of these imagery types were not strong enough to register any significant presence in the EEG coherence results. In particular, the emotional responses which occurred in many of the Interaction condition probes may have produced brain responses that could not be detected by scalp EEG, because emotional processing mainly occurs in deep brain structures.

However, just as in the Affect and Body conditions, the EEG coherence analysis of the Interaction Condition showed widespread and numerous gamma connections, which indicates that Craig was having vivid and meaningful images during these probes. He stated at the end of the session that his interaction with the significant person was particularly meaningful to him, even though during one of these probes he had difficulty recalling exactly what was said.

In summary, when Craig was guided toward an interactive imagery experience, the EEG and phenomenological data were consistent with regard to Craig's drowsiness and difficulty recalling imagery in one probe, and his drowsiness and incongruent imagery in another probe. The EEG and phenomenological data were also consistent regarding the imagery's meaningfulness with the widespread gamma coherence. The consistencies regarding Craig's alertness indicate that drowsiness, as identified by raw EEG, could be related to poor recall of imagery or incongruence between imagery and guiding. The consistencies regarding the coherence results show that the EEG was able to detect the strong sense of meaningfulness that Craig reported about his imagery during this condition. The EEG and phenomenological data during the Interaction condition were inconsistent regarding Craig's drowsiness and his reports of imagery that were congruent with the guiding in four out of seven probes, and Craig's reports of multiple kinds of imagery but no related EEG coherence patterns. The inconsistencies related to Craig's alertness suggest that drowsiness, as detected by EEG, is one of two things: either it is a kind of ASC, or it is actual drowsiness. If it is actual drowsiness, then either Craig's claim of vivid imagery was accurate and drowsiness did not affect the imagery's vividness, or Craig's claim of vivid imagery is inaccurate. Given Craig's experience as a GIM traveler, it is reasonable to believe that his claim of vividness during these images is accurate; therefore, the uncertainty with regard to drowsiness and imagery vividness and congruence lies with the EEG data's detection of drowsiness or ASC. With regard to the lack of EEG coherence despite Craig's reports of multiple kinds of imagery during this condition, as discussed in the Affect and Body conditions, it seems likely that there was not enough frequency or volume of brain processing of these various imagery types spread out across the seven Interaction condition probes to generate the relevant EEG coherence.

Kinesthetic Condition

Phenomenological Data

Table 34 summarizes the phenomenological data from the three probes during the Kinesthetic condition. All three of the images were consistent with the guiding, though the first two probes (out of the three) also involved music awareness, and emotional, visual, and spatial imagery. None of the images were very vivid, though the first image (probe #12) was incomplete as Craig attempted to fully respond to the guiding and the music. Craig selectively responded to the guiding in probe #15 while experiencing an expanding image, and the final probe contained only body movement in a stable image.

EEG Data

When Craig was guided toward a kinesthetic imagery experience, a review of his raw EEG data showed that he was drowsy during two of the three Kinesthetic condition probes (#s15 and 39).

The EEG coherence analysis indicated that, when Craig was guided to have a kinesthetic image, only the gamma band had significant coherence. Though fewer in number compared to the gamma coherence in the Affective, Body, and Interaction conditions, the gamma connections during the Kinesthetic condition were widespread and involved all the functional areas of the brain (decision-making, language, spatial processing/memory retrieval, motor planning, and visual). Such activity indicates that the entire brain shared information during this condition's imagery in order to make it coherent, though there may not have been as much information-sharing compared to the other conditions, given the fewer number of connections.

Table 34.
Kinesthetic Condition: Craig's Phenomenological Data

Probe #	Kinesthetic condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
12	Now feel yourself walking along the path toward the house. Notice how your feet feel as they take each step… […]	Feeling body walking on path, with frustration because of difficulty synchronizing movement with music	Yes; music, emotion	Incomplete, stable image Fully responsive to guiding Not influenced by music
15	Now imagine opening the door…feel the weight of the door as you open it…[…]	Visual sense of open door, but physical awareness of change of space from outside to inside house, and emotional sense of safety	Yes; visual, spatial, emotion	Expanding image Selective response to guiding
39	[…] You can walk out of the room, and out of the house… notice how your body feels as you walk…	Embodied sense of moving out of house	Yes	Stable image

Integration of EEG and Phenomenological Data

The EEG and phenomenological data related to Craig's alertness do not reveal any patterns regarding imagery vividness, recall, or ASC. One of the two probes identified by the raw EEG as being "drowsy" contains multiple types of expanding imagery while Craig selectively responded to the guiding (probe #15). The other probe identified as "drowsy" by the raw EEG contains imagery that was stable in nature and congruent with the kinesthetic guiding (probe #39). None of the imagery during this condition was vivid, and Craig did not report any awareness of his alertness or ASC. Given that there were only three probes during this condition, there is not enough information here to make any conclusions about Craig's alertness other than that Craig was capable of having and recalling expansive and kinesthetic imagery while drowsy.

Craig's images during the Kinesthetic condition involved many different kinds of imagery across the three total probes, such as kinesthetic, spatial, emotional, visual, and music awareness; yet, these kinds of imagery were not reflected in the EEG coherence data. Perhaps, as discussed in the Body and Interaction conditions, these other types of imagery did not occur frequently enough or to a strong enough degree to be detected by the EEG for the entire condition.

On the other hand, the significant gamma coherence for this condition reflects that Craig experienced multiple kinds of imagery simultaneously. For example, in probe #12 Craig felt his body move while experiencing the music, yet he simultaneously felt frustrated because his movements were not synchronized with the music. In probe #15, Craig moved into the house and sensed the change of space from outside to inside both visually and spatially; he also had a sense of safety. Interestingly, Craig did not report a great deal of meaning attached to any of the three images in this condition. Taking all these factors into consideration, 1) the multisensory images in two of the three probes, 2) no indication of particular meaningfulness attributed to any of the images, and 3) the fewest number of widespread gamma connections compared to all the other conditions), it appears that the gamma coherence for the Kinesthetic condition reflects a decreased emphasis on meaningfulness, while also reflecting Craig's multisensory imagery contributing to two of the three images.

In summary, when Craig was guided toward a kinesthetic experience, the phenomenological and EEG data were consistent regarding the multisensory imagery in two out of three probes along with the widespread gamma coherence. The data were also consistent regarding the diminished meaningfulness attributed to the images coinciding with the fewer number of connections in the gamma frequency (compared to the other conditions' imagery reports and gamma coherence results). These consistencies indicate that the number of gamma connections may be related to degree of meaningfulness, and that widespread connections in the gamma frequency reflect multisensory imagery that Craig synthesized into a single image.

On the other hand, when Craig was guided toward a kinesthetic experience, his phenomenological and EEG data were inconsistent in terms of the many kinds of sensory imagery Craig reported. This inconsistency has occurred in other conditions (Body and Interaction), and may be due to not enough brain activity related to these images to generate EEG coherence (particularly for the visual, memory, and spatial images), or due to the EEG's difficulty in detecting the relevant brain activity (emotion and music awareness).

Memory Condition

Phenomenological Data

Table 35 summarizes Craig's phenomenological data for the Memory condition, which contained three probes. All three probes' images were congruent with the guiding, though their memories contained multiple types of imagery. Emotions were common in all three probes, whereas visual imagery appeared in probe #s 22 and 31. Probe #31 also contained visual and auditory imagery. Only one probe (#32) contained vivid imagery. All three probes' images were stable in nature. Finally, Craig stated he was selectively responsive to the guiding in one probe (#22), but he did not comment on his alertness or ASC for any of the probes.

EEG Data

When Craig was guided to have imagery containing memories, a review of his raw EEG data indicated that he was drowsy in one out of the three probes (#32).

The EEG coherence analysis showed that, when Craig was guided to have memories, only the alpha and gamma frequencies contained significant coherence connections. The alpha coherence map shows that the left temporal and frontal lobes were idling, which means that the language and decision-making centers were not active. This suggests that Craig's images did not involve language or responses to words, nor did the images involve any decision-making or cognitive reactions to the imagery. The gamma coherence maps show that all the functional areas of Craig's brain (decision-making, language, spatial processing/memory retrieval, motor planning, and visual) shared information during the Memory condition imagery in order to make the imagery meaningful.

Table 35.
Memory Condition: Craig's Phenomenological Data

Probe #	Memory condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
22	Allow yourself to go back and remember a pleasant time with this person…Let your memory open up, and fully remember it.	Collage of memories about significant person, with visual images and emotions	Yes; visual, emotional	Stable image Selective response to guiding
31	Open to any memories you have about the object, or about anything or anyone the object reminds you of… […]	Body-felt emotions tied to memories about significant person	Yes; body, emotional, visual, auditory	Stable image
32	[…] now you are in a room from your past… Be aware of whatever is familiar to you in this place from the past.	Emotions related to room from past, with some visual sense of room's appearance and memories of room	Yes; emotional	Particularly vivid, Stable image

Integration of EEG and Phenomenological Data

The EEG and phenomenological data together provide limited information about Craig's alertness and imagery vividness. Because Craig offered no self-report regarding his alertness or ASC during this condition, the only information regarding alertness for this condition is the one probe where the raw EEG identified Craig's drowsiness, probe #32. This probe contained imagery that was vivid and stable with emotional content. Given the nature of the one drowsy probe, Craig's drowsiness did not interfere with his ability to have this vivid, stable image.

Craig's imagery reports during the Memory condition primarily concerned memories, emotions, visual images, and body sensations, but these imagery types were not directly reflected in the EEG coherence results, because the EEG did not contradict or specifically confirm Craig's reported experiences. First, the alpha coherence indicates that decision-making and language processes did not occur during the Memory condition images. These results seem to fit Craig's imagery reports, since none of his images required him to make any choices or decisions, nor did they involve dialogue or responses to particular words from the guiding. However, alpha coherence shows which brain areas are *not* functioning; therefore, these results do not confirm any of the experiences Craig reported during the Memory condition.

In terms of the gamma coherence during the Memory condition, all the functional areas of Craig's brain (decision-making, language, spatial processing/memory retrieval, motor planning, and visual) were involved in sharing information in order to make meaning, while Craig reported multiple senses and meaningful memories for all three of the condition's probes. Thus the gamma coherence reflects all of Craig's imagery during this condition, but mainly in general terms of meaningfulness and multisensory involvement. These results do not implicate specific brain functions because so many areas of the brain are involved, and because gamma coherence concerns information sharing among different areas of the brain rather than processing in specific functional areas of the brain. Thus, the kinds of images Craig reported during the Memory condition are not directly confirmed by the gamma coherence results, either.

In summary, when Craig was guided toward memory experiences, the EEG and phenomenological data were consistent regarding the alpha coherence and a lack of cognitive or language imagery, and the data were consistent regarding the gamma coherence and multisensory, meaningful imagery. Yet the EEG and phenomenological data were inconsistent in terms of Craig's ability to experience emotional imagery that was vivid and stable during a probe with drowsy brain states, and the lack of any EEG coherence results to match Craig's sensory imagery. Regarding Craig's drowsiness during a vivid, stable image that had emotional content, this same pattern of alertness and imagery characteristics had occurred several times in other conditions (Affect and Interaction). Because it is unlikely that Craig did not accurately report on his experience of vivid imagery, these instances may be examples of imagery during an ASC. Again, the EEG is not able to distinguish between drowsy brain states and ASC brain states. Regarding the lack of EEG coherence to match Craig's descriptions of sensory experiences, this also matches other conditions' coherence results (Body, Interaction, Kinesthetic). Again, this phenomenon could be due to lack of significant brain activity in functional areas of the brain that EEG can detect (in this case, visual and memory) as well as the limitations of scalp EEG in detecting other functional areas (in this case, emotional and auditory).

Visual Condition

Phenomenological Data

Table 36 summarizes Craig's responses during the Visual condition. This condition contained 16 total probes, the first nine during the induction (eight of these combining both body and visual guiding cues), and the remaining seven probes during the narrative portion of the session. Nine of the 16 probes were congruent with the visual guiding, and often involved other types of imagery such as body (two probes) spatial (two probes), emotional (two probes), memory, cognitive, auditory, and tactile (one probe each). Seven probes (out of 16) were not congruent with the guiding; most of these involved body images (five probes), whereas another image was language-based, and Craig could not recall the remaining probe's imagery. Two out of the 16 total images were particularly vivid; however, both of these were incongruent with the guiding and had body-based imagery. None of the vivid images had visual content throughout this condition. Craig responded selectively to the guiding in six of the nine induction probes, usually by ignoring or modifying the visual cues to focus on the body cues. He also stated he was disconnected from the guiding for three of the 16 probes, but that he fully responded to the guiding in three out of 16 probes. Craig did not mention his awareness of the music for any of the probes during the Visual condition. Finally, though half of the images (eight out of 16) were stable in nature, two were incomplete and Craig could not recall two of the images.

Table 36.
Visual Condition: Craig's Phenomenological Data

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
2	Now imagine a ball of light forming in the darkness... […]	Realized he missed guiding, scramble to create image; see ball of light eventually	Yes	Incomplete image Imagery shift Disconnected with guiding 'Out' of ASC
3	[…] and as the light moves, imagine that all of your head begins to glow… […]	Difficulty with visual cues combined with physical; relaxed body	Yes; body	Incomplete, Stable image Fully responsive to guiding
4	[…]Neck and shoulders glowing in the light…[…]	Disregarding some visual cues; body relaxed	No; body, cognitive	Stable image Selective response to guiding
5	[…] and as the lights move, your arms and hands begin to glow… […]	Disregarding visual cues; body relaxed, sense movement of ball	No; body	Stable image Selective response to guiding

Table 36. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
6	[…]as it moves around and through your torso and back, they begin to glow…	No imagery recalled	No	Disconnected with guiding
7	[…] As it moves, your hips and waist begin to glow… […]	Disregarding visual cues; body relaxed, sense movement of ball	No; body	Particularly vivid Selective response to guiding
8	[…]Upper legs and knees glowing in the light […]	Ignored cues, legs very heavy, relaxing more	No; body	Particularly vivid Stable image Selective response to guiding
9	[…]lower legs and feet glowing in the light, feeling more and more relaxed.	Energy in feet, sensation of "glowing," no visual	No; body	Stable image Selective response to guiding

Table 36. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
10	[…]…notice that wherever you move the light, your body begins to glow…[…]	Whole body relaxed, vague visual image of body	Yes; body	Stable image Selective response to guiding
11	[…] Look around you and see what surrounds the house, the colors and shapes and features of the landscape. […]	Visual and spatial awareness of house and its surroundings	Yes; spatial	Stable image Fully responsive to guiding
13	[…]take in everything you see, the roof, the windows, the outside walls….[…]	Visual close-up of house exterior, some self-coaching to see a "new house"	Yes; spatial, cognitive	Stable image Fully responsive to guiding
16	[…] ….Notice the lay-out of rooms…the light…the space…and the things around you.	Vague recollection of seeing living room, few details	Yes; spatial	Difficulty recalling image Disconnected from guiding

Table 36. (continued)

Probe #	Visual condition guiding direction (abbreviated)	Imagery response	Congruent? (Yes/No); [other imagery]	Phenom. codes
19	[…]…and notice any objects in the room that draw your attention…Look at it closely. […]	No recollection of an object, just conversation with significant person	No; language	Difficulty recalling image Selective response to guiding
21	[…] Take time to notice the person's face and appearance…[…]	Visual and emotional experience of closeness, conversing with significant person, person's voice	Yes; auditory, emotional	Stable image
29	As you enter the next room, look around and take in everything you see.	Detailed visual memory of room, and emotional awareness of significant person	Yes; memory	Imagery shift
30	[…]….take some time to look closely at [an object]…[…]	Visual, tactile, and emotional image of object from past	Yes; tactile, emotional, memory	Expanding image

EEG Data

When Craig was guided to have visual imagery, a review of his raw EEG data showed that he was drowsy during three out of the 16 probes and asleep during one out of the 16 probes (the same #5 probe from the induction for both Body and Visual conditions reported earlier under the Body condition).

The EEG coherence analysis found that, when Craig was guided to have visual experiences, the theta, alpha, and gamma frequencies all contained significant connections. The theta coherence map implicates spatial and visual processing, meaning that the imagery during the Visual condition involved spatial relationships between and/or among Craig and other objects in the imagery, as well as visual sensations. The alpha coherence map contains only a few significant connections, indicating that the language and decision-making regions were idling. This suggests that, during the Visual condition, the imagery did not involve any decision-making or cognitive processing, nor did it involve any use of dialogue or responses to words in the guiding. Finally, just as in all the other conditions, the gamma band contains many widespread connections indicating that all the functional areas of Craig's brain (decision-making, language, spatial processing/memory retrieval, motor planning, and visual) shared information in order to make the imagery during the Visual condition coherent. Due to the number of widespread conditions, the gamma coherence was very strong, and thus the brain regions implicated by this coherence do not necessarily mean that the same brain regions were directly involved in the Visual condition imagery.

Integration of EEG and Phenomenological Data

The EEG and phenomenological data together reveal some consistencies regarding alertness and Craig's imagery recall and perception of being in an ASC. Craig's only report regarding his alertness concerned his sensation of being "out" of the ASC during one probe. According to the EEG, Craig was alert during this probe, so these data match. During one probe identified by raw EEG as "drowsy" (#19), Craig could not recall the imagery, suggesting that drowsiness affected his ability to remember the imagery. Therefore alertness was associated with being "out" of the ASC, whereas drowsiness was associated with poor recall of the imagery.

The most common imagery Craig experienced during this condition was visual imagery, which was implicated in the theta coherence pattern. Though few of the Visual condition probes during the induction involved visual imagery, most of the narrative probes contained visual imagery; thus, it seems there were enough visual images during this condition to produce the significant EEG connections to the visual cortex at the theta frequency.

The next most common imagery type Craig experienced was body sensation, rather than body *movement* imagery. Thus the EEG may not have been able to reflect the body-based images during this condition.

Spatial processing was implicated by the significant theta coherence in this region, and may have been related to the induction imagery where Craig followed the guiding to focus on different parts of his body. Further, in the first three images during the narrative portion of the session (out of the total 16 images) Craig distinctly stated he had a clear sense of his location in relation to the house he was seeing, the sense of going inside the house, and the spatial layout of the house when he entered. Consequently, the EEG data and Craig's reports together show that spatial processing was a significant part of his imagery during the Visual condition.

The alpha coherence pattern identified the frontal lobes – responsible for decision-making – as idling during this condition, which generally matches Craig's reported experience. Though Craig coached himself in one probe out of 16 (#13) to follow the guiding more closely, overall his Visual condition imagery lacked much decision-making or cognitive reflection.

The alpha coherence pattern also showed that the regions responsible for language were idle during this condition, however Craig did report conversation in his imagery during the Visual condition, and also was somewhat concerned about specific words used in the guiding during the induction. Yet the other frequencies did not show any significant connections in the language region for this condition, so either Craig's imagery reports about his language-based images were inaccurate (a possibility, given his difficulty recalling the imagery sequence at times) or his language processing was not strong enough to produce activity detectible by EEG. Therefore, though the EEG data are consistent across different frequencies, they still do not match Craig's reports of language imagery during this condition.

Finally, just as in all the previous guiding conditions, the gamma band for the Visual condition contained many connections involving the entire brain in making the imagery coherent. At the same time, Craig's imagery during the Visual condition involved both meaningful images (significant persons, memories, scenes) as well as multisensory images. Thus the gamma coherence pattern reflects this condition's meaningful and varied multisensory imagery.

In summary, when Craig was guided toward a visual imagery experience, his EEG and phenomenological data were consistent regarding his alertness while being out of the ASC as well as his drowsiness while unable to recall imagery. The data were also consistent regarding the many widespread gamma connections reflecting multisensory and meaningful imagery. However, the EEG and phenomenological data for the Visual condition were inconsistent in terms of Craig's reported imagery involving language processing, while at the same time the alpha coherence showed that language processing was turned "off" and no other frequency band showed any language processing. This inconsistency may be due to inaccurate imagery reports or to low levels of brain activity in the language centers of Craig's brain.

Summary of Craig

EEG Coherence Findings across Conditions

Craig's EEG data showed significant theta coherence in only the Visual and Affect conditions. The coherence pattern for the Affect condition implicated visual and language processing, whereas the coherence pattern for the Visual condition implicated spatial and visual processing. The lack of significant coherence at this frequency in all the remaining conditions (Body, Interaction, Kinesthetic, and Memory) might suggest a lack of memory and attention processing in those conditions. However, memory and attention are also involved in other frequencies and other brain regions, so lack of theta coherence alone is not enough to completely rule out memory and attention processing in any of the conditions.

Craig’s EEG data showed very weak alpha coherence across all the conditions, with only the Memory and Visual conditions showing significant coherence. The coherence for both conditions indicated idling in the language and decision-making regions of the brain. Though the lack of alpha coherence in the visual cortex across conditions could imply that Craig was not relaxed throughout the session, the Power Spectral Density maps (not shown) for Craig showed that the visual regions had a great deal of alpha activity; therefore, Craig was definitely relaxed across all the conditions. For whatever reason, this significant activity was not in synchrony with other regions of his brain; therefore, there was no alpha coherence with the visual cortex.

Craig’s EEG data showed no significant beta coherence for any conditions. This suggests that Craig rarely experienced motor imagery if not specifically guided to do so, and that Craig was not fully attentive to, engaged, or involved in his imagery throughout most of the session.

Craig’s EEG data on gamma coherence showed widespread connections between numerous regions of the brain across all guiding conditions. This suggests that Craig’s brain actively worked to make the imagery meaningful and coherent, by engaging every functional area of the brain the EEG can detect—including decision-making, language and spatial processing, memory retrieval, motor planning, and visual processing.

Response to Guiding Across Conditions

Table 37 shows the extent to which Craig's imagery responses were consistent with the guiding conditions.

Table 37.
Craig's Imagery Responses to Guiding Conditions

	# Probes Presented	# Responses as Guided	# Responses Unguided	Total Responses
Body Imagery	14	12	9	21
Affective Imagery	8	6	11	17
Visual Imagery	16	9	7	16
Interaction	7	3	0	3
Memories	3	3	6	9
Kinesthetic Imagery	3	3	0	3

Based on the information in this table, it appears that Craig's preferred modalities for responding to the guide were memories and kinesthetic imagery (both with 100% congruence with the guiding), whereas he preferred imaging in an affective modality when not responding to the guide.

From the start of the session, Craig reported having some difficulties following all of the guiding cues, particularly when he was being guided to experience a different sensory modality than what he was experiencing in his image at that time. For example, as a result of his pre-session relaxation, Craig was so relaxed at the beginning of the induction that he later reported feeling annoyed by some of the guiding cues because they did not match his internal state of awareness, which was very body-based and did not involve any additional visual sensation as the guiding encouraged. Therefore he had to re-interpret the guiding to fit his experience in order to make use of the induction. From an EEG perspective, Craig's responses to the guiding may be related to the lack of beta coherence and his drowsiness, indicating lack of focus and alertness which made it difficult for Craig to maintain ongoing attention to the guiding.

Vividness of Imagery

Table 38 shows the relative vividness of various types of imagery reported by Craig.

Table 38.
Proportion of Vivid Imagery to Total Instances of Imagery Modality

	# Images Reported	# Vivid Images	% Vivid
Body Imagery	21	4	19%
Affective Imagery	17	7	41%
Visual Imagery	16	1	6%
Interaction	3	1	33%
Memories	9	4	44%
Kinesthetic Imagery	3	0	0%

Based on the information in this table, Craig most frequently experienced vivid imagery while having memories. The next most frequent vivid imagery involved affective images. Given that most of the vivid images involved memories, and most of these memories occurred while the EEG showed Craig was drowsy (see Table 39), drowsiness did not seem to interfere with imagery vividness; rather, the drowsy brain activity may have been an indicator of an ASC.

Two other factors affecting the vividness of Craig's imagery were the extent to which the imagery stayed in one place (stability of image), and Craig's alertness during the experience. It seemed that, when his images were stable, Craig had sufficient time to experience the images fully and deeply. In fact, Craig stated several times during the interview that this time to experience the imagery was very important to him.

Much of Craig's vivid and meaningful imagery also involved emotional, stable images where he was relaxed (and drowsy according to the EEG; see Table 39) and able to take time with the images. However, at times Craig could not recall imagery under these same conditions in probes immediately following a particularly vivid image. This could perhaps indicate some difficulty sustaining focus while drowsy, or could indicate some avoidance of the imagery content. Given the research situation of this one-time session, it would not be surprising that Craig would resist exposing too much of himself by shutting down his imaging and/or forgetting the imagery.

Craig also identified the vivid images as being very meaningful, and stated that their cumulative effect made the session very satisfying. Thus, Craig's most vivid imagery was characterized as meaningful, stable, often involving memories or emotions, and occurring while Craig was drowsy and/or in an ASC.

Alertness

Table 39 shows the frequency of images with drowsy brain states along with the number of vivid images for each type of imagery and the number of images for each imagery type that were classified as both vivid and drowsy.

Table 39.
Frequency of Imagery with Drowsy Brain States, Vivid Imagery, and Vivid and Drowsy Imagery

	# Drowsy Images	# Vivid Images	# Vivid and Drowsy Images
Body Imagery	6	4	0
Affective Imagery	13	7	5
Visual Imagery	8	1	0
Interaction	5	1	1
Memories	5	4	3
Kinesthetic Imagery	2	0	0

According to this table, Craig experienced drowsiness most frequently while having affective imagery. The affective imagery also had the highest incidence of vividness with drowsy brain states. And Craig's interactive imagery and memories also had a high degree of vividness with drowsy brain states. On the other hand, Craig's brain showed drowsiness during two probes where he had difficulty recalling the imagery or could not recall the imagery at all, one probe during the Visual condition (#19) and the other probe during the Affect condition (#20). Therefore, at times Craig was drowsy during his most vivid and meaningful images, whereas at other times his drowsiness affected his ability to focus on the guiding and ongoing imagery.

Drowsiness seemed to detract from Craig's full involvement in the session, particularly during the induction and first few probes of the narrative guiding. This may have been related to his intentional relaxation prior to the start of the session, which he described as his way of entering a “deep” ASC. Yet Craig felt that this may have backfired on him, since he commented later that maybe he was in “too deep,” especially during the induction, when he was having trouble following the guiding because of his desire to focus only on his body imagery. He was so relaxed that he fell asleep (according to the raw EEG) during one induction probe, and was the only participant to do so. In contrast, the EEG identified that Craig was often drowsy during very vivid and significant emotional images. Such imagery seems to indicate that Craig was in a deep ASC at the time, though drowsiness alone does not explain what the ASC means in terms of brain activity.

Therefore, Craig seemed to experience varying kinds of drowsiness that ranged from a sleepy state, disconnecting him from the music and guiding, to a more focused but relaxed state, allowing him to fully attend to and experience the imagery vividly. The raw EEG data were not able to distinguish between these kinds of “drowsiness” for each individual probe, but the absence of beta coherence across conditions may be an indicator of the absence of the attentiveness required to maintain ongoing focus on the imagery narrative, and therefore may reflect the consequences of Craig’s drowsiness.

Response to Music

Overall, Craig did not respond to or utilize the music during his imagery. He stated he was aware of the music in only two probes. In one of these probes, he felt the music’s mood set the stage for his interaction with a significant person. In the other probe, he felt frustrated by the difficulty he had matching his body’s movement with the pace of the music. Additionally, Craig stated at times during the interview (while hearing the music a second time) that the music was not familiar to him. There are no clear EEG connections with attentiveness to music, but ongoing attention and alertness could be factors in Craig's ability to take in the music while experiencing imagery. Given the lack of beta coherence, indicating little ongoing attention to tasks, and the prevalence of drowsiness throughout the session, Craig may not have been focused or alert enough to fully experience and utilize the music in his imagery.

Difficulty Recalling Imagery

Across conditions, Craig had difficulty reporting the sequence of his imagery at times. In fact, during the interview Craig inaccurately reported an entire swath of his imagery sequence, as he provided his imagery descriptions through three-fourths of the session before realizing that his descriptions were not matching the guiding probes, and in fact were many probes ahead. In going back to fill in the probes he had not addressed, he sometimes could not recollect which images occurred in response to particular guiding cues or how the imagery related to the music. Many of the images he could not clearly recall are based upon his best recollection the second time we revisited the probes during the interview. Images with visual content were difficult to recall most often (two out of five difficult to recall images). The EEG identified Craig's drowsiness during only two of the five difficult-to-recall images, one a Visual condition image (#19) and the other an Interactive condition image (#24). Though not all of these difficult-to-recall images are directly related to drowsiness, probe #24 occurred during a string of probes where Craig demonstrated drowsy brain activity according to the EEG (#23 through 27). Therefore, though probe #24's difficult-to-recall imagery is likely related to drowsiness, most of the difficult-to-recall probes occurred when Craig's brain showed an alert state.

Consequently, difficulty with imagery recall may not be directly related to drowsiness, but could be related to other factors, such as avoidance of imagery content. Given the nature of this one-time research session, and the proximity of many of the difficult-to-recall images to other vivid images, Craig could have felt that the vivid imagery was too potent to experience deeply at that moment, and (consciously or unconsciously) allowed his ASC to shift into a drowsy state to avoid deeper exploration.

Significance of Imagery Experience

Craig felt he had experienced a holistic, personally significant, and meaningful GIM session despite having some difficulty recalling the sequence of the imagery. During the post-session interview he was immediately able to make meaningful connections among the images and reflect upon each of them, even though those connections were not always apparent to him during the session itself. This is not to be confused with Craig's difficulty recalling the sequence of the images over time and in relation to the music and guiding; Craig was clear on the meaning and importance of each image, but was often uncertain about when he experienced each image and what music and guiding occurred around each image. As a result of these meaningful connections, the session was satisfying to Craig, despite the difficulty he had recalling the imagery at times. The very strong gamma coherence results across all the guiding conditions reflect Craig's brain activity involved in making meaning out of a wide range of imagery types.

Consistency between EEG and Phenomenological Data across Conditions

Across all the conditions, the EEG and phenomenological data were consistent regarding the gamma coherence's widespread and multiple connections, which reflected the meaningful and multisensory imagery that Craig reported. The data were also consistent in terms of the lack of beta coherence, which reflected Craig's lack of ongoing attention, resulting in his difficulty recalling the sequence of his imagery and some specific images. Together these consistencies explain how Craig could have had meaningful imagery while at the same time having difficulty recalling some of the imagery.

Across all the conditions, the EEG and phenomenological data were inconsistent regarding Craig's reports of multiple kinds of imagery, whereas no EEG coherence related to these or any other brain functions emerged for the Interaction, Kinesthetic, Memory, and Body conditions. This essentially means that, despite the experiences Craig reported, his brain lacked activity in the relevant regions that could synchronize and produce significant coherence. This might have occurred because Craig had many different kinds of imagery during these conditions, which produced such widespread and diffuse activity in the brain that none of it synchronized enough to produce coherence. It is also possible that, given Craig's difficulty sustaining focus on his imagery, Craig did not actually maintain awareness of his images long enough to produce brain activity to a strong enough degree for different regions to synchronize; therefore, no EEG coherence occurred.

Finally, the EEG and phenomenological data across conditions were unclear regarding drowsy brain states and their relationship with Craig's vivid imagery and difficulty recalling imagery. Most of Craig's vivid imagery occurred when his brain indicated he was drowsy, yet on the other hand Craig also had difficulty recalling his images or felt disconnected with the guiding when his brain showed drowsiness. Brain drowsiness during vivid imagery may actually be an indicator of an ASC, whereas such drowsiness during difficult-to-recall imagery may be simple drowsiness. For now, the EEG cannot distinguish between these situations.

CHAPTER 10

CROSS-CASE COMPARISONS: RESULTS AND DISCUSSION

EEG Data

EEG Alertness across Conditions

Table 40 shows the percentage of probes with drowsy brain states out of total probes for each guiding condition.

Table 40.
Percentage of Probes with Drowsy Brain States out of Total Probes by Condition

Guiding Conditions	Participants			
	Linda	Larry	Daphne	Craig
Affect	0%	25%	75%	75%
Body	0%	0%	43%	28%
Interaction	0%	14%	57%	71%
Kinesthetic	0%	33%	33%	66%
Memory	0%	33%	33%	33%
Visual	0%	0%	50%	25%

Participants were drowsiest during the Affect condition (one participant with 25% drowsy probes, and two participants with 75% drowsy probes), whereas they experienced the lowest (and most consistent) level of drowsiness during the Memory condition (33% for each of three participants with drowsy brain states). Linda was the least drowsy out of all the participants, as she was awake for all of the probes in the session. Daphne and Craig had the leading average rates of drowsiness across conditions, at 49% and 50%, respectively; that is, for half of all the probes in the session, both Daphne's and Craig's raw EEG data indicated drowsiness.

EEG Coherence across Conditions

Table 41 shows regions of the brain activated in all four participants under each of the guiding conditions according to the EEG coherence analyses. As seen in this table, in the Affect condition, three of the four participants had coherence with the visual, memory retrieval/spatial, and language processing centers in the brain. This means that, when guided to have affective imagery, most of the participants' brains engaged in visual, memory retrieval and/or spatial, and language processes.

In the Body condition, there was less consistency among the participants' responses, with two out of four participants sharing common active brain regions implicating language and memory retrieval/spatial processing. For these participants, when they were guided to have body-based images, their brains utilized language and memory retrieval and/or spatial processing.

In the Interaction condition, three out of four participants had coherence with the region responsible for memory retrieval/spatial processing, whereas two out of four participants had coherence with the region responsible for language processing. Thus, when guided to have interactive imagery, most of the participants' brains engaged in memory retrieval and/or spatial processing, whereas some participants' brains used language processing.

In the Kinesthetic condition, two out of four participants shared common active brain regions implicating motor, language, and memory retrieval/spatial processing. This

Table 41.
Brain Activity According to Guiding Condition

Guiding Conditions	Participants			
	Linda	Larry	Daphne	Craig
Affect	Visual, Language, Memory retrieval/Spatial	Visual, Memory retrieval/Spatial, Motor IDLE – Visual, Decision-making	Language, Memory retrieval/Spatial	Visual, Language
Body	Visual, Language, Memory retrieval/Spatial	IDLE – Visual, decision-making	Language, Memory retrieval/Spatial	None
Interaction	Visual, Language, Memory retrieval/Spatial, Decision-making	Visual, Memory retrieval/Spatial, Motor IDLE – Visual, Decision-making	Language, Memory retrieval/Spatial	None
Kinesthetic	Visual, Language, Memory retrieval/Spatial, Motor	Motor	Language, Memory retrieval/Spatial	None

Table 41. (continued)

Guiding Conditions	Participants			
	Linda	Larry	Daphne	Craig
Memory	Visual, Language, Memory retrieval/Spatial, Motor	Visual, Memory retrieval/Spatial, Motor IDLE – Visual, Decision-making	Language, Memory retrieval/Spatial	IDLE – Visual, Decision-making
Visual	Visual, Language, Memory retrieval/Spatial, Decision-making	Visual, Memory retrieval/Spatial, Motor IDLE – Visual, Decision-making	Language, Memory retrieval/Spatial	Visual, Spatial IDLE – Visual, Decision-making

means that, when guided to have kinesthetic imagery, some participants' brains engaged in motor, language, and memory retrieval/spatial processing.

For the Memory condition, three out of four participants showed coherence with the region responsible for memory retrieval/spatial processing, whereas two out of four participants showed coherence with the regions responsible for language and visual processing. However, two out of four participants also had alpha coherence showing that the visual and decision-making regions were idle during the Memory condition. For one of these participants, the alpha coherence conflicted with her other coherence results regarding visual processing. Therefore, when guided to have memories in their imagery, most of the participants' brain activity involved memory retrieval and/or spatial processing, whereas some participants' brain activity involved language and visual processing. But some participants' brains also showed that visual and decision-making processing was turned "off" during the Memory condition.

In the Visual condition, visual processing was implicated in three out of four participants; however, two of these participants also had alpha coherence in the visual cortex, meaning that visual processing was idle during this condition. Memory retrieval and/or spatial processing was also implicated in three out of four participants, whereas language and decision-making processing was implicated in two out of four participants. Thus, when guided to have visual imagery, most participants engaged in visual processing, though some participants simultaneously showed that their visual processing was turned "off." However, most participants also engaged in memory retrieval and/or spatial processing, whereas some participants engaged in language and decision-making processing.

Out of all the conditions, the Affect condition shows the most homogeneity in responses, with three out of four participants showing common brain processing in visual, memory retrieval/spatial, and language regions. This is interesting given that the EEG cannot precisely detect affective processes; however, most participants responded with similar kinds of brain activity to affective guiding. This may reflect the narrative direction of the guiding for this session, which may have evoked these kinds of experiences while also eliciting affective responses. In other words, the guiding asked participants to experience emotion in a visual, memory/spatial, and/or language-based context.

The Body condition shows the least amount of common brain processing, with only two brain regions (language and memory retrieval/spatial processing) involved in coherence patterns common to two out of four participants. This condition contained nine induction probes which provided guiding for visual imagery along with body-based imagery. Language and memory retrieval/spatial processing were also common in the Visual condition (which shared these induction probes with the Body condition), and this may explain the presence of these kinds of processes in the Body condition.

In general, however, each guiding condition tended to result in its corresponding type of brain processing: the Interaction condition showed common language processing (which relates particularly to this condition’s probes guiding participants to speak and listen to a person in their imagery), the Kinesthetic condition showed common motor processing, the Memory condition showed common memory retrieval processing, and the Visual condition showed common visual processing.

Table 42 shows the guiding conditions in which each participant experienced alpha, beta, gamma, and theta coherence. As seen in this table, significant coherence occurred in the theta frequency for three out of four participants during the Affect, Memory, and Visual conditions, and for two out of four participants during the Interaction and Kinesthetic conditions. The theta frequency’s general function is to facilitate memory and attention processing. Thus, memory and attention processing occurred in a general sense when participants were guided to experience affective, memory-based, and visual imagery.

Table 42.
Guiding Conditions with Significant Coherence

Coherence Frequency	Participants			
	Linda	Larry	Daphne	Craig
Theta	Affect	Affect	Body	Affect
	Body	Memory	Interaction	Visual
	Interaction	Interaction	Kinesthetic	
	Kinesthetic	Visual	Memory	
	Memory		Visual	
	Visual			
Alpha	None	Affect	Visual	Memory
		Body		Visual
		Interaction		
		Memory		
		Visual		
Beta	Interaction	Affect	Affect	None
	Visual	Interaction	Body	
		Kinesthetic	Interaction	
		Memory	Kinesthetic	
		Visual	Memory	
			Visual	

Table 42. (continued)

Coherence Frequency	Participants			
	Linda	Larry	Daphne	Craig
Gamma	Affect	Affect	Affect	Affect
	Body	Body	Body	Body
	Interaction	Interaction	Interaction	Interaction
	Kinesthetic	Memory	Kinesthetic	Kinesthetic
	Visual	Visual	Memory	Memory
			Visual	Visual

Significant coherence in the alpha frequency occurred for three out of four participants in the Visual condition, and for two out of four participants in the Memory condition. The alpha frequency shows which areas of the brain are idling; thus, during the Visual condition some parts of the brain were idle (namely the visual and decision-making regions). This means that, when guided to have visual imagery or memories, some participants' brains did not engage in visual processes or decision-making. Though idling visual regions would generally indicate relaxation, a desired state for participating in a GIM session, they also would contradict any indications of visual processing, and particularly processing visual imagery. Such contradictions occurred a few times in this study, and explanations vary from problems with collecting EEG data to inaccurate reports of imagery.

For the beta frequency, significant coherence occurred in three out of four participants' data during the Visual and Interaction conditions, and in two out of four participants' data during the Affect, Kinesthetic, and Memory conditions. The beta frequency generally concerns motor planning and ongoing attention (due to short-term memory). Therefore, when most participants were guided to have visual or interactive imagery, and some participants were guided to experience emotional, kinesthetic, or memory-based imagery, their brains engaged in generalized motor processing and/or demonstrated ongoing attention to the imagery.

The gamma frequency showed significant coherence in all four participants' data for the Affect, Body, Interaction, and Visual conditions, and in three out of four participants' data in the Kinesthetic and Memory conditions. Gamma coherence concerns the degree of information-sharing, or meaning-making, the brain does during an experience. In nearly all the conditions, each participant engaged in some kind of meaning-making while imaging, because their brains shared information among different regions in order to make the imagery coherent.

Altogether, the most common frequency across participants showing significant coherence was the gamma frequency, the next most common was theta, then beta; alpha was the least common coherence result. This suggests that meaning-making was the most common general brain process, and regional idling the least common. Sensory and cognitive functions (e.g., decision-making, visual perception, memories) were fairly common across participants.

Phenomenological Data

Table 43 compares the four participants on various components of the phenomenological data, as ranked by the researcher. Participants were ranked according to the frequency of each kind of data; where ties occurred, other data in the same category were considered to make a clear determination of rank (e.g., a tie regarding stability of image would be decided according to the frequency of other non-stable images such as expanding, contracting, or incomplete images). The rankings used are: 4 (the highest level of all participants), 3 (second highest level), 2 (third highest level), 1 (lowest level of all participants).

Using the rankings in terms of high (rankings 3 or 4) versus low (1 or 2), I compared the data categories to determine what relationships existed across participants.

Congruence with guiding does not appear to be related to any of the other kinds of phenomenological data.

Vividness and significance of the experience were inversely related to disconnection from guiding and reports of drowsiness; that is, the more vivid or significant imagery a participant reported, the less frequently he/she reported feeling drowsy or disconnected from the guiding.

Stability of imagery and responsiveness to music are inversely related to difficulty recalling imagery and reports of being “in” the ASC. That is, the more stable imagery a participant reported, or the more responses to music that were reported, the less difficulty a participant had recalling his/her imagery, and the less often he/she reported being in the ASC.

Table 43.
Rankings of Participants' Phenomenological Data

Phenomenological Data	Participants			
	Linda	Larry	Daphne	Craig
Probe/Response Congruence	1	3	4	2
Stability of Image	4	2	3	1
Vividness of Image	1	2	3	4
Responses to Music	3	2	4	1
Disconnect from Guiding	3	4	1	2
Difficulty of Recall	2	4	1	3
Significance of Experience	2	1	4	3
Reports of "in" ASC	2	4	1	3
Reports of sleepiness/ drowsiness	3	4	1	2

Table 44 compares the six guiding conditions with the same phenomenological data as in Table 43, as ranked by the researcher. Each condition was ranked according to the frequency of each kind of data; where ties occurred, other data in the same category were considered to make a clear determination of rank (this was not possible in the category of Reports of "in" ASC, as the three tied conditions had no other ASC data for comparison). The rankings ranged from 6 (the highest level of all conditions) to 1 (lowest level of all conditions). Each condition's description takes the highest (5 or 6) and lowest (1 or 2) rankings into consideration. I ignored rankings of 3 or 4.

Table 44.
Rankings of Phenomenological Data by Guiding Condition

Phenomenological Data	Guiding Condition					
	Affect	Body	Interaction	Kinesthetic	Memory	Visual
Probe/Response Congruence	2	5	1	4	6	3
Stability of Image	6	3	4	2	1	5
Vividness of Image	6	1	4	3	5	2
Responses to Music	3	2	5	6	4	1
Disconnect from Guiding	3	6	2	1	5	4
Difficulty of Recall	6	2	5	1	4	3
Reports of "in" ASC	1	6	4	1	1	5
Reports of sleepiness/ drowsiness	5	4	3	1	6	1

The Affect condition ranked low on Congruence between guiding and imagery, as well as for Reports of "in" ASC, whereas it ranked high on Stability of image, Vividness of image, and Difficulty of imagery recall. Therefore, in terms of phenomenological data, the Affect condition's imagery was very stable and vivid, often difficult to recall, and not often congruent with the guiding. Furthermore, participants stated they were "in" the ASC least often during the Affect condition.

The Body condition ranked low on Vividness of imagery, Responses to music, Difficulty of imagery recall, and ranked high on Disconnect from guiding, Reports of “in” ASC, and Congruence between guiding and imagery. In other words, in terms of phenomenological data, the Body condition’s imagery was easy to recall, not very vivid, was not influenced by the music, and participants felt disconnected from the guiding and often reported being “in” the ASC.

The Interaction condition imagery ranked low on Congruence between guiding and imagery, and Disconnect from guiding, and ranked high on Responses to music. Therefore, the Interaction condition imagery was least congruent with the guiding, but participants were generally aware of the guiding while highly aware of the music.

The Kinesthetic condition imagery ranked low on Disconnect from guiding, Reports of “in” ASC, and Reports of sleepiness, whereas it ranked high on Responses to music. So participants reported that, during the Kinesthetic condition, they felt aware of the guiding and of the music, and infrequently reported being “in” the ASC or being sleepy.

The Memory condition imagery ranked low on Stability of imagery and Reports of “in” ASC, whereas it ranked high on Congruence between guiding and imagery, Reports of sleepiness, Disconnect from guiding, and Vividness of imagery. Therefore the imagery in the Memory condition was highly congruent with the guiding and very vivid, but not very stable. At the same time, participants infrequently reported being “in” the ASC, but often reported being sleepy and disconnected from the guiding.

The Visual condition ranked low on Responses to music, Reports of sleepiness, and Vividness of imagery, whereas it ranked high on Stability of imagery and Reports of being "in" the ASC. In other words, the imagery during the Visual condition was not very vivid, yet it was very stable. Participants also stated that, during this condition, they were not very aware of the music, while they infrequently reported feeling sleepy but often reported being "in" the ASC.

When looking at the data by condition, some of these relationships become clearer. For instance, the participants most frequently reported being "in" the ASC during the Visual and Body conditions; of course, these conditions shared the probes containing the induction and the final probes guiding participants back to alertness. During the induction and the return participants naturally reported on changes in their awareness, including whether they were "in" or "out" of the ASC. Also, because of the induction, they also would be more likely during those conditions to lose focus and report that they had lost track of the guiding or could not recall their imagery. And their imagery was not likely to be vivid during these sections of the session. On the other hand, the Affect and Memory conditions occurred in the middle to latter third of the session, after participants had been imaging and hearing the music for a period of time, and therefore were more likely to be in an ASC and experience vivid imagery. Therefore, some of the phenomenological data reflects not only the guiding condition, but the sequence of the probes in the overall narrative, as well.

Relationship between EEG and Phenomenological Data

Affect Condition

In the Affect condition, the EEG and phenomenological data were consistent regarding the high incidence of drowsy brain states with the low rate of congruence between reported imagery and the guiding conditions. The data were also consistent regarding the high incidence of drowsy brain states with the high degree of vividness in the imagery. Additionally, the strong presence of gamma coherence across participants fits with the vividness and meaningfulness of the imagery.

The EEG and phenomenological data were inconsistent regarding infrequent reports of being “in” the ASC while this condition had the highest incidence of drowsy brain states. If drowsy brain activity is related to being in the ASC, then participants were unaware of, or under-reported, their altered brain state.

The EEG and phenomenological data were unclear regarding the EEG coherence and their relationships with the guiding condition. Because affect cannot really be detected via EEG, the EEG cannot inform the participants’ experiences of affect during this condition. The situation is further complicated by reports of multiple kinds of imagery other than affect during these probes. Thus, even if emotional processing could be detected, the EEG data would not have been able to directly identify brain activity related to emotional processing.

Body Condition

During the Body condition, the EEG and phenomenological data were consistent in terms of the low incidence of vivid imagery, few responses to music, little difficulty recalling imagery, and few probes with drowsy brain states. This suggests that participants were generally alert, not very altered, but did not have very vivid imagery and were not particularly attentive to the music. The few reports of responses to the music along with the high number of reports of being “in” the ASC also matches the pattern found previously in the phenomenological data.

The EEG and phenomenological data were inconsistent regarding the EEG coherence and the guiding conditions. There was little overlap among the participants in terms of coherence results, and what little they had in common included language and memory retrieval/spatial processing. This brain region does not seem to be related to body-based imagery, but this discrepancy may be due to the ambiguity of “body” imagery, which the brain may register as motor imagery, tactile imagery, or a kind of body sensation, with the latter two kinds too remote and specific for EEG to detect.

The EEG and phenomenological data were also inconsistent regarding the high degree of disconnection from the guiding along with the low rates of drowsy brain states. This incongruence seems to suggest a lack of focus during this condition rather than drowsiness. Supporting this conclusion is the general lack of beta coherence during the Body condition, which may suggest very little ongoing attention to the imagery.

Interaction Condition

During the Interaction condition, the EEG and phenomenological data were consistent regarding the coherence with the language processing center and the guiding condition. This relates particularly to the guiding which asked participants to converse with a person in their imagery. At the same time, the fact that only two out of four participants showed coherence in this region reflects the lower rate of overall congruence between the guiding and the imagery. The data were also consistent regarding the presence of strong gamma coherence across participants and the degree of significance most participants attributed to the interactions with people in their imagery.

The EEG and phenomenological data were inconsistent in terms of the high incidence of drowsy brain states along with high reports of responses to music. In this case, the drowsy brain states may actually reflect an ASC in which participants had heightened awareness of the music during the Interaction probes.

Kinesthetic Condition

In the Kinesthetic condition, the EEG and phenomenological data were consistent in terms of the coherence with the brain region responsible for motor planning and the guiding condition.

However, the EEG and phenomenological data were inconsistent regarding the relatively high incidence of drowsy brain states with several phenomena: few reports of sleepiness, many reports of response to music, and few reports of disconnection from the guiding. This suggests that brain drowsiness had little to do with awareness of sleepiness, and might indicate that participants were not actually sleepy but were in an ASC, or they were not aware they were sleepy. The high rate of drowsy brain states did not affect high rate of music awareness, which might also indicate an ASC, since participants would be more sensitive to the music. And the high rate of drowsy brain states did not cause participants to lose awareness of the guiding – again, perhaps an indicator of ASC, as they may be more sensitive to the guiding cues while in an ASC. Thus, when the phenomenological data are considered with the frequency of brain states in the Kinesthetic condition, it appears that participants may have often experienced an ASC.

Memory Condition

In the Memory condition, the EEG and phenomenological data were consistent in terms of the EEG coherence with the region responsible for memory retrieval and the guiding condition, particularly since the imagery had a high percentage of congruence with the guiding to experience memories. The imagery also ranked high in vividness, which was consistent with the low incidence of drowsy brain states. Also, gamma coherence occurred consistently across participants, while participants stated that the imagery during this condition was meaningful.

The EEG and phenomenological data were inconsistent regarding the low incidence of drowsy brain states, while participants frequently reported feeling disconnected from the guiding and feeling sleepy. So though it appears that participants were not drowsy, but rather felt disconnected and sleepy due to lack of focus, this does not fit the moderate amount of beta coherence (in two out of four participants), which usually indicates ongoing attention to the imagery. Considering that the imagery was quite congruent with the guiding while being otherwise vivid and meaningful, the reports regarding attention and alertness during the Memory condition may not be accurate or relevant to the other EEG and imagery data.

Visual Condition

During the Visual condition, the EEG and phenomenological data were consistent regarding the coherence with the visual cortex and the visual guiding condition, the reports of many different kinds of imagery with the low rate of congruence between the imagery and guiding condition and the EEG coherence involving multiple regions of the brain, the low incidence of drowsy brain states and few reports of sleepiness or being “in” the ASC, and few responses to music with few reports of vivid imagery. Therefore, the imagery during the Visual condition was not very vivid and was not very congruent with the guiding condition, and participants were not drowsy while they did not report feeling drowsy or “in” the ASC. Furthermore, the EEG coherence showed connections with multiple regions of the brain, among them the visual cortex.

The EEG and phenomenological data were inconsistent regarding the EEG coherence showing both activity and idling in the visual cortex, along with reports of visual imagery. Though some explanations have been offered according to specific situations in each of the participants’ data, it is still unknown how visual imagery can occur while the visual cortex is supposedly idling. This discrepancy may illustrate conflicting studies regarding whether the visual cortex processes visual imagery differently from visual perception (Kozhedub, et al, 2007; Overton, 2004).

CHAPTER 11

LIMITATIONS, FINDINGS, AND IMPLICATIONS

Limitations

From the EEG perspective, the primary limitation of this study is that it is not a neuroscience study; it is not as controlled or rigorous as would be required in the field of neuroscience, so the results are not generalizable as they would be in a neuroscience study. In this vein, the small sample size of this study limits the applicability of the conclusions, which reveal more about individual brain responses than responses of GIM travelers on the whole. Also, the research question was very broad, looking at multiple conditions and EEG frequencies with a very wide range of variables. Therefore this research is a starting point for further research rather than a conclusive study.

On the phenomenological side, these kinds of data bring to light interesting questions about first-person reports of the GIM experience, particularly about the degree of awareness of one's own experience and how well participants can accurately describe their experiences either during the experience or afterward, as in this study. While these four participants usually had little difficulty describing their experiences in detail after the session, at times some participants could not recall their imagery, and this led to some gaps in the data. It begs the question as to whether these participants would be able to more accurately describe what was happening in those moments while they were occurring, and how this situation relates to similar clinical situations where clients cannot engage with their imagery.

In terms of the integration of the EEG and phenomenological data, the main methodological limitation concerned the fact that this research was not pure neurophenomenology, due to the a priori categorization of the EEG data into guiding conditions before analysis. Therefore the guiding conditions became independent variables rather than dependent variables; they were not determined by first-person data, and as a result the conditions were not focused on particular experiences as reported by the participants. For example, the Affect condition contained some reports of affective imagery, but also reports of visual imagery, memories, and language processing. So the EEG data related to the Affect condition does not reflect only affective processes, but all of the processes that occurred during that condition. As a result, while the EEG data was interpreted according to each condition's imagery during the integration of all the data, it is difficult to make precise conclusions about each kind of imagery and its correlating EEG coherence. The general conclusions from this study will form a starting point for future neurophenomenological research.

In terms of technical limitations, the EEG could not detect all of the reported types of imagery experiences. Some of this is due to the complexity of such imagery (e.g., music processing requires many different brain structures) and some is due to the location and size of the brain structures that process such imagery (e.g., emotional processing occurs in the limbic structures, deep in the brain, too far away for scalp EEG to detect).

Furthermore, the types of processing that the EEG can detect had partial overlap with some imagery types, which made it difficult to precisely determine how the imagery was related to the coherence findings. For instance, "body sensation" could have involved awareness of the limbs or a sense of heaviness in the chest. The EEG might have detected awareness of body parts in terms of motor planning, but the sense of heaviness is too vague to be found in any of the regions detectible by EEG. So some of the EEG results related to certain imagery could not be separated from other kinds of imagery during the analysis (body sensation being the best example).

One final limitation concerns the fact that this study's data were not gathered in a true GIM session, but rather in an adapted format incorporating music and imagery. The primary difference between this study's session and a true GIM session is the lack of interactive dialogue between the researcher/guide and participants. While such interaction could have helped participants engage with the imagery (through guiding which was responsive to their experiences) and also report in-the-moment about their imagery, the interaction would have also greatly complicated most of the study's variables, while also affecting the quality of the EEG acquisition. Despite the lack of interactive guiding, most of the phenomena seen in this study, including the ASC, exploring consciousness via internal imagery experiences, and participants' reactions to the guiding cues and programmed music, are prominent and necessary features of individual GIM experiences (Bruscia, 2002b), and therefore this study's results have meaningful implications for GIM theory, research, and practice.

Findings

Linda

Linda's EEG and phenomenological data depicted an alert, slightly guarded music and imagery travel experience. Linda's EEG data showed that she was persistently alert and that her brain tended to engage in visual, language, and memory retrieval/spatial processing during the session. Her brain also tended to make meaning out of the imagery by sharing only visual and language information. The coherence frequencies indicated little ongoing attention and/or motor processing (beta), whereas no regions of the brain were idling (alpha). In most cases, her imagery reports aligned with the coherence results, including the congruence between the limited amount of significance Linda attributed to the session and the limited range of gamma connections across guiding conditions. These data show that Linda did not enter into a deep altered state, nor did she engage in much deeper exploration of her consciousness, yet she experienced many different kinds of imagery. Altogether, the data suggest that this music and imagery experience involved what GIM practitioners call "in the head" traveling during the music and imagery.

Larry

Larry's integrated data described his inconsistent ASC and focus on the imagery experience, leading to his experience of a string of sensory images rather than an ongoing, exploratory imagery narrative. As a result, the session had brief meaningful moments, but on the whole was not particularly significant for him. Larry's EEG and phenomenological data often showed that he may have had brief periods of an ASC while drowsy. His brain tended to engage in visual processing and memory retrieval in most conditions, though his imagery descriptions often focused on body sensations. Only when Larry's brain showed both beta and gamma coherence across the brain, and when Larry was drowsy and his imagery involved memories or interactions, did he experience vivid, meaningful imagery, and may have been in an ASC. But most of the travel was characterized by disconnected sensory experiences; thus, this session depicted "body" traveling with the music and imagery.

Daphne

Daphne’s integrated data seems to indicate a relatively consistent ASC leading to a coherent, ongoing imagery narrative with personal, meaningful implications. Her EEG coherence patterns showed consistent ongoing attention and meaning-making across all conditions, while also involving many different kinds of brain processes. These coherence results generally matched Daphne’s reports of a wide variety of imagery, including many vivid images involving memories and significant relationships. Furthermore, she reported the most awareness of the music out of all four participants. Her brain showed drowsiness for a significant portion of the session, yet during these periods Daphne reported experiencing detailed, vivid, and meaningful images. Because of the quality of Daphne’s imagery as well its ongoing narrative, it is unlikely that Daphne was asleep; rather, she was probably in an ASC at these times and sustaining attention on imagery that involved deep self-exploration. The vivid, meaningful, and coherent imagery narrative combined with the full range of brain activity, frequencies, and alertness states indicates that an ASC was achieved for a significant portion of the session and led to a travel that Daphne said contained “real GIM imagery.” Thus she experienced an effective travel.

Craig

Craig’s session was characterized as generally significant to him, but he was too drowsy to gain the full benefit of his imagery experience. Craig’s integrated data showed that his imagery was generally very meaningful; however, he often lacked focus on the ongoing narrative, which made it difficult for him to recall the sequence of images in portions of the session. This recall difficulty may be related to the lack of EEG coherence associated with the many different kinds of imagery he reported, as Craig's brain may not have sustained a particular image long enough to generate any coherence between regions of the brain. Craig's brain indicated drowsiness during periods where he had difficulty recalling the imagery, as well as during very vivid images. Thus he may have had periods of being in an ASC, while during other periods he may also have been simply drowsy. In the end, Craig's inconsistent alertness and focus made it difficult for him to sustain ongoing attention to his experience, and thus his imagery consisted of snatches of intense memories and sensory images that he had to work to tie together after the session. This session depicted several moments of effective travel, but also depicted how drowsiness affected the travel for this participant, mainly by impeding imagery recall.

Cross-Cases

In broad terms, the EEG data confirmed that brain activity changes and shows patterns of response during GIM, and that the brain activity can be studied and monitored during a session. The focus of the data analysis was on alertness states as well as coherence relationships. With regard to alertness states, cross-case comparisons of EEG data across the four participants generated the following hypotheses:

1) Alertness during a GIM session varies according to the individual, ranging from being quite alert during all guiding conditions to being quite drowsy or asleep for up to 75% of the conditions.
2) Alertness during a GIM session varies according to guiding condition. For this group, the Memory condition led to the most alertness and Affective guiding condition led to the most drowsiness. Because alertness also varies according to

the individual, these data seem to suggest that each individual reacts to guiding conditions differently by entering and leaving different levels of consciousness.

With regard to coherence relationships, cross-case comparisons suggested the following:

1) Individuals have distinctive coherence patterns in response to the music and imagery conditions. For example, Linda's coherence patterns consistently involved visual, language, and memory retrieval/spatial processing in every condition, while other conditions also involved decision-making and motor processes. In contrast, Craig's brain showed far fewer coherence patterns overall, with no significant relationships in three of the six conditions, and visual processing as the most common active region in two of the six conditions. These differences show that each individual had a distinctive biological response to the music and imagery conditions.
2) Across cases, the coherence patterns generally vary according to the guiding conditions. In most cases, the brain processes aligned with the nature of the guiding condition. For instance, visual processing occurred during the Visual condition, memory retrieval occurred during the Memory condition, language processing occurred during the Interaction condition, and some motor processing occurred during the Kinesthetic condition.
3) Across cases, the frequencies involved in the coherence patterns vary according to the individual. Some individuals rarely had coherence in certain frequencies

(Linda had none in the alpha frequency), while others had coherence in all the frequencies most of the time (Larry).

4) Across cases, all the participants' brains engaged in meaning-making processing during most of the guiding conditions, as shown by the degree of gamma frequency coherence for all participants.
5) Coherence frequency is sometimes related to guiding condition. For Larry and Daphne, the coherence frequencies did not vary according to guiding condition, whereas Linda's and Craig's coherence frequencies varied somewhat according to guiding condition.

The phenomenological data revealed several interesting patterns and relationships among the data. Cross-case comparisons of the participants' subjective reports generated the following hypotheses:

1) Sustained focus, responsiveness to the music, and attention to the guiding generally lead to the most vivid and meaningful imagery.
2) Attention to guiding, vividness, and ASC varied according to the guiding condition, whereas reports of drowsiness did not.
3) ASC and vividness varied according to where the image took place in the sequence of the overall narrative of the script, whereas reports of drowsiness did not.

In short, the phenomenological data not only reveal basic relationships between attention and quality of imagery, and their variability according to guiding condition, but also show an arc of attention and quality of imagery from the beginning of the session to the end. Further analysis focusing on the sequence of the imagery, rather than on the imagery's guiding conditions, could describe this arc more clearly, and could perhaps identify travelers' stages of engaging with the imagery during a session.

Cross-case comparisons of the extent to which the EEG and phenomenological data were consistent across the four participants generated the following hypotheses:

1) ASC is related to, but not equivalent to, body relaxation; rather, the ASC is a state of focused relaxation, which was often indicated by the combination of drowsy brain states and beta coherence, along with detailed, vivid, and meaningful imagery.
2) Imagery generates brain activity in the same regions that would be activated during a real-life experience. For example, visual imagery activates the visual cortex, motor imagery activates the central regions, memories activate memory retrieval in the right temporal lobe, and so on. Thus the imagery in GIM can feel real and very vivid.
3) Whereas theta and alpha activity are traditionally associated with meditative and altered states of consciousness, this study shows the role beta and gamma frequencies have in GIM. These frequencies are necessary for engaging in ongoing imagery and then making meaning of the imagery. When participants had one or the other, something was lacking in their experience of the session. When participants had both gamma and beta together (e.g., Daphne), the session had both significance and vividness.

Practice Implications

EEG Implications for Practice

The EEG data on alertness suggest that each individual manages his/her state of consciousness with varying levels of difficulty and success. Some participants were quite alert throughout the session, and some were quite drowsy. Because GIM and its effectiveness are intimately linked to the exploration of deep levels of consciousness, an important challenge for the client in GIM is to remain alert enough to have vivid music imagery experiences, while also allowing him/herself to explore deeper levels of consciousness in relation to those experiences. This challenge may require considerable help from the therapist or guide, either during the session itself by continually monitoring the client’s level of consciousness and helping the client to go deeper, or by engaging the client in consciousness-altering exercises outside of the music imagery experience.

Based on the EEG data on alertness and guiding conditions, one way the therapist can help the client to explore deeper levels of consciousness is to be aware of how the client’s alertness state varies according to the various different kinds of guiding interventions (e.g., visual probe, affective probe). If each individual has a certain style of altering consciousness levels in response to various guiding interventions, the therapist has to take this style into account in guiding. For example, if the client typically falls asleep during affective probes, and deepens during body probes, the therapist can use this information to help the client manage the exploration of deeper consciousness levels. The therapist may also consider whether the client is using alertness and drowsiness as a defense against certain kinds of experiences. This entire issue of alertness may be an important assessment concern that has not had sufficient attention from practitioners and researchers

The EEG data on coherence showed that each participant in this study showed different patterns of brain response to each of the guiding conditions—that is, each participant responded biologically differently to the session. This suggests that there are neurological correlates for traveling style: a visual traveler will have more activity in the visual cortex, a person who thinks in words will show more left temporal lobe activity, and so forth. Thus not all travelers experience imagery in the same way; each individual's brain processes imagery uniquely. This has implications for guides, as they may tend to guide according to their own traveling styles or imagery preferences, and therefore they may not be guiding in a manner most helpful for their travelers.

Therefore, guides need to assess how their clients tend to perceive their imagery, and then use this information to guide their clients to experience imagery in modalities that are most accessible and vivid for them. And, similar to the previous findings regarding drowsiness and altered states, guides also need to consider if avoidance of a particular kind of imagery is a defense against such experiences.

Phenomenological Implications for Practice

The first main implication for practice to emerge from the phenomenological data concerns how focus, responsiveness to the music, and attention to the guiding lead to vivid and meaningful imagery. Guides must help clients develop each of these skills in order to promote effective imagery experiences. If clients are having difficulty with any of these tasks, then guides need to assess themselves to discover under what circumstances they are able to attend, focus, and respond to the guiding, imagery, and music. Furthermore, guides need to assess what seems to prevent their clients from succeeding in these tasks as well. If a client is having particular difficulty with any of these tasks, then the guide can help the client practice each task outside of a GIM experience. Again, psychological defenses may be at work with a client who is having difficulty with any of these skills. For example, Linda voiced her awareness of having "music issues" and knew that this was an area which she would need to address in further

GIM work. The guide must consider the potential for such defenses and approach the situation appropriately.

The second implication for practice to arise from the phenomenological data concerns how attention to guiding, imagery vividness and ASC vary depending on the guiding condition/modality. Guides must assess how their clients are responding to the various kinds of guiding they provide, and determine if the guiding cues they are giving are the most effective ones to promote attention, imagery vividness, and exploration of consciousness. This implication relates to the EEG implications discussed previously; however, this implication addresses how guiding affects particular experiential phenomena from the client's subjective perspective. Thus, clients may not only show biological tendencies to respond to particular guiding modalities (EEG implication), but they may also have phenomenological tendencies to respond to particular guiding modalities. As in the EEG implications, guides may need to adapt their guiding style to best fit their clients' needs, while also considering the possibility that clients' responses may be due to defenses and avoidance of different kinds of experiences (such as being responsive to the music and/or guiding, having vivid imagery, or entering an ASC).

Third, the implication of an "arc of experience" over the session indicates a need for therapists to assess how their clients' attention, ASC, responsiveness to the music, and imagery vividness change over the course of the session. Therapists need to provide clients time to relax, enter an ASC, fully open to the imagery, engage with the imagery, and then close the imagery. Guides cannot expect clients to leap into extremely vivid and significant imagery from the very start of a session. Thus guides need to attune to their clients' needs in terms of readiness for each phase of the session, and guide supportively to assist clients in moving through each phase.

Consequently, such an arc of experience has implications for music programming in GIM, in that care should be taken to select music that would support each phase of the experience. For example, the opening music should allow the client to become comfortable and gradually become more focused on the imagery and music, then the middle music selections should be more stimulative, while the closing music selections should help the client close his/her imagery and return from the ASC. These musical considerations match Bonny's concept of the "musical contour," which she used to develop the first programs in GIM (Bonny, 1978/2002t).

Integrated Data Implications for Practice

The first important implication for practice arising from the integrated EEG and phenomenological data concerns the nature of the ASC in GIM. The ASC is necessary for a meaningful, purposeful session, and often starts from a state of physical relaxation. But GIM therapists need to consider the purpose of relaxation in the induction of an ASC in GIM. Body relaxation is not the goal as much as the relaxation of psychological defenses, in order to engage in exploratory imagery with the assistance of the music and the guide. When the participants in this study became drowsy during the session (whether according to EEG data or their own perception), they had difficulty fully engaging and later recalling the imagery. This was also demonstrated in the raw EEG data showing drowsiness and sleepiness, as well as in the decrease in beta coherence indicating lack of ongoing attention to the imagery. Thus excessive relaxation was counterproductive to the purpose of GIM. This supports the two-pronged approach to the induction advocated by

Bonny (1975/2002f)—fostering physical relaxation while focusing the traveler's concentration.

The second implication for GIM practice to emerge from the integrated EEG and phenomenological data concerns the power of imagery in GIM. Because imagery uses the same kinds of brain activity as real life experiences, imagery in a therapeutic context means that brain and psyche are able to engage in imagery situations as if they were real-life. This carries great responsibility for the therapist, because psychological safety may be compromised if this is not fully respected. Imagery regarding past traumatic experiences, for example, must be approached with great care, because (in simple terms) the brain will experience these memories using the same regions and processes of the brain that processed the initial traumatic event (Körlin, 2002). On the other hand, imagery can also provide a safe context for engaging in positive, life-changing experiences as well as creative problem-solving, particularly regarding therapeutic problems that for whatever reason cannot be addressed in real life situations. The neurological reality of such imagery would assist clients in not only psychologically, but also neurologically (through neuron plasticity), developing a new way of perceiving and interacting with their selves and the world (see Körlin, 2002). The therapist, therefore, needs to keep in mind the powerful nature of vivid imagery, and how such imagery will affect each particular client, given his/her background and needs.

Further along these lines, Körlin (2002) has theorized that avoidance of particular imagery or of particular musical sounds may actually be a neurological defense, particularly regarding traumatic imagery. Furthermore, these defenses should be respected and not immediately broken down. Thus, as Körlin (2002) suggests, healing the trauma involves creating new, or modifying existing, neurological pathways so that the client can experience previously avoided imagery, or even allow new imagery and experiences to occur. If a therapist believes the client has experienced trauma in the past, a full and careful assessment must be made regarding the sensory nature of the trauma, and any musical or sound associations with that trauma. Körlin (2002) describes in detail possible modifications of the GIM session, including music and guiding adaptations. In addition, biofeedback might prove to be a useful adjunctive approach to assist clients in this process of recovery. Overall, this study seems to corroborate the neurological reality of imagery and the relevance of Körlin's (2002) approach, particularly for clients with history of trauma.

The third main implication for clinical practice deals with the significance of attention (beta frequencies) and meaning-making (gamma frequencies), as well as relaxation (alpha and theta frequencies) to promote deep exploration of consciousness. Clients need to be able to develop mentally relaxed, focused attention on the music, guiding, and imagery. This is certainly a skill that takes time to develop, and not even all the participants in this study managed to achieve such a state, even though each had experienced at least 25 personal sessions and were either in training to become GIM guides or were fully-trained GIM facilitators. Therefore, both clients and therapists need to accept and nurture the learning curve of traveling in GIM.

The development of this attentional skill is in addition to the relaxation of psychological defenses that must occur for clients to engage in exploratory, significant imagery. Clients must have developed a trusting relationship with the guide as well as the music in order to relax these defenses. When psychological defenses are not relaxed, the imagery becomes mainly sensory and superficial. Letting down these defenses brings up the need for ego strength mentioned before; however, if a client needs his/her defenses to function, then GIM is not an appropriate intervention.

These findings together provide a clearer picture of what a client undergoes during a GIM session, and what clients need to be able to do in order to gain full benefits of a session. Mainly, clients need to have strong enough identities (or, ego boundaries) in order to withstand powerful imagery, and be able to separate reality from imagery. This research supports the current practice that GIM is not appropriate for clients who are psychotic or have poor ego boundaries, while GIM with traumatized clients must be used with a great deal of care. However, in the latter case, the implications suggest that, when used carefully, GIM may be able to provide a uniquely beneficial means of recovering from trauma.

Research Implications

EEG Implications for Research

Future research from a neurological perspective should first address different alertness states and states of consciousness in GIM, and how these vary according to different conditions, including guiding interventions and music. Such study could help clarify how much variability in consciousness is attributable to individual differences versus guiding or music conditions.

Another neurological research topic should examine in more detail how EEG coherence varies according to different guiding conditions, and how much of this variability is due to differences in individuals. Beyond EEG research, other neuroimaging methods such as magnetoencephalogaphy (MEG) could identify brain processing in deeper brain structures, and therefore perhaps identify processes related to a wider range of sensory and cognitive functions than can be found in EEG.

Finally, further EEG research using a larger sample size can verify the prevalence of gamma frequencies in GIM participants, as well as the range of EEG frequencies seen in this sample and how frequencies vary according to different guiding and music conditions. The verification of this study's results with a larger sample could further demonstrate the "full brain workout" that GIM demands on participants, and may have implications for further research on meditation and other altered-state experiences.

Phenomenological Implications for Research

All future phenomenological research should employ a more naturalistic means of gathering data. By conducting a true GIM session, involving interactive dialogue between traveler and guide, the research can seek to verify this study's phenomenological findings, such as how focus, responsiveness to music, and attention to guiding lead to vivid and meaningful imagery; and how guiding condition affects attention to guiding, imagery vividness, and ASC. Further, with more naturalistic data acquisition, research can determine how and to what degree interactive guiding, along with moment-by-moment experiences of the music, affect all these phenomena.

Additionally, future phenomenological research should examine the implicated arc of GIM experience for participants, which until now had only been studied by Bonny in the context of her work using LSD in sessions (Bonny, 1995/2002c). Because this study shows how (a non-drug-induced) ASC, responsiveness to music and recall of imagery were related to the sequence of particular guiding conditions, a naturalistic approach to data acquisition could again clarify the role of interactive guiding in this arc of experience. Such research could identify phases of experience during a GIM session, and help therapists guide their clients more effectively, while also providing insight into development of programs of music that would facilitate effective traveling. If phases of effective travel can be identified, then both music programs and guiding interventions could also be investigated for their ability to best facilitate effective travel.

Integrated Data Implications for Research

Future research utilizing a purer neurophenomenological approach requires a narrower research question as well as a focus on a particular EEG variable. Additionally, there have been recent advances in EEG analysis which allow participants to speak during the EEG acquisition. Thus participants could report about their imagery during the session, providing for a more naturalistic GIM experience with more precise alignment of the EEG data with the music and phenomenological data, and eliminating the need to rely only on a post-session interview. Finally, consideration needs to be given to the types of processing that are easily detectible via EEG and the types of imaging under investigation. Because this study looked at all possible imagery, several different kinds of imagery were reported that could not be corroborated via EEG due to the limitations of the resolution of the EEG and the kinds of brain processes related to such imagery.

Given these points, several major topics for future neurophenomenological research include:

- Researching the phenomenological and neurological indicators of drowsiness and ASC in GIM, including how and why states of consciousness change during a session. Such research would ideally identify client styles of altering consciousness during a session, which would have great implications for clinical work. Furthermore, such research could help clarify if the ASC occurs though sequential or simultaneous experiences of particular brain frequencies along with focus, vividness, and meaningfulness of imagery.

- Whether promoting beta and gamma activity during a GIM session results in more vivid and meaningful sessions (in other words, biofeedback for GIM). Would this help clients learn how to have effective travels more quickly? Or would such training detract from the therapeutic process, focusing too much on brain activity?
- Given the neurological reality of imagery, whether and how neurological patterns change after a course of GIM therapy; in other words, do Körlin's (2002) theories regarding music and imagery's ability to physiologically change the brain and lead to healing from trauma bear out? Such research would have enormous implications for any therapy that employs biopsychosocial theories of health and healing.
- The brain responses to music and imagery seen in this study have broad biological and health implications. It is already known that imagery alone can have physiological effects on stress and other body systems. Health psychologists have described this interconnectedness of mind-body in terms of biopsychosocial models of health and healing, which have been related to GIM in the past (Short, 2002; Burns, 2002). Until now, however, there have not been any neurological data from a GIM context supporting these models. Future research needs to identify the role and significance of music, along with imagery, in the biopsychosocial effects of imagery in these situations.

Reflecting on this study's methodology, the use of neurophenomenology to examine what clients undergo during a music and imagery experience also has implications in future related research. Neurophenomenology was chosen as the methodology for this research question for two primary reasons: its suitability for GIM, and its purpose to integrate and make sense of the most relevant and important kinds of data for GIM clients and therapists alike, and its ability to yield significant information about what clients undergo during music and imagery experiences. With regard to the first point, this research showed how GIM, by its very nature, is particularly well suited to neurophenomenological research. This is because GIM clients need to be attuned to internal experiences and be able to relate those experiences to another person in order to successfully engage in the method. With this methodological advantage, the participants in this study were able to describe their subjective experiences in detail so that these experiences could be related to the objective EEG data. Further, because the music and imagery session involves a participant's mainly internal imagery experience, obtaining neurological data via EEG was a fairly uncomplicated task. As a result, this study brought together and integrated two very different kinds of data in order to produce meaningful conclusions. Thus, the methodology was able to integrate the two Wilber quadrants it sought to simultaneously investigate in the music and imagery session: the Upper Right (EEG data) and the Upper Left (internal experience) (see Figure 1). Second, the conclusions found by this study could not have been achieved through any other research methodology, and they have significant implications for GIM theory and practice, as well as research. Thus this study demonstrated that neurophenomenological research can yield important information about what clients undergo during music and imagery experiences.

Theoretical Implications

EEG Implications for Theory

The EEG data showed that participants entered and left different levels of consciousness, but did so using a wider range of brain frequencies than would be expected in a meditative or contemplative activity. The whole-brain involvement in this kind of task is very interesting and has not yet been discussed in the neuroscience field. On the other hand, the relationship between the guiding conditions and the corresponding sensory or functional areas of the brain was expected, and also validate the body-mind connection of the music and imagery experience.

Phenomenological Implications for Theory

The phenomenological findings regarding how several phenomena influence vivid and meaningful imagery have not been directly researched or addressed before in the GIM literature. Most GIM literature emphasizes the music's role in not only influencing, but possibly directing, the imaging experience. This study's finding regarding the importance of participants' attention and focus on the music, guiding, and overall experience, puts some responsibility on the client, and reiterates Bonny's belief that the imagery is the client's sole responsibility (Bonny, 1979/2002g).

On the other hand, the phenomenological findings also show how the guiding affected the participants' responses to the imagery, including the vividness of the imagery, the ASC, and even how the participants attended to the guiding direction itself. Again, while much of the GIM literature has focused on the importance of the music, it has not often addressed the importance of the guiding, and in particular how guiding modalities affect client traveling. However, the guiding in this study was designed to work closely with the musical features of the program, so both music and guiding were interrelated. But given the participants' strong responses to particular words in the guiding, some further examination of the role of the guiding in GIM is warranted.

Finally, while Bonny and other GIM researchers have often discussed the musical contour (Bonny, 1978/2002t) or psychoacoustic profile of music programs (Lem, 1998) and how the dynamics of a music program has the potential to shape a client's experience, this study suggests that clients have an arc of experience that is influenced not only by the music, but also by other phenomena such as guiding cues. Therefore this study begins to describe the session's profile from the client's perspective of all these phenomena, and suggests possible phases of experience, such as shifting into an ASC, stages of engagement with imagery at various levels of consciousness, and then shifting out of the ASC. Again, this perspective shows the complexity of the dynamics of the various phenomena in a GIM experience, and in particular demonstrates that, while music is significant, it is perhaps not as initially influential to a client as had been previously thought. This conclusion matches the conclusions reached in Bruscia, et al. (2005), who found that the entire session environment (room, rapport with guide/researcher, participant readiness) also influenced how participants engaged with the music and imagery. It may be that the influence of the music on a client's experience becomes stronger as a client (and his/her guide) learns to manage the various phenomena of the GIM session, and that ultimately the most powerful GIM sessions involve the client being fully open to the influence of the music.

Integrated Data Implications for Theory

The integrated EEG and phenomenological data first provide a clearer definition of the ASC, which also shows its purpose and importance for the GIM session. This definition validates Bonny's use of the ASC as well as how an ASC without drugs is particularly effective. Whereas LSD increases theta frequency in deep brain structures (Overton, 2004), this study shows that the full spectrum of brain frequencies is necessary to achieve an effective music and imagery travel. Therefore, Bonny's perception that a non-drug induced ASC led to a more effective GIM session (Bonny, 1980/2002) turned out to be neurologically accurate.

While Bonny did not hypothesize about the degree of the brain's involvement in this method, the implications of this study fit with her conceptualization of the function of the music and the ASC in GIM. Both of these serve to move a person's awareness through multiple layers of consciousness (again, see Figure 2), not focusing only on a transpersonal state or on fantasies, for example, but through these and/or many more experiences within a single session. Given this study's results, it is interesting to revisit Bonny's citation of Tart's (1972) definition of an ASC: " a qualitative alteration in the overall pattern of mental functioning, such that the experiencer feels his consciousness is radically different from the way it functions ordinarily" (Bonny, 1977/2002f, p. 80). It seems that 1) the ASC in GIM not only *feels* very non-ordinary, but it is *biologically* non-ordinary, because of its neurological demands; and 2) the music assists in expanding upon the neurological engagement in the GIM session, and when combined with the ASC, makes it neurologically possible to experience a very wide range of imagery.

The importance of the beta and gamma coherence to the music and imagery experience in this study expand upon current thinking regarding the role of different brain frequencies associated with the ASC in GIM, as well as with meditative or dream states. In her cut-log diagram (Figure 2), Bonny illustrates how the alpha and theta frequencies relate to creative and expressive experiences as well as other mind states. The activities associated with alpha and theta frequencies, such as relaxation, contemplation and meditation, are entirely driven by internal experience, and do not involve attending or relating to a therapist/guide or music – phenomena that are external to the traveler, and which are an integral part of the GIM experience.

This may be why, as found in this study, beta and gamma frequencies seem to be required for effective GIM travel. *Ongoing attention* (the neurological function of the beta frequencies) for GIM involves maintaining awareness of the ongoing music and imagery and relating this to the guide by both reporting the imagery as it occurs (though not during this study) and by verbally responding to the guide's cues. The *meaning-making* (the neurological function of the gamma frequencies) for GIM is implicit in the experience as well as in the purpose of the session—in the moment, the music and imagery often require multiple sensory and cognitive functions that need to be integrated during the image. At the same time, clients are also fully aware that the imagery has larger meaning outside of the session. Though the larger meaning may not be apparent in the moment, the mind is responding in neurologically embodied patterns of meaning-making through metaphors which are elaborated upon with new imagery (a concept discussed in Perilli, 2002). These two meaning-making tasks (in-the-moment integration and retrospective meaning-making) are not necessarily implicated in traditional meditative practices or dream states, which are usually associated with slower brain wave activity (theta and alpha). Thus GIM is much more than meditation or dreaming—it utilizes the whole brain in every way, calling upon every kind of functional region as well as the full range of frequencies the brain uses to process and share information. In other words, when a GIM traveler is in an ASC and experiencing the music and imagery vividly, the brain gets a full-body workout.

Therefore, by combining these elements of ASC, music, guide, and a traveler's openness to self-exploration, Helen Bonny tapped into a very powerful interaction of body and mind which is unlike any other form of therapy or method of self-discovery. This study shows that the reality of internal subjective experience during a music and imagery session indeed manifests in biological phenomena, and the degree to which this engages the mind and, in turn, affects the body, is what makes GIM such a uniquely powerful therapeutic experience. Further research along all these lines can continue to deepen therapists' understanding of what occurs both psychologically and biologically during a GIM session, so that they and their clients can best use the power of music and imagery toward health and healing.

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APPENDIX A

SESSION SCRIPT

Table 45.

Music and Imagery Session Script

	Probe #	Probe condition	Script
INDUC-TION	1	Body	Take a long, deep breath. Slowly take in as much as you can… and let it out. Slowly breathing in…. and out… in….and out…focusing only on your breath…..noticing how it feels as the air moves into your nose..and lungs, and out of your lungs…and nose. Breathing in….and out…starting to feel more and more relaxed.
	2	Visual	Now imagine a ball of light forming in the darkness... As it appears, focus on it, and let it be any shape or color…and as bright as you want
	3	Visual/Body	Now imagine the ball of light moving to the top of your head….and then down, around and through your head. ….moving down, around, and through your head…and face….and as the light moves, imagine that all of your head begins to glow….as you start to feel more and more relaxed.

Table 45. (continued)

Probe #	Probe condition	Script
4	Visual/Body	Now imagine the ball of light moving around and through your neck and shoulders. As it moves, your neck and shoulders begin to glow, and as they glow, they feel more and more relaxed. Neck and shoulders glowing in the light, feeling more and more relaxed. [5 seconds]
5	Visual/Body	Now the ball of light splits into two balls, one ball for your right arm and hand, and one ball for your left arm and hand… each ball moves around and through your arms and hands… and as the lights move, your arms and hands begin to glow… as you start to feel more and more relaxed.
6	Visual/Body	Let the two balls come back together again into one ball….imagine the ball moving around and through your torso and back… as it moves around and through your torso and back, they begin to glow… and you feel more and more relaxed. Torso and back glowing in the light, feeling more and more relaxed.

Table 45. (continued)

Probe #	Probe condition	Script
7	Visual/Body	Now the ball moves to your hips and waist…. And then around and through your hips and waist…. As it moves, your hips and waist begin to glow… feeling more and more relaxed. Hips and waist glowing in the light, feeling more and more relaxed.
8	Visual/Body	Now let the ball move down to your upper legs and knees … moving around your upper legs and knees, they begin to glow… as your upper legs and knees glow, they feel more and more relaxed…. Upper legs and knees glowing in the light, feeling more and more relaxed.
9	Visual/Body	Now let the ball move down to your lower legs and feet… as it moves around your lower legs and feed, they begin to glow… as they glow, you feel more and more relaxed… lower legs and feet glowing in the light, feeling more and more relaxed.
10	Interaction/ Body/ Visual	Now move the ball of light wherever you need it to go to relax any part of your body…notice that wherever you move the light, your body begins to glow….and as it glows, you feel more and more relaxed.

Table 45. (continued)

	Probe #	Probe condition	Script
ALWYN	11	Visual	Now let the ball of light move away from you, to a path on the ground in front of you… As the music begins [sync w/ start of music], you see that the path leads to a house in the distance, a house you have never seen before. Look around you and see what surrounds the house, the colors and shapes and features of the landscape. Take some time with everything you can see at this distance
	12	Kinesthetic	Now feel yourself walking along the path toward the house. Notice how your feet feel as they take each step, and how your body moves while you walk along. Feel your torso, your arms, and your head as you walk. Open yourself up to all the sensations of walking down the path.
	13	Visual	As you move closer to the house, the outside is more visible…—take in everything you see, the roof, the windows, the outside walls….look at the colors and textures of the outside of the house.

Table 45. (continued)

Probe #	Probe condition	Script
14	Body	Moving closer still, you approach the door….notice the door handle… and surface of the door. Reach out and touch the surface---what it feels like; its temperature, its texture, its size.
15	Kinesthetic	Now imagine opening the door…feel the weight of the door as you open it….and when you are ready step into the house.…notice how your body feels as you move into the house.
16	Visual	Look around as you enter…. and take in whatever you can see ….Notice the lay-out of rooms…the light…the space…and the things around you.
17	Affect	Be aware of how it feels to be inside the house—notice any emotions you might have being there…
18	Body	Now walk into a room of the house….and slowly move around the room…noticing any sensations your body may have….as you slowly move through the room.
19	Visual	Look around carefully…and notice any objects in the room that draw your attention…Look at it closely. Take time with it….noticing details, colors, shapes.

Table 45. (continued)

	Probe #	Probe condition	Script
	20	Affect	Open yourself to any emotions or reactions you might have at this time…
BARBER	21	Visual	Now move into another room. Notice that there is a person you know there….in the room waiting for you. Take time to notice the person's face and appearance…notice what the person is wearing…
	22	Memory	Allow yourself to go back and remember a pleasant time with this person…Let your memory open up, and fully remember it.
	23	Affect	As you relive the memory, open to your emotions about the experience and the person. Allow yourself to feel these emotions
	24	Interaction	If the person has something to say, listen to it; really open to what the person is saying to you.
	25	Interaction	If you have something to say back, take time now to say it. Speak freely to the person.

Table 45. (continued)

Probe #	Probe condition	Script
26	Interaction	Listen to what the person has to say in response, and say anything else you need to say.
27	Affect	Take some time now to be aware of your feelings about the person after this exchange.
28	Interaction	Begin to draw this interaction to a close. Say goodbye to the person and prepare to move into another room of the house.
29	Visual	As you enter the next room, look around and take in everything you see.
30	Visual	You notice an object that is important to you….take some time to look closely at it…look carefully at everything about it.
31	Memory	Open to any memories you have about the object, or about anything or anyone the object reminds you of….. Allow the memories to become clear and vivid.
32	Memory	Now you notice that the scene has shifted around you… the object is still with you….but now you are in a room from your past… Be aware of whatever is familiar to you in this place from the past.

Table 45. (continued)

Probe #	Probe condition	Script
33	Affect	Become aware of any emotions or reactions you may have about being in the room with this object
34	Affect	Stay with those feelings for a little while
35	Body	If you wish, touch or hold the object….and bring into awareness how it feels…
36	Interaction	If there is something you would like to do with this object, take time now to do what you need to do….
37	Affect	Be aware of any feelings you have now.
38	Interaction	If you wish, you can leave the object wherever it needs to be, saying goodbye to it... or taking it with you.
39	Kinesthetic	It's now time to leave this place. You can walk out of the room, and out of the house… notice how your body feels as you walk…
40	Affect	Be aware of your emotions while you shut the door behind you, and leave that place
41	Body	Continue moving away from the house,…and return now to the path where you first began…..When you arrive on the path, notice how your feet feel being back on the ground….keep walking back to where you started

Table 45. (continued)

	Probe #	Probe condition	Script
RETURN (no music)	42	Body	Begin to draw this image to a close. Take time with the image to take in what you want to keep with you, knowing you can return to this place whenever you want. Let the image fade while gradually allowing your awareness to return to your body, to the here and now, noticing how your body feels in the chair. Notice the sounds of the room, and remember where you are. Take your time.
END			Whenever you are ready you can open your eyes.

APPENDIX B
RECRUITMENT MATERIALS[

[email text sent to area GIM therapists]

Dear GIM practitioner,

I am seeking participants for my dissertation research examining the GIM imagery experience along with brain activity. If you are able and interested in assisting me, I am requesting that you pass along this information to any of your clients who may be interested in joining the study. The inclusion and exclusion criteria are listed below. Also, I need to recruit an equal number of male/female and musician/non-musician participants, so please consider these characteristics as well.

Participants must:

- have experienced at least FIVE Bonny Method of Guided Imagery and Music sessions,
- be over age 18

AND must *not*:

- Have any neurological problems (such as seizure disorders, brain injury or stroke, or multiple sclerosis)
- Have any hearing loss or other sensory disorder/loss
- Be taking psychiatric medication

- Have any chronic pain or physical disability that would interfere with a 15-minute long EEG testing session
- Have severe mental illness

Participants will individually participate in a one-time GIM session at Temple University Hospital while connected to an electroencephalograph (EEG) machine. They will then be immediately interviewed about their experience. The entire session should last no more than 2 hours. Every participant who completes a session will receive $20 in compensation.

Please have interested persons contact me directly for more information and to verify their eligibility.

Thank you very much for your help,

Andi McGraw Hunt, MMT, MT-BC

PhD Candidate

Music Therapy Program

Temple University

484-343-0028

andimh@temple.edu

This letter has been approved by Temple University's Institutional Review Board

Boyer College
of Music and Dance
TEMPLE UNIVERSITY

Department of Music Education and Therapy
110 Presser Hall
2001 North 13 Street
Philadelphia, Pennsylvania 19122

phone 215-204-8310
fax 215-204-1982
web www.temple.edu/boyer

Participants Wanted for Research

A Neurophenomenological Description of the Guided Imagery and Music Experience

Andrea McGraw Hunt, MMT, MT-BC

Participants are sought for this study whose purpose is to discover how personal imagery experiences are related to brain activity.

Participants must:

- have experienced at least five Bonny Method of Guided Imagery and Music sessions
- be over age 18

AND must ***not***:

- Have any neurological problems (such as seizure disorders, brain injury or stroke, or multiple sclerosis)
- Have any hearing loss or other sensory disorder/loss
- Be taking psychiatric medication
- Have any chronic pain or physical disability that would interfere with a 15-minute long EEG testing session
- Have severe mental illness

Participants will individually participate in a one-time GIM session at Temple University Hospital while connected to an electroencephalograph (EEG) machine. The GIM Session will last a total of 45 minutes and will be semi-directed by the researcher. Participants will then be immediately interviewed about their experience. The interview will take approximately one hour. All participants will receive $20 in compensation.

For more information and to determine if you are eligible, please call or email:

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OCT 1 9 2009
VALID FOR NO MORE THAN ONE YEAR

Andi McGraw Hunt, MMT, MT-BC, PhD Candidate
Music Therapy Program, Temple University
484-343-0028
andimh@temple.edu

GIM/EEG RESEARCH
Andi McGraw Hunt
484-343-0028
andimh@temple.edu

GIM/EEG RESEARCH
Andi McGraw Hunt
484-343-0028
andimh@temple.edu

GIM/EEG RESEARCH
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484-343-0028
andimh@temple.edu

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484-343-0028
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484-343-0028
andimh@temple.edu

GIM/EEG RESEARCH
Andi McGraw Hunt
484-343-0028
andimh@temple.edu

APPENDIX C
IRB APPROVALS

TEMPLE UNIVERSITY

Office for Human Subjects Protections
Institutional Review Board
Medical Intervention Committees A1 & A2
Social and Behavioral Committee B

3400 North Broad Street
Philadelphia, Pennsylvania 19140
Phone:215.707.3390
Fax:215.707.8387
e-mail: richard.throm@temple.edu

Research Review Committee B

Certification of Approval for a Project Involving Human Subjects

Protocol Number:	12776
PI:	BRUSCIA, KENNETH
Approved On:	19-Oct-2009
Review Date:	29-Oct-2009
Committee:	B BEHAVIORAL AND SOCIAL SCIENCES
Department:	MUSIC-THERAPY (2207)
Project Title:	A Neurophenomenological Description of the Guided Imagery and Music Experience

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In accordance with the policy of the Department of Health and Human Services on protection of human subjects in research, it is hereby certified that protocol number 12776, having received preliminary review and approval by the department of MUSIC-THERAPY (2207) was subsequently reviewed by the Institutional Review Board in its present form and approved on 19-Oct-2009 with respect to the rights and welfare of the subjects involved; appropriateness and adequacy of the methods used to obtain informed consent; and risks to the individual and potential benefits of the project.

In conforming with the criteria set forth in the DHHS regulations for the protection of human research subjects, and in exercise of the power granted to the Committee, and subject to execution of the consent form(s), if required, and such other requirements as the Committee may have ordered, such orders, if any, being stated hereon or appended hereto.

It is understood that it is the investigator's responsibility to notify the Committee immediately of any untoward results of this study to permit review of the matter. In such case, the investigator should call Richard Throm at 707-8757.

ZEBULON KENDRICK, Ph.D.
CHAIRMAN, IRB

TEMPLE UNIVERSITY

Office for Human Subjects Protections
Institutional Review Board
Medical Intervention Committees A1 & A2
Social and Behavioral Committee B

3400 North Broad Street
Philadelphia, Pennsylvania 19140
Phone:215.707.3390 Fax:215.707.8387
e-mail: richard.throm@temple.edu

Research Review Committee B

Recertification of Approval for a Project Involving Human Subjects

Protocol Number:	**12776**
PI:	**BRUSCIA, KENNETH**
Expires On:	17-Oct-2011
Committee:	B BEHAVIORAL AND SOCIAL SCIENCES
Department:	MUSIC-THERAPY (2207)
Project Title:	A Neurophenomenological Description of the Guided Imagery and Music Experience

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Based on a review of your status report, the Institutional Review Board hereby re-approves protocol number **12776** , originally approved on 19-Oct-2009, for the period ending 17-Oct-2011

* Original Review Date: 19-Oct-2009
* Re-Review Date: 20-Sep-2010

It is understood that it is the investigator's responsibility to notify the Committee immediately of any untoward results of this study to permit review of the matter. In such case, the investigator should call Richard Throm at 707-8757.

ZEBULON KENDRICK, Ph.D.
CHAIRMAN, IRB

APPENDIX D
CONSENT FORMS

Boyer College
of Music and Dance
TEMPLE UNIVERSITY

Department of Music Education and Therapy
110 Presser Hall
2001 North 13 Street
Philadelphia, Pennsylvania 19122

phone 215-204-8310
fax 215-204-1982
web www.temple.edu/boyer

Consent Form

Study Title: A neurophenomenological description of the guided imagery and music experience

Principal Investigator: Kenneth Bruscia, Ph.D., FAMI, MT-BC
Professor and Dissertation Advisor
Music Therapy Program
215-204-8314
kbruscia@temple.edu

Student Investigator: Andrea McGraw Hunt, MMT, MT-BC
Ph.D. Candidate
Music Therapy Program
610-627-0670
andimh@temple.edu

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Purpose of research: This research seeks to see how brain activity and imagery experiences in Bonny Method of Guided Imagery and Music (GIM) sessions are related. Your participation will contribute to a new research method that will bring together both electroencephalographic (EEG) data and your descriptions of your imagery experience to help understand what people undergo while in a GIM session.

Selection of subjects: You have been selected for this research because you meet the following criteria:

- You are above age 18
- You have experienced at least five individual GIM sessions
- You do not have any neurological problems (such as seizure disorders, brain injury or stroke, or multiple sclerosis)
- You do not have any hearing loss or other sensory disorder/loss
- You are not taking psychiatric medication
- You do not have any chronic pain or physical disability that would interfere with a 15-minute long EEG testing session
- You do not have severe mental illness

Both male and female participants and both musicians and nonmusicians are needed.

General experimental procedures: This research requires your participation in a single testing session that will take approximately 2 hours total. The entire session will take place at the outpatient EEG lab at Temple University Hospital (TUH) during a scheduled time. This session has two parts, 1) the GIM session and 2) the reflection interview.

1) The GIM session will first involve your being connected to an EEG machine while you are comfortably reclining in a chair. A trained EEG technician will affix 19 electrodes to your scalp using conductive gel (which washes out easily) and medical tape. This procedure will take approximately 15 minutes. At this point, the technician will leave and the researcher will conduct the GIM session by first discussing with you any questions you have about the study, and then any expectations or thoughts you have about the upcoming imagery portion of the session. When this short discussion is complete, the researcher will begin the EEG data recording and guide you in a relaxation exercise. The data recording includes not only your brain activity as collected through the electrodes on your scalp, but also audio (with video) recording of your upper body during the session (see Permission to Video Record form). The researcher will then play a recorded music program with the researcher's voice giving an open-ended guided imagery direction. Unlike in a typical GIM session, it is important that you follow this direction *silently,* because talking will disrupt the EEG recording. The music program is approximately 12 minutes long. When the program is over, the researcher will guide you back to an alert state and will then allow you to share whatever is immediately on your mind regarding the imagery experience. When you are ready, the researcher will disconnect you from the EEG machine and you can take a break while she prepares for the next part of the session. The total duration of this part of the session is approximately 45 minutes. You will then take a break (10-15 minutes) before starting the second portion of the session.

2) This next part involves you and the researcher viewing the video recording of you taken by the EEG machine during the imagery experience so that you can recount, in as much detail as possible, what you experienced during the session. The researcher will audio record this entire interview (see Permission to Audio Record form), and will ask you questions to help you 1) fully describe moment-by-moment the imagery and your awarenesses during the imagery; and 2) when exactly these experiences and awarenesses occurred. The researcher can rewind and play back portions of the EEG video (which will include the sound of the music and interventions from the session) as much as necessary in order to help you recall the experience as best you can. When you feel you have provided as much detail of your experience as possible, then the procedure is completed. This interview may take up to an hour or more, depending on the amount of detail you can provide and the ease you have in recalling your experience during the GIM session.

The researcher may contact you via email at a later date in order to verify her categorization of your detailed descriptions, which will allow her to compare your descriptions of your experience with other participants' descriptions. This interaction may involve one or more email communications, and does not require meeting in person.

<u>Risks</u>: There are minimal risks anticipated with this study. The EEG testing experience will not be uncomfortable, but may feel unfamiliar. Also, the gel used to affix the electrodes to your scalp, while nontoxic, washable, and non-staining, may be messy. The GIM session may lead to uncomfortable emotions and imagery experiences. However, the investigator is a trained music therapist who has designed the session to evoke experiences that can be managed in a single session. In the unlikely event that you have a very difficult time coping with the experience, the researcher will refer you to a trained therapist who can provide support and follow-up.

Benefits: You may gain some personal insight or have a beneficial imagery experience by participating in this study. The investigator will give you $20 cash in compensation for your time and effort in participating in this study; this will be given to you at the end of the single test session at TUH.

Confidentiality: None of your personal information will be used to identify any of the data collected in this study. A randomly generated ID number will be assigned to your data and will be used to label the computerized files, interview recordings, and any documents used in the data analysis. Any data that is saved onto removable storage media (e.g., CD-ROMs) will be stored in a locked cabinet or box, accessible only to the investigator or those assisting with analyzing the raw EEG data. The master list containing your name and your assigned ID number will be kept in a locked cabinet in the researcher's office. Additionally, all research data stored on the researcher's computer will be password-protected and accessible only by the researcher.

The EEG technicians, neurologist, and electrical engineer assisting with this study have signed a statement assuring that they will not reveal any identifying information about you that they may encounter during the study.

Disclaimer/Withdrawal: You are free to decide whether or not to participate in the study. Non-participation in the research or withdrawal from the research will not affect future interactions with the investigator, researcher, or Temple University. You will not be coerced into participation or coerced into staying in the study.

Subject rights: By signing this form you indicate that you understand that if you want further information regarding your rights as a research subject, you may contact Richard Throm, Program Manager & Coordinator at Office of the Vice President for Research of Temple University by phoning (215) 707-8757.

Questions: Please contact either the investigator or the researcher if you have any questions about this study, and we will answer them. The investigator's and researcher's contact information is at the top of this form.

Participant's Signature: ________________________ Date:____________

Witness's Signature:________________________ Date:____________

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of Music and Dance
TEMPLE UNIVERSITY

Department of Music Education and Therapy
110 Presser Hall
2001 North 13 Street
Philadelphia, Pennsylvania 19122

phone 215-204-8310
fax 215-204-1982
web www.temple.edu/boyer

Permission to Audio Record

Investigators' Names:	Kenneth Bruscia, Ph.D. and Andrea McGraw Hunt, MMT, MT-BC (Student Investigator)
Department:	Music Education and Therapy
Project Title:	A neurophenomenological description of the guided imagery and music experience

Subject: ______________________________ Date: ________________

I give Andrea McGraw Hunt permission to audio record me. This recording will be used only for research purposes. This recording will be used as a part of a research project at Temple University. I have already given written consent for my participation in this research project. At no time will my name be used.

WHEN WILL I BE AUDIO RECORDED?

I agree to be recorded during the time period: _______________ to ________________.

HOW LONG WILL THE RECORDINGS BE USED?

I give my permission for these recordings to be used from: _____________to ____________.

Data will be stored for three (3) years after completion of the study, after which time it will be destroyed.

WHAT IF I CHANGE MY MIND?

I understand that I can withdraw my permission at any time. Upon my request, the recording(s) will no longer be used. This will not affect my care or relationship with the investigators or Temple University in any way.

OTHER

I understand that I will not be paid for being audio recorded or for the use of the recordings.

FOR FURTHER INFORMATION

If I want more information about the audio recording(s), or if I have questions or concerns at any time, I can contact:

Dr. Kenneth Bruscia, Professor and Dissertation Advisor and/or
Andrea McGraw Hunt, Ph.D. Candidate
Music Therapy Program
Department of Music Education and Therapy
Esther Boyer College of Music and Dance
Temple University
Philadelphia, PA 19122

This form will be placed in my records and a copy will be kept by the persons named above. A copy will be given to me.

Please print

Subject's Name:

Date:

Address:

Phone:

Subject's Signature:______________________________

____
Witness Signature Date

____
Witness Signature Date

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THAN ONE YEAR

Boyer College
of Music and Dance
TEMPLE UNIVERSITY

Department of Music Education and Therapy
110 Presser Hall
2001 North 13 Street
Philadelphia, Pennsylvania 19122

phone 215-204-8310
fax 215-204-1982
web www.temple.edu/boyer

Permission to Videotape

Investigators' Names: Kenneth Bruscia, Ph.D. and Andrea McGraw Hunt, MMT, MT-BC
Student Investigator
Department: Music Education and Therapy
Project Title: A neurophenomenological description of the guided imagery and music experience

Subject: ______________________________ Date: ___________

I give Andrea McGraw Hunt permission to videotape me. This videotape will be used only for the research purposes. This videotape will be used as a part of a research project at Temple University. I have already given written consent for my participation in this research project. At no time will my name be used.

WHEN WILL I BE VIDEOTAPED?

I agree to be videotaped during the time period:_______ to _______.

HOW LONG WILL THE TAPES BE USED?

I give my permission for these tapes to be used from: ______ to _______.

Data will be stored for three (3) years after completion of the study, after which time it will be destroyed.

WHAT IF I CHANGE MY MIND?

I understand that I can withdraw my permission at any time. Upon my request, the videotape(s) will no longer be used. This will not affect my care or relationship with the investigators or Temple University in any way.

OTHER

I understand that I will not be paid for being videotaped or for the use of the videotapes.

FOR FURTHER INFORMATION

If I want more information about the videotape(s), or if I have questions or concerns at any time, I can contact:

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THAN ONE YEAR

Dr. Kenneth Bruscia, Professor and Dissertation Advisor and/or
Andrea McGraw Hunt, Ph.D. Candidate
Music Therapy Program
Department of Music Education and Therapy
Esther Boyer College of Music and Dance
Temple University
Philadelphia, PA 19122

City:____________________ State:
Zip Code

Phone: Office___________ Home

This form will be placed in my records and a copy will be kept by the person(s) named above. A copy will be given to me.

Please print

Subject's Name:

Date:

Address:

Phone:

Subject's Signature:____

____
Witness Signature Date

____
Witness Signature Date

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TEMPLE UNIVERSITY

Department of Music Education and Therapy
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Philadelphia, Pennsylvania 19122

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Additional Personnel Confidentiality Statement

Study Title:	A neurophenomenological description of the guided imagery and music experience
Principal Investigator:	Kenneth Bruscia, Ph.D., FAMI, MT-BC Professor and Dissertation Advisor Music Therapy Program 215-204-8314 kbruscia@temple.edu
Researcher:	Andrea McGraw Hunt, MMT, MT-BC Ph.D. Candidate Music Therapy Program 610-627-0670 andimh@temple.edu

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Personnel Name:________________________________

Title:________________________________

Role in this research:________________________________

You, the above-named personnel, are assisting the Investigator and Researcher with the above named study in your specified role. In this role, you may encounter personal information pertaining to subjects in this study. By signing this statement, you agree to not reveal any of this information to anyone other than personnel directly involved in this study, maintaining confidentiality for these participants.

Personnel signature:________________________________ Date:________________

Witness signature:________________________________ Date:________________

APPENDIX E

PROBE CODING FORM

Phenomenological Data Analysis

PROBE #____

Guiding Category for probe

- Body
- Visu (Visual)
- Inte (Interaction/Communication)
- Kine (Kinesthetic)
- Affe (Affect)
- Memo (Memory)

Type of Imagery Experience (only code specific modality if modality occurred singularly throughout probe)

- B – Body: Any imagery related to awareness of body parts, body sensations (but not body movement)
- V – Visual: Imagery related to anything seen, including colors, shapes, forms, patterns
- A – Auditory: Imagery related to either external auditory cues (e.g., music or guiding) OR internal auditory imagery
- T – Tactile: Imagery related to sense of touch
- E – Emotional: Affective imagery
- D - Digital/dialogical (words): Imagery involving use of words/language/communication
- O – Olfactory: Imagery relating to smell
- K – Kinesthetic: Imagery related to sensations of body movement
- C – Cognitive: Thoughts, evaluations about the imagery experience
- S – Spatial: Imagery related to sense of one's spatial experience in the image
- M - Multiple senses: More than one sensory modality reported (do not specify which)
- N – No senses: No sensory modality reported

Imagery Vividness – Degree of detail, richness in experience of imagery, as described

- PV – Reported as particularly vivid experience
- NPV – Not reported as particularly vivid
- DR - Difficulty recalling or describing imagery
- II – Incomplete image; unable to form image completely

Imagery Dynamics – Whether the imagery changed, shifted, or deepened over the course of the probe

- IC - Imagery contraction: Reduction of experienced imagery modalities (e.g., Visual and Body experience becomes only Body experience)

- IE - Imagery expansion: Increase of experienced imagery modalities (e.g., Body experience becomes Body and Visual experience)
- IS - Imagery shift: Shift of one imagery experience to another, without increase or decrease in number of modalities (e.g., Visual becomes Body; Visual and Body becomes Emotional and Kinesthetic) *(code 's' for single shift, 'm' for multiple shifts)*
- SI - Stable imagery: Imagery experience stays static, modality does not change (e.g., stays Visual throughout probe)
- SS – Simultaneous, separate imagery: separate but simultaneous modalities in contrast (simultaneous visual image and seemingly unrelated emotional image) [track # of instances, if not enough code according to stability of images] I still don't know the value of this one.

Music Awareness – quality of awareness of music as reported

- MI – reported that image was influenced by music throughout most of probe
- NMI- Reported that image was not influenced by music throughout most of probe
- MND – Influence of music not recalled or described

Guiding Awareness – quality of awareness of guiding as reported

- FR - Reports being fully responsive to guiding during this probe
- SR – Reports selective response to guiding – intentionally responded to portions of guiding, but did not respond to other portions
- DG – Reports being disconnected from guiding for part or all of probe
- GND - Cue not recalled or described

Altered State Awareness – quality of altered state as reported

- O - Not in ASC ('out') majority of probe – as reported by P's perception of 'out' or in the process of moving out of ASC
- I - In ASC ('in') majority of probe – as reported by P's perception of 'in' or in the process of going deeper into ASC
- A - Fell asleep

Congruence with Guiding – The degree to which participants' sensory experiences were congruent with the intended sensory experience of the probe as perceived by the guide.

- C – Congruent: Experienced imagery modalities match guiding cues for most of the probe
- NC – Not Congruent : Experienced imagery modalities have little to no relationship to guiding cues during the probe

APPENDIX F
TECHNICAL DESCRIPTION OF EEG COHERENCE ANALYSIS

Statistical Analysis Methodology
Richard Greenblatt, Ph.D.
Source Signal Imaging, Inc.

Data analysis methods. Data were analyzed using EMSE(r) v5.4 (Source Signal Imaging, Inc., San Diego CA).

Preprocessing. Before frequency domain analysis, data were bandpass filtered from 0.1-50 Hz using a zero-phase-shift order-256 FIR filter. Eye artifacts were removed using the software's express ocular artifact filter. The data were then spatially filtered using a Laplacian montage to minimize crosstalk between electrodes.

Frequency domain analysis. Each of the four datasets (one per subject) were divided into seven interval groups, one for each of the six experimental conditions, and one for background. Within each of these seven interval groups, one second windows were used to separately estimate power spectral density (PSD) and coherence. These estimates were pooled into seven conventional frequency bands, as shown in Table 1.

Band	*Low (Hz)*	*High (Hz)*
Delta	Near DC	4
Theta	4	8
Alpha	8	13
Beta1	13	18
Beta2	18	25
Gamma1	25	35
Gamma2	35	50

Table 1: Frequency domain analysis results were binned into bands. For each of the seven bands, the table shows the high and low frequency limits.

Estimating PSD and coherence. Assume we are given two zero-mean time series for channel i and j, $x_i(t)$ and $x_j(t)$, with Fourier transforms $X_i(f)$ and $X_j(f)$ respectively. Then for a time interval consisting of a set of W subintervals (or windows), we may estimate the power spectral density (PSD) over that interval as

$$PSD_i(f) \approx \frac{1}{W} \sum_{1}^{W} \left| X_{i,w}(f) X^*_{i,w}(f) \right| \qquad \text{Eq. 1}$$

Where $X_{i,w}(f)$ is the Fourier transform of $x_i(t)$ for the w-th window and $X^*_{i,w}(f)$ is its complex conjugate.

For a time interval consisting of a set of W subintervals (or windows), the coherence between channels i and j, $COH_{i,j}(f)$, may be estimated as

$$COH_{i,j}(f) \approx \frac{\frac{1}{W} \sum_{1}^{W} \left| X_{i,w}(f) X^*_{j,w}(f) \right|}{\sqrt{\left[\frac{1}{W} \sum_{1}^{W} \left| X_{i,w}(f) X^*_{i,w}(f) \right|\right]\left[\frac{1}{W} \sum_{1}^{W} \left| X_{j,w}(f) X^*_{j,w}(f) \right|\right]}} \qquad \text{Eq. 2}$$

Note that Eq. 2 implies that $0 \le COH(f) \le 1$. In addition, Eq. 2 implies that coherence may vary either due to changes in phase- or power-correlation between channels.

Statistical analysis. Data were analyzed for using non-parametric (permutation-based) methods to test the null hypothesis that the difference between each experimental state and background was due to chance, using methods described in Greenblatt and Pflieger (2004), except when noted below for multiple comparison correction. These tests were conducted independently for each of the four subjects, and also for a composite data set created by concatenating all data from each of the subjects into a grand data set. Permutation tests were based on a random resorting of labels between each of the conditions and background for each of the single-window binned transforms. Thus for each coherence estimate and condition, there were 19x18 electrode pairs and 7 bands, or 2394 tests per subject. 40 permutations were used for each condition, yielding a p-value resolution of 0.025. A threshold value of $p \leq 0.05$ following marginal multiple comparison correction was used to determine statistical significance.

We implemented a marginal multiple comparison correction using a family-wise error rate (FWER) method (Benjamini and Hochberg, 1995). For each of the coherence reference channels and each frequency bin, we found the maximal statistics over all other channels. These maximal statistics were then used to construct an empirical cumulative density function (e-cdf). This e-cdf was used to in the standard way to assign a p-value to the true labeling. The use of this approach allowed us to detect significant frequency bin and reference channel specific coherence maps. This marginal test is less conservative than a global FWER multiple comparison correction, which failed to identify any significant effects.

Topographic mapping. Conventional 10-20 electrode location coordinates were used for topographic mapping. The results of statistical hypothesis were mapped in two ways. First, all pairwise interactions that exceeded threshold were mapped by drawing a solid line between the relevant electrode pairs. Second, the network connectivity index (NCI) was calculated for each electrode. For each coherence reference electrode, the NCI is a count of the number of connections for this reference which exceed statistical threshold. The NCI may then be visualized for each band as a pseudo-color map.

References.

Benjamini Y, Hochberg Y. Controlling the False Discovery Rate: a Practical and Powerful Approach to Multiple Testing. *J. R. Statist.Soc. B* **57**(1):289-300, 1995.

Greenblatt RE, Pflieger ME. Randomization-Based Hypothesis Testing from Event-Related Data. *Brain Topogr*; **16**(4)225-232, 2004.

APPENDIX G
EEG COHERENCE RESULTS

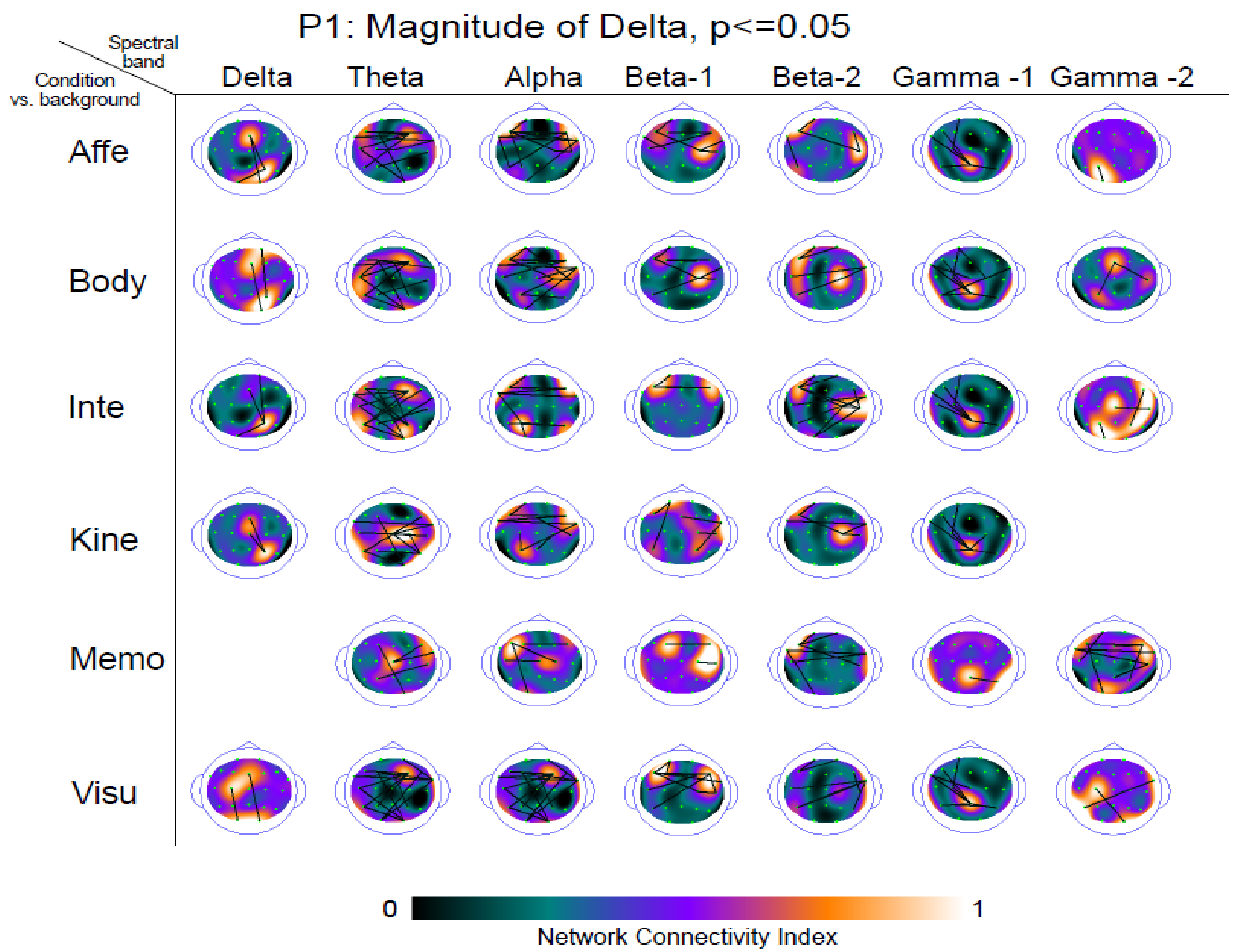

Figure 6. EEG Coherence Maps: Linda

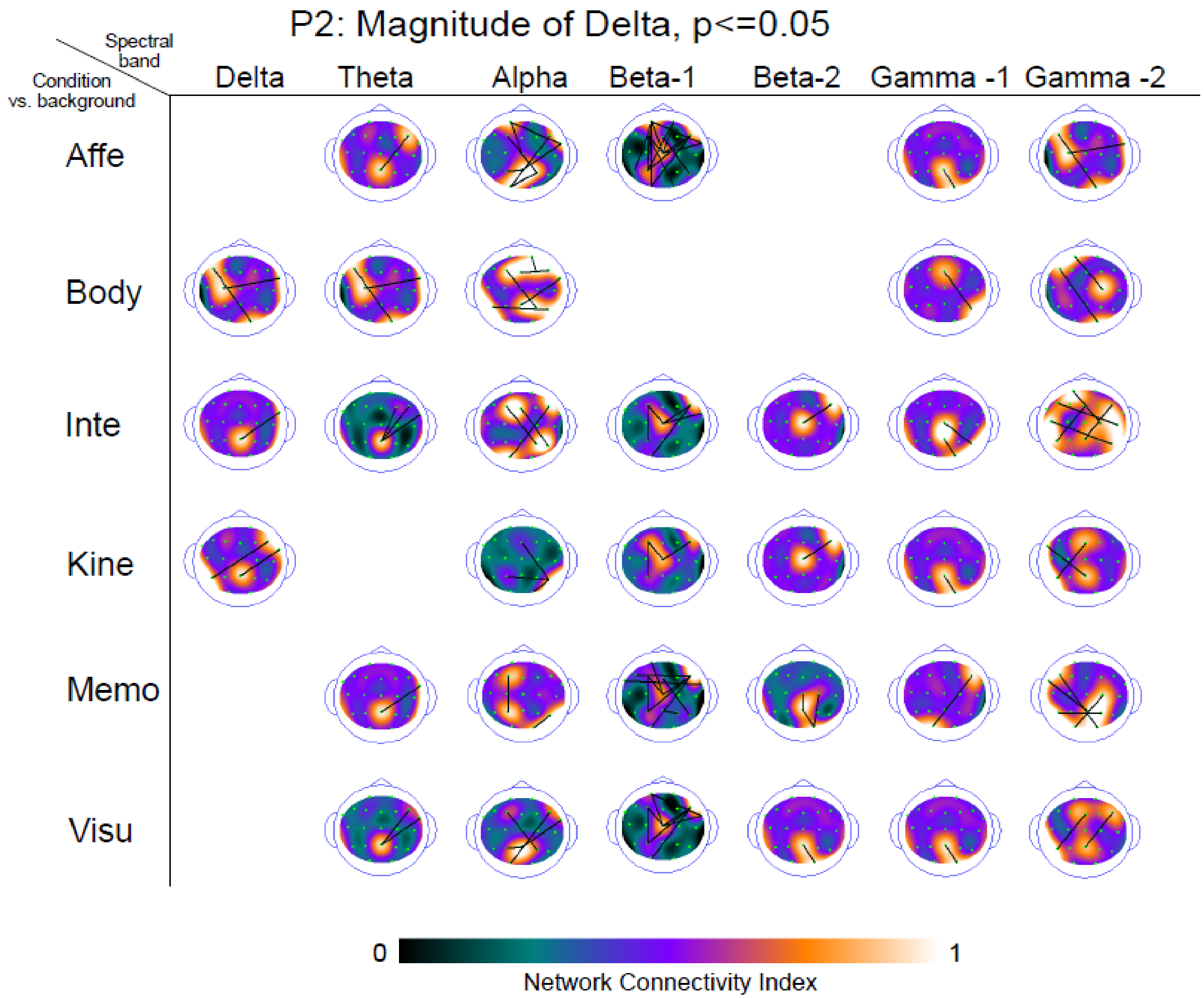

Figure 7. EEG Coherence Maps: Larry

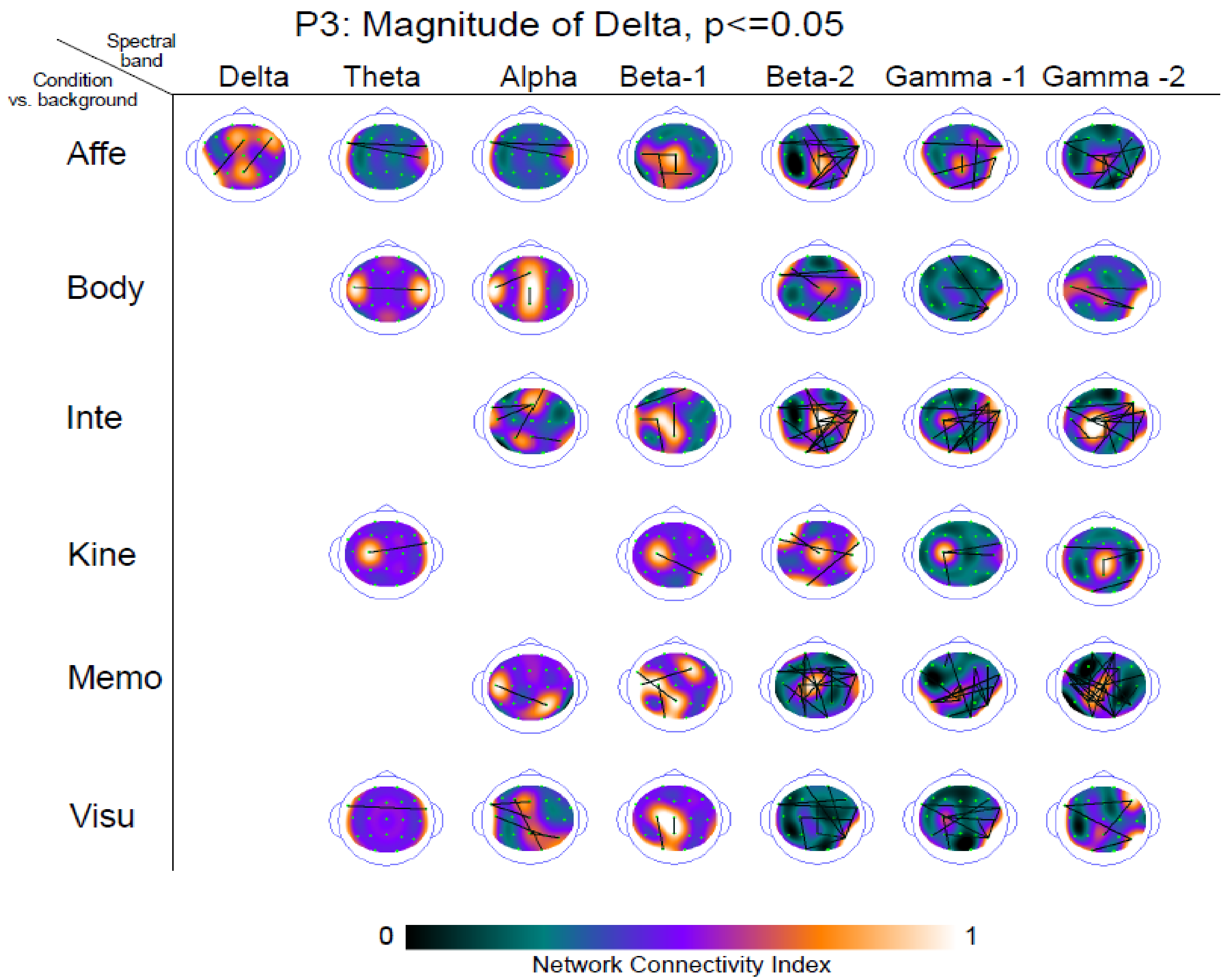

Figure 8. EEG Coherence Maps: Daphne

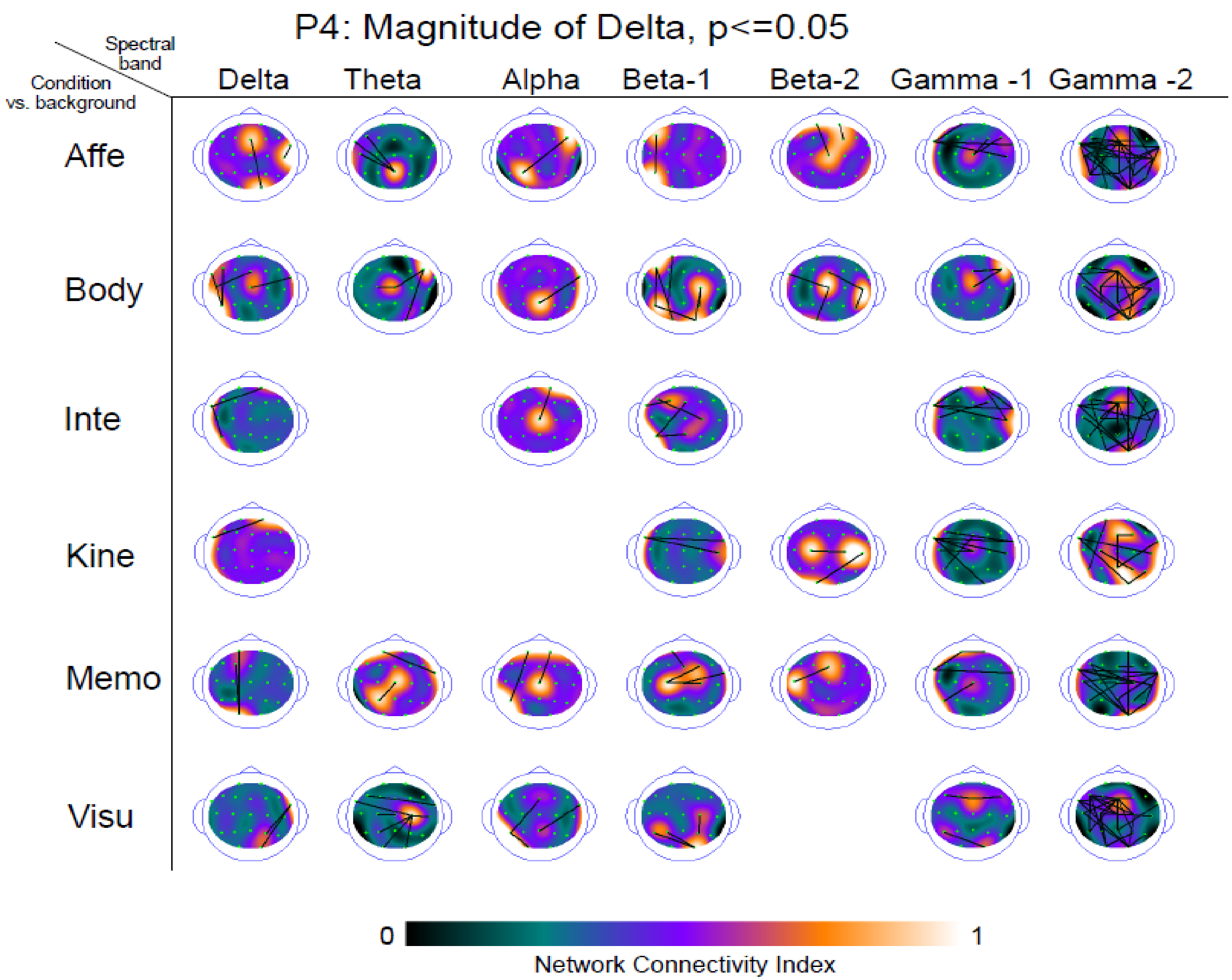

Figure 9. EEG Coherence Maps: Craig