

**EMBRACING THE DICHOTOMY: AMBIVALENCE, ATTITUDINAL  
STRENGTH, AND THEIR ROLE IN COGNITIVE PROCESSING  
AND PERSUASION AMID CONFLICTING INFORMATION**

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## ABSTRACT

In the age of infodemic, we are surrounded by contradictory data, news, and opinions, leading to widespread misinformation and public uncertainty. While extensive research addresses misinformation, it falls short of comprehensively understanding how people form judgments amidst conflicting information. Previous research on processing conflicting information has mainly focused on the influence of pre-existing attitudes, whether positive, negative, or ambivalent. While the effects of univalent prior attitudes on information judgment are established, the role of ambivalent attitudes is less understood. Importantly, ambivalence is complex, and current research lacks a substantial understanding of its nature. This research, instead, extends its current typology by identifying two distinct forms of ambivalence: skewed ambivalence and balanced.

Understanding the nature of ambivalence offers significant insights since it has the potential to affect information processing. Ambivalence is commonly thought to be a potential catalyst for biased information processing, and research has indicated a tendency for systematic examination of the information to resolve ambivalence. This perspective tends to assume that one side of the evaluation is dominant, resulting in skewness in ambivalence. However, it should be noted that ambivalence can take different types, such as balanced forms, containing two equally weighted evaluations. These unique types of ambivalence may impact information processing differently. This aligns with the idea behind the Heuristic and Systematic Model (HSM), in which different motivations are associated with the extent and nature of (objective versus biased) information processing. For instance, balanced ambivalence can trigger accuracy

motivation, while skewed ambivalence may lead to defensive motivation. The gap in understanding the complex role of different types of ambivalence in motivational information processing sets the stage for this research. Motivations are crucial in information processing and decision-making, particularly when facing conflicting messages. Defensive or accuracy motivations significantly influence how individuals respond to divergent perspectives in conflicting messages. The type of motivation determines both the cognitive effort one is willing to invest and one's tendency to either amplify or moderate one attitude when encountering contradictory information. From a decision-making perspective, this is pivotal.

The results of the current study support two distinct types of ambivalence - skewed and balanced, and their distinct relationship with motivations behind information processing. Skewed ambivalence, with one side of evaluation dominating, fosters defensive motivation. This is perhaps because of the preference for consistency in evaluation, but with the existing minority view, one may feel uncomfortable holding conflicting thoughts. Balanced ambivalence, on the other hand, fosters accuracy motivation due to the equally weighted two sides of evaluation. It was also found that individuals with balanced ambivalence are more certain and confident in their attitudes while individuals with skewed ambivalence showed less certainty and confidence in their judgment. This discrepancy offers further support for the uniqueness of two types of ambivalence. Despite these differences, both types of ambivalence lead to a heightened intention to put extra effort into understanding and processing conflicting information. Overall, the findings not only offer a theoretical understanding of ambivalence and its

function in information processing but also provide practical insight into combating conflicting information and misinformation.

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# CHAPTER 1

## INTRODUCTION

### Overview

In the age of infodemic, we face overabundant information, news, and opinions, at many times contradicting one another. The unprecedentedly interconnected and democratized communication arena has led to the proliferation of conflicting information and misinformation. As individuals navigate through the maze of information, distinguishing between accurate reliable information and misleading or false information becomes a real challenge. The challenge is further complicated by the presence of valid yet divergent sources and evidence supporting contradicting viewpoints. For instance, debates around abortion policies showcases how views and information contradict with each other, with one side emphasizing women's freedom and the other side arguing for protection of fetal life. While extensive research (Farrell, McConnell & Brulle, 2019; Roozenbeek & Van Der Linden, 2022; Roozenbeek et al., 2022) has been conducted to solve the problems of misinformation or disinformation, solely looking at the faulty information does not provide enough implications for understanding the whole picture, and especially cannot elucidate how people make their mind when they confront conflicting information. It is essential to delve deeper into the conflicting nature of the information and investigate how people interpret and arrive at decisions on contradictory positions.

Additionally, the phenomenon extends beyond the mere existence of conflicting information we confront. People oftentimes hold pre-existing attitudes, positive, negative or ambivalent, holding positive and negative evaluation simultaneously (van Strien, Brand-Gruwel & Boshuizen, 2014). This further compounds the complexity of

the issue as individuals grapple with contradictory information and divergent evidence with their pre-existing attitude (Kardash & Scholes, 1995; Maio & Haddock, 2007; van Strien, Brand-Gruwel & Boshuizen, 2014). Research shows how univalent prior attitude influence judgement of new information (Lescarret et al., 2023; Sude & Knobloch-Westerwick, 2022; van Strien, Brand-Gruwel & Boshuizen, 2014); our understanding on ambivalent attitude remains limited and somewhat ambiguous. Previous research (Nordgren, Van Harreveld & Van Der Pligt, 2006; Van Harreveld et al., 2009) suggests ambivalence is a source of discomfort that urges people to seek resolution. Nevertheless, new evidence suggests whether and how individuals respond to this ambivalence is contingent upon a complex interplay of factors, such as attitude certainty and situational factor such as commitment to a decision (Sawicki et al., 2013). Thus, gaining a nuanced comprehension of this intricate process through which people respond to ambivalence becomes increasingly crucial in our pursuit of understanding of information processing and decision making in face of conflicting information and pre-existing attitude.

Moreover, previous literature (Clark, Wegener & Febrigar, 2008; Jonas, Diehl & Bromer, 1997; Rudolph & Popp, 2007) offers limited understanding of how pre-existing attitude, particularly ambivalence, influence processing of new coming conflicting information. Ambivalence is commonly regarded as a potential catalyst for biased information processing and research has indicated a propensity for systematic examination of the information when people are trying to resolve the ambivalence (Nordgren, Van Harreveld & Van Der Pligt, 2006; Van Harreveld et al., 2009). This perspective is under the assumption that ambivalence is inherently aversive, and

systematically examining conflicting information serves as a resolution this discomfort. However, ambivalence is not necessarily an unpleasant state (Itzhakov, Kluger & Dotan, 2017; Rothman et al., 2017) and in reality, heuristic processing or a combination of both can serve the purpose. Previous research (Chaiken & Ledgerwood, 2012; Chen, Duckworth & Chaiken, 1999; Giner-Sorolila & Chaiken, 1997) has also pointed out different motivations in the dual processing theories and their potential links to different modes of information processing. However, the specific motivation conditions under which different modes of processing have yet to be fully explored. Furthermore, the relationship between aversion triggered by ambivalence and the need for resolution appears to exist under various motivations, such as commitment to a decision, which may overlap with principles of motivations within HSM paradigm. For instance, when individuals who are ambivalent about gun regulation policies may experience heightened uncertainty when required to vote on the gun regulation legislation (facing the need to make decisions). This coexistence of ambivalence and uncertainty under the need to make a decision may trigger the inclination toward accuracy motivation in HSM framework. Thus, a careful and systematic processing of available information may provide the well-informed decision. Thorough examination of these intersects will contribute to a more comprehensive understanding of how ambivalence influences information processing strategies.

### **Statement of the Problem**

Collectively, this research hopes to answer many questions. Central among these questions is the nature of ambivalence itself: Is it indeed an aversive state that people need to resolve? If it is an aversive state, how will people feel when they are

confronted with conflicting information? Does it make them even more aversive? Furthermore, how does ambivalence influence the interpretation of new information, particularly when that information either introduces more contradiction into the mix or could help them make resolution, to their standpoint? This research seeks to shed light on the dynamics of ambivalence and its impact on information process in hope to contribute to a deeper understanding of how individuals navigate the complexities of conflicting information environment with various forms of pre-existing attitudes.

**Conflicting information**, at its core, is “two or more propositions that are logically inconsistent with one another” (Carpenter & Han, 2020, p.48). Carpenter and Han (2020) explained that conflicting information should not be limited in terms of the origin of the source (either from one single source or multiple source), nor should it be limited to the mode of consumption (active search versus passive encountering); however, what should be emphasized is the defining “conflict”, which makes it impossible for people to simultaneously take both propositions. Supposing two statements varied in terms of the recommended stage to initiate mammography screening (at age 40 as recommended by some experts and at age 50 as recommended by other professionals), a woman could not initiate mammography screening at both age (40 and 50) and needs to pick a side. The aforementioned conceptualization is referred as informational conflict (Gollust, Fowler & Nagler, 2021). The second conceptualization captures the decisional conflict resulted from the information. For example, a health behavior, such as drinking coffee, is associated with two distinct outcomes. One outcome indicates potential benefits, another suggests potential risks. When individuals come across two messages covering either benefits or risks of coffee consumption, they

might experience the decisional conflict. Even though two messages do not directly contradict each other, as coffee consumption could genuinely be linked to both outcomes depending on the amount of consumption, individuals may still experience conflict as they question whether to consume coffee or not (Gollust, Fowler & Nagler, 2021). Though both conceptualizations emphasize distinct aspect of conflicting information, both have been shown to be associated with concerning consequences and signify other related phenomena in decision-making and information processing, such as attitudinal ambivalence.

**Attitudinal Ambivalence** is defined as a state characterized by simultaneous experience of both positive and negative evaluations or emotions toward the same object (Jonas, Broemer & Diehl, 2000). Previous research has identified three dimensions: cognitive ambivalence, affective ambivalence, and affective-cognitive ambivalence (Jonas, Broemer & Diehl, 2000), but it has yet to recognize the distinct types within ambivalence. Ambivalence, as simultaneous existence of both positive and negative evaluation, is measured along a continuum considering not only the intensity of these opposing evaluation but also the similarity in their magnitude. When opposing evaluations are equivalent in magnitude, there is lack of preference for a dominant side. Consequently, this study proposes that ambivalence should be further be considered into different types, distinguishing between equivalent (or balanced) ambivalence (when opposing evaluations have similar magnitude) and skewed ambivalence (presence of a dominant component). This study centers on the different types of ambivalence and its unique impact on motivational information processing.

**Motivation information processing** has been studied using the Heuristic-Systematic model (HSM), which argues, individuals process information through two distinct modes, heuristic processing and systematic processing (Chaiken, 1980). The first one, heuristic processing relies on mental shortcuts (heuristics) and simplified decision rules to quickly form judgements and make decisions, oftentimes without extensive analysis; whereas the systematic processing involves with more thoughtful and effortful information processing, evaluation of the evidence and arguments before arriving at a conclusion (Chaiken & Ledgerwood, 2012). The first relies on mental shortcuts (heuristics) and simplified decision rules to quickly form, whereas the second involves more thoughtful and effortful evaluation of the evidence and arguments before arriving at a conclusion (Chaiken & Ledgerwood, 2012). The mode of processing is determined primarily by two principles: the least effort principle and the sufficiency principle (Chaiken, 1980; Chaiken, Liberman & Eagly, 1989; Chaiken & Ledgerwood, 2012). The least effort principle emphasizes the efficiency of using the least amount of cognitive resources and least demanding processing to reach decisions. However, the sufficiency principle points out that individuals are sometimes driven to put extra cognitive effort to achieve aspired confidence in their judgment (sufficiency threshold) (Chaiken & Ledgerwood, 2012). As suggested, the extent of information processing is reflected by the gap between actual confidence and aspired confidence that as the gap increases, individuals ought to put more effort into bridging the confidence gap. Thus, according to these two principles, individuals will resort to systematic processing, assuming enough cognitive capacity, if the heuristic processing is insufficient to provide enough confidence in their judgments. This may occur due to a lack of heuristic cues

and/or the heuristics alone cannot bridge the confidence gap. Additionally, the HSM argues that the amount of processing is determined by individuals' motivation (Chen, Duckworth & Chaiken, 1999).

There are different types of motivations in HSM: accuracy, defensive, and impression, with the latter being less relevant to this research, as it emphasizes the achievement of social goals and interpersonal consequences rather than the evaluation of conflicting information and attitude itself (Chen, Duckworth & Chaiken, 1999). Accuracy motivation, defined as "the desire to hold attitudes and beliefs that are objectively valid," indicates a preference for systematic processing when such motivation is higher than lower (Chaiken et al., 1996, p.556). While this does not guarantee the validity of the judgments, it emphasizes the balanced processing of information from all viewpoints. To reflect such objectivity, research has looked at the selection of information under different motivations. And they have found that when holding an accuracy motivation, individuals are more likely to reach for counter-attitudinal information and less likely to generate confirmation bias (Kim, 2007; Lundgren & Prislin, 1998). Defensive motivation, on the other hand, assumes a higher preference for information congruent with existing beliefs under the desire to defend one's position. This can lead to selective information-seeking and confirmation bias, which was shown in previous research (Lundgren & Prislin, 1998; Winter, Metzger & Flanagan, 2016). Thus, motivations play a crucial role in information processing and decision-making, particularly when facing conflicting message.

## **Theoretical Foundation**

Pre-existing attitude, especially ambivalence and uncertainty, offers overlapping conditions with aforementioned principles. For instance, ambivalence has been assumed to lead to comprehensive and objective processing because ambivalence may result from lack of knowledge or inaccurate knowledge, which overlaps with sufficiency rule that if individuals are accuracy-motivated they are more likely to engage in more comprehensive processing including counter-attitudinal information (Kim, 2007; Lundgren & Prislín, 1998). This could also be linked to the type of ambivalence - equivalent and skewed ambivalence. In a situation of balanced ambivalence, when holding similarly strong positive and negative evaluation, accuracy motivation is likely to become more dominant, driving individuals to process information comprehensively to resolve ambivalence. On the other hand, in a situation of skewed ambivalence, individuals have dominant attitude while still feel ambivalent, which indicates a preference in their attitude position. In this vein, individuals are more likely to take a defensive position to selectively process information that favors their dominant attitude. This can also be explained with aversiveness related to ambivalence.

Additionally, it appears that the psychological experiences tied to ambivalence play a pivotal role in motivating and even shaping the type of information processing. For instance, previous research (Nordgren, Van Harreveld & Van Der Pligt, 2006) has suggested that skewed ambivalence is associated with biased information processing, a connection that is attributed to the aversiveness linked to ambivalence. However, while this relationship has been suggested, the mediating role of aversiveness remains underexplored, with only one study providing empirical evidence supporting

discomfort as a mediator (Nordgren, Van Harreveld & Van Der Pligt, 2006). It is reasonable to hypothesize that when ambivalence is not accompanied by aversiveness – for example, an individual who acknowledges both the importance of personal freedom in gun ownership and the necessity of public safety without experiencing discomfort with the conflicting thoughts – they may show less directional motivation and instead lean towards accuracy motivation and prioritize the acquisition of information or knowledge about gun regulation policies. This rationale suggests that the psychological experiences under ambivalence might serve as a vital factor influencing information processing strategies when individuals encounter conflicting information.

Another thing to note that although discomfort associated with ambivalence may play a pivotal role influencing individuals' information processing strategies when confronted with conflicting information, the type of ambivalence they experience also hold major influence on the motivation they are likely to adopt. Consider, for instance, individuals who exhibit a more skewed form of ambivalence, where one side of attitude dominates the other, they are more inclined to engage in defensive motivation when they feel aversiveness triggered by ambivalence. In this case, individuals who exhibit a skewed form of ambivalence toward gun regulation, with support for gun ownership clearly dominates but acknowledge certain drawbacks, may experience psychological discomfort with this conflicting feeling. They may be inclined to engage in defensive motivation by selectively processing information that reinforces their dominant, pro-gun ownership position. This defensive motivation is also characterized by a desire to bolster their dominant attitude

component and directional processing of information. On the other hand, individuals with a more balanced form of ambivalence, tend to lean towards accuracy motivation unless they experience discomfort with their ambivalence. They seek to acquire balanced knowledge and information without needing to defend one side over the other since they possess both sides of the attitude. However, when these individuals do experience aversiveness linked to their ambivalence, they might switch to defensive motivation, similar to those with skewed ambivalence.

Considering attitudes as a continuum, with ambivalence on one end and univalence on the other, the more skewed ambivalence is, the closer it is to univalent end of the spectrum. This proximity suggest that they are more likely engage in defensive motivation and exhibit directional processing, driven by confirmation bias. In contrast, those with balanced ambivalence, when not under the influence of aversiveness, are more likely to hold accuracy motivation and engage in a more balanced information processing.

It is also important to note that, although skewed ambivalence is closer to univalence, it still holds the power of ambivalence and would influence information processing differently than univalence. In fact, the existence of opposing evaluation would booster the possibility for systematic processing to gather information from both sides. Systematic processing involves a careful and deliberate consideration of information, as these individuals hold internal tension brought by their ambivalence. On the other hand, heuristic processing has been indicated (Fazio, 2007; Yan, 2015) as the go-to mode for individuals with univalent attitude due to selectivity in their information processing (or so-called) confirmation bias.

## **Summary**

This chapter introduced the premise of this study, proposing different types of attitudinal ambivalence and their unique yet essential influence on motivational information processing. The project includes a pilot study to test the technique for priming different forms of ambivalence and an experiment to gauge conditions for motivated information processing when facing subsequent conflicting information under varying forms of ambivalence. It seeks to extend our current understanding of the HSM and attitude strength and provide insights on strategies that can guide individuals in effectively processing and understanding conflicting information. For instance, potential strategies can be encouraging individuals to recognize the ambivalent attitude and acknowledge their mixed feeling before making a decision, which can help them approach information more reflectively. The study offers theoretical, methodological, and practical contributions when examining how ambivalence influences motivational information processing and decision-making.

## CHAPTER 2

### THEORETICAL FOUNDATION & HYPOTHESES

#### **Conflicting Information**

The advancement of Internet and social media has revolutionized how information is created, disseminated, and consumed. While the development has empowered people to access a wide range of information and democratized information sharing, it also gave rise to the challenge of conflicting information. Addressing the issue of conflicting information has become a burden for society with far-reaching consequences in various aspects (Carpenter et al., 2016; Shanteau, 2000). Conflicting health information has led to the erosion of trust in public health, declined adoption of preventative measures, and inconsistent public health responses (Nagler, Yzer & Rothman, 2019; Shi et al., 2022). Conflicting political information has exacerbated polarization, undermined democratic processes, and led to social unrest; and conflicting science information has fueled skepticism surrounding public institutions, misled public, and hindered social progress (Mutz, 2002). Research has shown the profound effects of conflicting information in various areas, yet little is known regarding how people understand and process it.

Understanding conflicting information is challenging due to its complexity. Early research studied conflicting information through two-sided messages, which cover both the pro and con side of the subject (O'Keefe, 1999). Recent research (Carpenter et al., 2016; Nagler, 2014) has been looking at conflicting information with more nuanced conceptualization.

One important difference to be made with its conceptualization is whether to define conflicting information by perception or by existence. As Carpenter et al. (2016) argued conflicting information should be recognized as people's perception rather than existence since the former determines behavioral consequences. Without perception, solely existence of conflicting information lacks impact. People's perceptions are determined by multiple factors. Carpenter et al. (2016) proposed operational definition of conflicting information that focuses on logical inconsistency in information rather than decisional conflict resulting from opposing sides of the argument. This shall not be considered as conflicting information by having one message indicating abortion rights protect women's decision about her body while having another message indicating legalizing abortion promotes a culture where life is disposable. The previous example does not have direct logical inconsistency but may face a decisional conflict. Such definition emphasizes different possibilities of conceptualization and operationalization. It also signifies the impact of personal factor, such as decisional conflict and background, on the perception of conflicting information (Carpenter et al., 2016). For instance, a patient may look at scientific research information as conflicting due to the need to make a decision, while a researcher may consider such scientific research as heterogeneous but not necessary conflicting as a scientifically trained audience. Nagler (2014) proposed a definition for conflicting information as "messages that offer information about a single behavior producing two distinct outcomes" (p.25). In this definition, information pointing abortion associating with women's rights can be in conflict with information indicating abortion relating to murder since there is decisional conflict whether to support legal abortion or not. I find this definition more practical and compatible with the type of

conflicting or contradictory information in the public information environment and extend the understanding on behavioral outcomes in persuasion continuum.

Conflicting information shall be distinguished from more popular term misinformation. Misinformation emphasizes on the false or inaccurate nature of information, especially those with ill-intention to deceive (Southwell et al., 2022; Vrage & Bode, 2020). Thus, misinformation is conceptually distinct from conflicting information by focusing on the inaccuracy of the information and the motives behind dissemination (Carpenter & Han, 2006). Conflicting information, instead, focuses on the conflict rather than accuracy and disregard its motives behind dissemination. Similarly, I argue, conflicting information shall be distinguished from two-sided messages. A two-sided message includes both supporting arguments as well as opposing arguments (Allen, 1991). There are two types of two-sided messages, refutational and non-refutational. While the first include opposing arguments and then refuting them, the second only mention the opposing arguments without any refutation. The refutational two-sided messages aim to introduce the opposing arguments and showcase why the opposite position is inferior to advocated position (Allen, 1991). Two-sided message, as argued by Lee and colleague (2018) is not entirely different from conflicting information. However, two-sided messages are related to competitive frames that include two-sided frames (supporting and opposing). Conflicting information, especially following Nagler (2014)'s definition, focuses on the decisional conflict, which may introduce uncertainty and confusion. Additionally, two-sided messages, especially refutational one, put more emphasis on advocated arguments, leaving opposing arguments less weight (Burgoon, 1975). Whereas conflicting information, which does not emphasize on refuting one side

or persuading individuals with advocated arguments, pay no attention to argument weights or, ideally, should not be significant difference in argument weight. Moreover, traditionally two-sided messages are presented in single text whereas the focus of this study is to understand processing of conflicting information in multiple texts, emphasizing decisional conflict as a critical component.

Further clarifying conflicting information involves examining its typology. Conflicting information has been classified based on four dimensions: 1) multiplicity of sources, 2) issue of the conflict, 3) evidence heterogeneity, such as evidence supported by similar versus different sources, and 4) temporal inconsistency where a proposition exists at one time point contradicts with another proposition at a different point in time. These dimensions do not exist separately from each other, as Iles et al. (2022) offered exemplars of the scenarios when different dimensions intersect with one another. For instance, when conflict exists in the ambiguous evidence, sources do not need to disagree with each other but instead acknowledge the mixed evidence (i.e., experts admit that the consequences of banning legal abortions are mixed). When conflict arises from both the source and the evidence, information provided by one source contradicts another source or existing guideline (i.e., expert A argues that legal abortion is protecting human rights, whereas expert B argues that legal abortion is not protecting human rights). Finally, conflict can arise from the same source due to changes in evidence (i.e., experts stated legal abortion is protecting human rights previously; however, they changed their statement due to new evidence suggesting legal abortion is not protecting human rights). Such particular attention to the source and evidence heterogeneity is based on broad evidence that differences in source and presentation of the evidence would generate different cognitive

responses and perceptions (Lee, Nagler & Wang, 2018). For instance, research found that multiple sources would trigger more aversive conflict than a single source (Smithson, 1999), acknowledgment of mixed evidence or uncertainty in current findings would increase scientists' credibility (Ratcliff et al., 2018), and revisions in current guidelines although would not trigger aversive impression of current recommendation, would have backlash toward future revisions (Lyons et al., 2020). The conceptualization and typology is crucial for examining the impact of conflicting information on attitudes and decision-making process.

Past research has focused on the consequences of conflicting information, research on the sources of conflicting information is insufficient. Research on sources of health-related conflicting information has indicated that sources can vary from professional to lay people and internet to conversation; Media and internet remain the most common patient-reported sources (Ahn & Kahlor, 2023; Hwang et al., 2007; Mashlach, Seidman & Seidman, 2002). In particular, the advent of social media has amplified the presence of conflicting information (Smith et al., 2019). Additionally, conflicting information may be present when people actively search for (Eysenbach, 2003) or passively consumed (i.e., advertisements) (Elstad et al., 2012). This has significant implication on how people respond to conflicting information — whether by actively seeking it out or passively consuming it. The different approaches may involve different level of cognitive effort in understanding and processing conflicting information.

Moreover, there is also a critical gap in research to understand how people interpret and process conflicting information. Richter and Maier (2017) conducted a

meta-analysis to examine the cognitive process of conflicting information in multiple texts. They proposed a two-step flow from validation during comprehension to biased processing of conflicting information, leading to text-belief consistency, especially for individuals with strong prior beliefs. The results of the meta-analysis support the text-belief consistency effect in comprehension processes that people are more likely to agree with information that aligns with their pre-existing belief. Richter and Maier (2017) also found that this preference of text-belief-consistency is likely due to mixed force of the inherent cognitive comprehension (or so-called epistemic monitoring) and motivated reasoning. Similarly, in an experiment that used open-ended reading and writing tasks, van Strien and colleagues (2014) found strong prior belief will elicit biased processing toward prior attitudes. Yet, the critical gap still exists regarding how individuals who do not hold strong pre-existing attitudes process conflicting information. This gap is particularly important as individuals without strong prior preferences in attitudes may adopt different cognitive strategies when encounter conflicting information, potentially affecting the subsequent interpretations and behaviors. Therefore, this research addresses how conflicting information is processed by individuals without strong pre-existing attitude, or more specifically, by individuals with ambivalent attitudes. The focus of the current research is to examine how pre-existing attitudes or ambivalent attitude influence the processing of upcoming conflicting information. Although such attitudes or ambivalent attitudes may have been influenced by accumulated conflicting information in the past, the process of forming these attitudes is not the focus of this study. Instead, the current research centers on understanding how pre-existing ambivalent attitudes, or ambivalent attitudes already present in individual's mind without influence of new information,

affect individual's reaction to the subsequent conflicting information. This reflects the situation in which we already hold ambivalent attitudes toward some issues and our reactions to the information we consume next could be impacted by these prior dispositions. Accordingly, this study does not manipulate the amount of conflicting information participants see on both sides. Rather, it measures the attitudes directly after a priming technique. This approach is intended to enhance the external validity of the findings by reflecting situations in which individuals are not influenced by the consumption of conflicting information, but by their pre-existing attitudes.

### **Attitude**

An important step before addressing how individuals with ambivalent attitudes process conflicting information is to understand attitude itself, exploring its conceptualization, structure, and the influence on information processing. The following sections address this fundamental question about attitude and its function.

### ***Its definition, Structure, Function, and Measurement***

As a concept that has fascinated numerous researchers, attitude serves as a dominate area in social psychology. Attitude holds its complexity and intricacy as a psychological construct. It is the fundamental concept in many social psychological phenomena, especially in communication. The past research has defined attitude in many ways, the followings a couple examples.

“An attitude is a mental and a neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related” (Allport, 1935, p.749).

“Attitude is a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor” (Eagly & Chaiken, 1993, p1).

“... are predispositions to respond, but are distinguished from other such states of readiness in that they predispose toward an evaluative response” (Osgood, Suci & Tannenbaum, 1957).

“An association between a give object and a given evaluation” (Fazio, 1989, p.155).

Allport’s (1935) foundational definition highlights attitudes as a state of readiness that guide behavior in a given context (Greenwald, 1968). Attitudes, in this case, exert influence on the subsequent behavior based on the context, leading either to attractions or avoidance in responses (Greenwald, 1968; Staats et al., 1973). In contrast, Osgood and colleagues (1957) emphasize attitudes specifically as evaluative predispositions, which are linked to both emotional (affective) and instrumental (goal-oriented) responses. This definition narrows the focus of attitudes on evaluative response.

Eagly and Chaiken (1993) further refined this concept and defined attitude as the “psychological tendency that is expressed by evaluative responses”, a train of thought different from the readiness to respond. They argued that attitudes as tendencies implies attitudes as the internal state that is kept for at least short period of time. This definition 1) allows distinction of attitude from related term such as personality, 2) underscores the possibility of attitude being a short-term as well as an enduring experience, and 3) acknowledges attitude as both a state that is originating from biological base (McGuire, 1985) and a learned experience (Campbell, 1963).

Beyond defintions, attitudes can be structuraly conceptualized through three components,— affect (emotions), cognitions (beliefs) and behavior (or behavioral

tendencies) (Insko & Schopler, 1967). The affective component of attitude signifies the favorable or unfavorable, positive or negative emotions toward the attitude object; the cognitions contain beliefs or thoughts about the attitude object; and behaviors (or behavior intentions) consists of tendencies to respond or actions on the object (Eagly & Chaiken, 1993). Eagly and Chaiken (1993) detailed how evaluative response may exemplify in each of the component. For example, the evaluative response in the affective components addresses people's emotions, mood and feelings toward the attitude object, with positive evaluation generally associates with positive affect (e.g., People may experience anger or frustration if they oppose abortion versus people who support abortion may experience positive feelings of expressing freedom of choice). The evaluative response of cognitive component consists of covert as well as overt beliefs and cognitions people have about the object. These beliefs can range from positive to negative including neutral with positive beliefs links positive attributes of the objects (i.e., Abortion can protect women's free choice and negative beliefs links negative attributes of the object (i.e., Abortion would kill a kid's life). And evaluative response related to behavioral component contains overt responses. In the situation of abortion, it can range from negative responses (i.e., protesting against its legislation) to positive responses (i.e., helping women in the state where abortion is illegal getting legal and affordable options in other places).

This structural view of the attitude broadens the conceptualization of attitude by offering a convenient framework and the array of research, however, it has faced many problems. The definition offers a heuristic way of thinking about attitude that can be traced in long history (Smith, 1947 – here see Eagly & Chaiken, 1993, p12). Each of

these divisions of attitude, as argued by Ajzen (2014), should have distinction from the other two, that is, responses within each division should relate stronger with each other and less with responses in other two divisions. However, the research in tripartite model is limited to validation of the construct and model proving the distinctiveness of the three components given the lack of explanatory and predictive power in results and lacks implications on the functions of these different components (Pratkanis, 2014; Pratkanis & Greenwald, 1989).

The position that I would like to follow is the most common definition of “attitude as evaluative response” (Ajzen, 2014; Pratkanis, 2014). Attitudes reflect evaluations ranging from positive to negative (Eagly & Chaiken, 1998). A positive attitude can be inferred by the favorable responses to the evaluative object, whereas negative attitude is expressed by the unfavorable responding. Such evaluations may predict subsequent behavioral intentions and actions.

Ajzen’s Theory of Planned Behavior model provides a valuable theoretical framework to elaborate upon this conceptualization. This theory delineates the causal relationship from beliefs, attitude, to intentions and behavior (Ajzen, 1991; 2014). In this framework, attitudes are a function of beliefs, following the expectancy-value approach. Beliefs are linked to attributes of the object with different subjective values and an attitude is the product of the multiplied attributes and its value (Cohen, Fishbein & Ahtola, 1972). It is important to notice that only salient beliefs contribute to an attitude (Ajzen, 2014). Attitude, consequentially, exert influence on behaviors or intentions of behaviors. To note, this causal chain, according to Fishbein-Ajzen framework, does not only follow one direction. That being said, while the behavioral intentions and behaviors

are antecedents of attitude and beliefs, the experience of the behavior can also change existing beliefs and attitudes (Fishbein & Ajzen, 2000).

It is also reasonable to view attitude as knowledge structure stored in memory and the structure of attitude, then, is represented by the object-evaluation and the knowledge structure associated with it (Fabrigar, MacDonald & Wegener, 2005). Furthermore, while the intra-attitude structure refers the structure of a single attitude, the inter-attitude structure refers to the structure of more than one attitude, which is also called the attitude system (Eagly & Chaiken, 1998). Attitude is activated when attitude object is encountered. Although, some responding predisposition may be inherited from genetics, attitudes are only formed after the encounter since attitude requires indirect or direct experience with the evaluative object (Eagly & Chaiken, 1998). Related to the formation of the attitude, the concept of availability denotes the presence of the knowledge structure stored in memory so that an attitude can be activated for the following occurrence of the object and the term accessibility refers to the readiness of activation of the knowledge structure (Eagly & Chaiken, 1998).

Beyond conceptualization and structurization, attitudes serve various functions. Attitudes help us adapt to the environment. We differentiate good stimuli from the bad and accept good stimuli that improve our well-being while reject the bad stimuli that threaten us. This is the fundamental function of the attitude. Functional theory classified functions of attitude into different aspects, including value-expressive function, ego-defensive function, utilitarian function, knowledge function, social adjustive function (DeBono, 1987; Eagly & Chaiken, 1998; Katz, 1960; Maio & Olson, 1999). The functional theory offers a conceptual understanding of different functions of attitude,

however, lacks empirical support due to a lack of adequate operationalization and measures (Eagly & Chaiken, 1993; Fazio & Olson, 2007).

Of particular importance to this research is the object appraisal function of attitude, (Fazio & Olson, 2007). In this train of thoughts, attitude holds constructive power, which influences and helps guide the perceptions of the object and event (Allport, 1933; Fazio, 1986). The constructed perceptions, in turn, may affect how we interpret events and information and encourage attitudinal congruent behaviors. As previously mentioned, attitude serves as predictor of behavioral intentions and behaviors (Ajzen, 2014) and as heuristics that stores evaluation of the object as a cue to solve problem in relation to the attitude object (Pratkanis & Greenwald. 1989). Additionally, corresponding to the object appraisal function is that attitude affects information processing, especially more accessible attitude. For example, Houston and Fazio's research (1989) found that accessibility reinforced the process of attitude-congruent information, which is evaluated more favorably and persists over time. Similarly, Fazio, Powell and Herr (1983) found that both primed and valued (i.e., participants rated the object instead of being primed) positivity and negativity bias the subsequent interpretations. The activation of attitude from memory influences how subsequent information is being processed and accessibility is likely to moderate the effect (Fazio, 2014)

Attitude measurements reflect its conceptual diversity. For instance, Thurstone's quantitative index of attitude focuses on the implicit subjective attitudinal responses on different properties of the object, including cognitive (beliefs and thoughts) responses, affective feelings, and overt past actions or future intentions (Ostrom, 1957; Thurstone, 1929; 1931). Including Thurstone's scale, measure for attitude as evaluative construct

commonly uses structured self-reporting to directly measure an attitude (Fabrigar, Krosnick & MacDougall, 2005). Within this structured approach, for instance, bipolar scale is commonly used (i.e., semantic differential scale). This technique supports a bipolar structure of attitude indicating that attitude can include knowledge structure that are congruent with one's evaluation as well as opposing one's evaluation (i.e., there are positive attitude toward abortion as well as negative ones) (Pratkanis, 1989). The underlying assumption for bipolar scale is that the selection for one end (i.e., positive) is the equivalent to the rejection of the other end (i.e., negative) (Cacioppo, Gardner & Bernston, 1997). Pratkanis (1984) also proposed a unipolar scale measuring attitude from neutral to one extreme (usually the positivity since negative attitude has not yet been the focus of research). This scale, as argued by Pratkanis (1984) supports a unipolar structure of attitude that selective elaboration and learning should be expected with more positive attitude compared to less positive or neutral attitude. Other common techniques include Likert scale, Guttman scale, and single item measure. There is also unstructured way of measuring attitude, oftentimes in the form of open-ended responses (Krosnick, Judd & Wittenbrink, 2005). Contrary to direct measurement, attitude can also be measured indirectly, such as implicit attitude test. The underlying assumption for the indirect measures is that attitude exert influence on their performance of different tasks and attitude can be inferred by the size of the influence. This way, respondents are not required to be aware of their attitudes, which is the opposite with direct measures (Schwarz, 2008).

## **Attitude Strength**

Connecting to previous exploration of attitudes, another factor critical to understand how pre-existing attitude influence information processing the concept of attitude strength. Attitude strength plays a vital role because it determines the extent to which attitudes are stable, resistant to change, and impactful in guiding perceptions, judgments, and behaviors. As strong attitudes are more impactful in shaping information processing leading to selective exposure to attitude-congruent information, weaker attitudes, like ambivalent attitudes, exerts different effect on information processing, perceptions, and even behaviors. With this significance in mind, it is necessary to understand attitude strength itself.

### ***Definition***

The reason why attitude has fascinated social science research for many decades is because of its complexity as a construct. As discussed, attitude is considered as an evaluative response with a degree of favorability, which varies by direction (favorable or unfavorable, like or dislike, positive or negative). Other than its direction, attitude, also varies by its strength. It can be stable and persistent as well as weak and transitory. Those strong attitudes are more influential and consequential to behaviors and information processing as those weak attitudes exerting less influence (Pomerantz, Chaiken & Tordesillas, 1995; Prisin, 1996). Attitude strength has always been thought as holding higher predictive power than direction (valence) for behaviors and other consequences.

Research has identified many attributes under the umbrella of attitude strength, including but not limited to accessibility, crystallization, affective-cognitive consistency,

stability, vested interest, differentiation, conviction etc. (Albelson, 1988; Raden, 1985; Scott, 1959). When it comes to conceptualization, it is more useful to think some attributes as antecedents of attitude strength while others as consequences (Bassili, 2008; Brinol, Petty & Stavraki, 2019). Krosnick and Petty (1995) offered a nuanced way of defining attitude strength as “the extent to which attitude manifest the qualities of durability and impactfulness” to avoid confusion with various associated attributes” (p. 3). In this definition, durability and impactfulness are treated as “causal indicators” of attitude strength, which are also viewed as “phantom variable”, and attitude strength is considered as “a heuristic label” attaching to certain attitudes that are pertinent to certain characteristics (Krosnick & Petty, 1995, p.3).

These two casual indicators, durability and impactfulness, each is further broken down into two manifestations and collectively compose the defining features of attitude strength. The manifestations of durability that received most attention are persistence and resistance (Krosnick & Petty, 1995). The persistence, or so-called stability, refers to the extent to which an attitude remains unchanged in a period of time, even facing challenges. The resistance, on the other hand, refers to the attitude’s capacity to endure an attack (Petty, Haugtvedt & Smith, 2014; Petty & Krosnick, 2014). The manifestations of the impactfulness focuses on the ability to influence information processing and judgment and the ability to guide behavior (Krosnick & Petty, 1995). The first one refers to its capacity to bias and selectively elaborate certain information, while the second one predicts that stronger attitudes are more likely to guide behaviors than the weaker ones. In this sense, Krosnick and Petty (1995) defines attitude strength as the extent to which an attitude holds these four defining features.

Additionally, as noted by Krosnick and Petty (1995), these four defining features, though are conceptually distinctive, are likely to co-occur. Some of the features exert direct influence on the others. For instance, attitudes with high resistance are likely to enhance its persistence as resistant attitude endures attacks and become reinforced in memory. Similarly, persistence influences the impactfulness of an attitude as persistent attitude hold higher predictive power on behaviors (Schwarz, 1978). There lies some indirect relationship among these features as well. For instance, the overt behavior of a congruent attitude can enhance its resistance, which is mediated by the commitment to the attitude (Krosnick & Petty, 1995). Furthermore, it is also argued that the features share some origins such as knowledge and direct experiences. Holding knowledge and direct experience regarding an attitude object is likely increase the resistance and persistence by providing experience and information to support the attitude. Likewise, knowledge and direct experience can increase information processing by offer supporting evidence and assist understanding.

### ***Dimensions of Attitude Strength***

The complexity of attitude strength is partially due to its multi-dimensionality. For instance, Krosnick and Smith (1994) discussed 10 dimensions based on popular literature, including extremity, intensity, certainty, importance, interest in attitude-relevant information, knowledge, accessibility, direct experience, attitudes of rejection and noncommitment, and evaluative-cognitive consistency. Prislun (1996) had similar choices of dimensions, however, decided to break down consistency into evaluative-affective consistency and evaluative-cognitive consistency and similarly break down extremity

into evaluative extremity and affective extremity. Other researchers included ambivalence as one key dimension (Bassili, 2008; Thompson, Zanna & Griffin, 2014).

Each of these dimensions offer unique explanation on qualities of attitude and influence on consequences of attitude. Extremity, for example, refers to the extent of deviation from the mid-point (neutral) to either of the ends (positive or negative), also referred to evaluative extremity (Bassili & Krosnick, 2002; Gunther, 1988; Prislin, 1996). The affective extremity refers to conceptually different aspect of the attitude, which focuses on the emotions related to the attitude object, often times operationalized on deviation from the mid-point on the affective scale (Prislin, 1996). The importance indicates the extent to which a person cares about the attitude object where as interest in relevant information refers to the extent to which an individual is motivated to pay attention to relevant information on an attitude object (Krosnick & Smith, 1994). The knowledge and direct experience are relatively straightforward that describes one's acquired knowledge structure in memory related to the attitude object and one's past experience related to the object (Krosnick & Smith, 1994; Prislin, 1996). Consistency, including both evaluative-cognitive consistency and evaluative-affective consistency, refers to the alignment between an overall evaluation and (1) cognitions about the attitude object's usefulness in achieving goals, and (2) the significance of emotional responses associated with the attitude object (Prislin, 1996). Many more dimensions were examined in the factor analytical studies to see the relations in dimensions and the unidimensionality of attitude strength as a construct.

Petty and Krosnick (2014) in their book organized these dimensions by “1) aspects of the attitude, 2) aspect of the cognitive structure associated with the attitude and

attitude object, 3) subjective beliefs about the attitude and attitude object, and 4) cognitive processes by which an attitude is formed” (p.5). In their categorization, valence and extremity of the attitude are attributes of the attitude itself; Knowledge, consistency, and ambivalence are aspects related to the attitude's structure. Relevance, vested interest, importance, and certainty are associated with the subject's beliefs about the attitude and the attitude object; Lastly, the process refers to elaboration, which indicates the extent to which a person thinks about the attitude object (Petty & Krosnick, 2014).

Each of the dimensions shares the common feature of contributing to the durability and impactfulness of the attitude (Petty & Krosnick, 2014). This commonality in their consequences could suggest that there may exist some relationship among these dimensions. Some research suggests that each of the dimension may overlap and correlate with each other (Pomerantz, Chaiken & Tordesillas, 1993). For instance, Pomerantz, Chaiken and Tordesillas (1993) found that the dimensions they included in their study belong to two factors. Additionally, other researchers also revealed a two or three-factor structure for the dimensions in attitude strength (Bassili, 1996; Gardner & Lastovika, 1979; Prislin, 1996). However, different dimensions were explored in different studies and there is variability regarding the number of factors obtained from past research. Thus, we can hardly draw the conclusion if there exist a multi-factor structure for all possible dimensions related to attitude strength (Bassili, 2008). In addition, Krosnick et al. (1993) argued that the random and systematic measurement error may contributed to the variability in factors obtained from past study. In their more advanced method, they used confirmatory factor analysis instead to seek if there exist one single structure, which was rejected by their results. Krosnick and Smith (1994) also argued that

while some dimensions may belong to one or two factors, others may not relate to any of those factors. This also suggest that attitude strength is not unidimensional and each of the dimensions are conceptually unique. There are some arguments on whether there is a higher order within these dimensions (Krosnick & Smith, 1994). For instance, some argues that ego-involvement to be in higher hierarchy reflecting dimensions such as intensity and importance (Krosnick & Smith, 1994). However, disagreement exists in the way of operationalizing the dimensions, such as centrality and importance, which have been argued to hold higher order, and resulting in difference in relationship among dimensions. Thus, results from past research are insufficient and this remains to be a question that need further research.

The functions of attitude strength, as illustrated from its definition, is to exert influence on the durability and impactfulness of the attitude. This has one imperative consequences to the attitude – resistance to change/persuasion (Eaton, Majka & Visser, 2008). Ample research has demonstrated that strong attitudes tend to be more durable and more resistant to persuasion. That is the commitment to the attitude, confidence of the attitude, certainty of the attitude, and many other dimensions are going to increase the stability of the attitude (Bassili, 1996; Brinol, Petty & Stavraki, 2019; Clarkson, Tormala & Rucker, 2008; Krosnick & Smith, 2014). Fazio (2014) proposed a nuanced explanation why attitude strength increases its durability and resistance. In Fazio’s explanation, attitude strength determines the association between an object and its summary evaluation in memory, so-called accessibility. Stronger attitudes tend to be more accessible, meaning the evaluation is more likely to come to mind when encountering the

attitude object. This accessibility allows the attitude to guide thoughts and behaviors automatically, oftentimes without conscious effort.

The influence of attitude strength also extends to attention and information processing. For instance, attitude importance has been shown as one of the key factors influence motivation to information gathering and biased information processing (Krosnick & Berent, 1991; Pomerant, Chaiken & Tordesillas, 1995; Visser, Krosnick & Simmons, 2003). Certainty, another important dimension of attitude strength, exert different impact on information seeking and processing. In the same study, Visser, Krosnick and Simmons (2003) found that certainty did not predict information seeking. Maheswaran and Chaiken (1991) found that careful information processing was increased by uncertainty. Among these dimensions, attitudinal ambivalence holds a unique position due to its inherent evaluative inconsistency. It exerts critical impact on persuasive efforts, which has triggered long-lasting attention from researchers to explore its effects and implications for persuasion. However, to understand the matter, it is essential to understand its impact on cognitive processing of information, setting up the stage for further persuasive efforts.

### **Attitudinal Ambivalence**

Within attitude strength, attitudinal ambivalence serves as a unique dimension in influencing attitude durability, impactfulness, and even information processing. Understanding ambivalence and its implications is the focus of current research.

### *Its Conceptualization and Definition*

Attitude, as previously mentioned, is commonly operationalized as a continuum ranging from positive to negative. However, this unidimensional approach resists the complexity of attitude, which was later re-examined and proposed the idea of ambivalence. The introduction and exploration of ambivalence as a structural property of attitude took a long time due to the perplexity of ambivalence in its conceptualization and operationalization (Thompson & Zanna, 1995). It is first described as a state of tension between good and bad in the goals (Lavin, 1951 as cited in Thompson & Zanna, 1995). Later, it is conceptualized the “psychological state in which a person holds mixed feelings (positive and negative) towards some psychological object”, emphasizing the subjective feelings associated ambivalence (Gardner, 1987, p.241). Others addressed ambivalence in terms of the inconsistency in evaluation within or across affective, behavioral, and cognitive dimensions (Jonas, Broemer & Diehl, 2000; Thompson, Zanna & Griffin, 2014). Two themes emerged in these definitions, co-existence of positive and negative associations and simultaneous existence of these two associations (van Harreveld, Nohlen, Scheider, 2015). The definition I would like to follow is describing ambivalence as simultaneously holding both positive and negative evaluations (Jonas, Broemer & Diehl, 2000; Kaplan, 1972; Thompson, Zanna & Griffin, 1995).

By definition, attitudinal ambivalence includes three forms: cognitive ambivalence, affective ambivalence, and affective-cognitive ambivalence. Cognitive ambivalence denotes the inconsistent evaluation of an object, which addresses the beliefs inconsistency. Affective ambivalence is pertinent to positive and negative emotions towards the same object (i.e., love and hate). Affective-cognitive ambivalence refers to

the inconsistency between cognition and emotions, which can be regarded as a “heart” versus “mind” conflict. This definition does not include an intentional component in attitude addressing the behavioral aspect of attitude, which is one of the categories of the traditional tripartite model of attitude. The reason for the exclusion, as argued by Jonas et al. (2000) is that ambivalence is understood as a mere quality of the basis of attitude, and the intentional component can be an interesting phenomenon of its own. However, this does not preclude the possibility of intentional/behavioral components entering the basis of attitude as behavioral beliefs (Jonas, Broemer & Diehl, 2000). While this evaluative inconsistency can exist across these different dimensions of attitude, it is not the focus of this study to distinguish these different kinds of ambivalence but rather provide an introduction of different approaches of thinking ambivalence.

Ambivalence must be differentiated from adjacent concepts, such as indifference and cognitive dissonance. The first one refers to the psychological state of lack of arousal and involvement with the attitude object (Baek, 2010) and the second one describes the state of discomfort of having incongruency in attitudes and behavior (Festinger, 1962). While the indifference emphasizes on the state of non-involvement or neutral attitude, which is commonly measured by the mid-point on the attitude scale as “neither positive or negative”, individuals with ambivalent attitude remain to be involved with the attitude object by having both positive and negative attitude at the same time (Kaplan, 1972). On the other hand, while both ambivalence and cognitive dissonance involve inconsistency, ambivalence refers to the inconsistency in evaluations and cognitive dissonance exists in between attitude and behavior (Jonas & Ziegler, 2007). The similarities involve dealing with inconsistency; however, the cognitive dissonance has been shown as a state of

discomfort (Elliot & Devine, 1994) while ambivalence may not necessary be such state. Only limited research supported the idea of ambivalence as an unpleasant state that needs to be resolved, which is usually amplified by other variables, such as need to make a decision (see Newby-Clark, McGregor & Zanna, 2002; van Harreveld, van der Plight & De Liver, 2009). Others think ambivalence as a resolution for the uncertainty (Reich & Wheeler, 2016). In tandem, ambivalence is a complex matter that is distinct from these concepts and needs further discussion.

### *Its Typology*

**Experienced and Formula-based ambivalence.** Attitudinal ambivalence is often conceptualized and measurement in two distinct ways: experience (subjective) ambivalence and formula-based (objective) ambivalence (Costarelli & Colloca, 2007; Jonas, Bromer, Diehl, 2000; Jonas & Ziegler, 2007). Experienced (subjective) ambivalence reflects individual's conscious awareness of existing conflict in their attitudes toward a given object. This term taps into their experience of having inconsistency in their evaluations (Jonas & Ziegler, 2007). The formula-based ambivalence (objective ambivalence) reflects on the potential ambivalence one may hold; however ambivalence may not be salient when they answer the questions (Costarelli, 2011; Jonas, Bromer, Diehl, 2000). This term taps into the indirect measured ambivalence by measuring positive evaluation and negative evaluation in separate questions, which reflects the potential conflicts in their evaluations (Jonas & Ziegler, 2007).

Experienced ambivalence has been tested for correlation with different formula-based ambivalence (DeMarre et al., 2014; Luttrell et al., 2022; Priester & Petty, 1996). Experienced and formula-based ambivalence were significantly correlated, and all

formula-based ambivalence was significantly correlated (Priester & Petty, 1996). However, the correlation between experienced and formula-based ambivalence was only moderate, which suggested that the two are not interchangeable (Jonas, Broemer & Diehl, 2000). It makes sense that formula-based ambivalence, or so-called objective ambivalence, does not imply that people have access to their ambivalence (ambivalence is salient), whereas experienced one directly measures it. For instance, Newby-Clark and McGregor (2002) found that (formula-based) objective ambivalence was significantly related to (experienced) subjective ambivalence at high accessibility, but the relation was not significant at low accessibility. The problem with formula-based ambivalence is that it may lead to the accessibility of aspects of their attitude in other cases will not be accessed. This gives a potential explanation for the moderate correlation between the experienced and formula-based ambivalence. Another potential explanation is that formula-based ambivalence is a predictor of experienced ambivalence. According to Priester and Petty's (1996) analysis, formula-based ambivalence did explain the variance when treating experienced ambivalence as a dependent variable, but not all of it. Another source of variance was experiencing one's own attitude different from that of one significant other. This could be explained by the balance theory (Heider, 1958) that when one evaluates the object differently from a significant other, the tension they experience could lead to the feeling of ambivalence (Priester & Petty, 1996).

According to the hypothesis by Jonas et al. (2000), ambivalence, as structural evaluative inconsistency of the basis of the attitude (as measured by formulas), is different from subjective ambivalence and can generate different strength-related consequences from the consequences of subjective ambivalence. Jonas et al. (2000)

argued that subjective ambivalence may not only originate from structural evaluative inconsistency but also from uncertainty of one's attitude or inconsistency between one's belief and another individual's belief. This leads to the following differences in terms of attitude stability, information processing, and behavioral consequences.

The first prediction is pertinent to structural evaluative inconsistency as measured by formula-based (objective) ambivalence, that evaluative inconsistency leads to less attitude stability. Sharing same thoughts with the "attitudes-as-constructions model" (Erber et al., 1995), attitudes are easily influenced by contexts and because ambivalent individuals hold both positive and negative attitudes toward the object, their attitude responses may vary to a relatively high extent between a context with salient positive cues and a context with salient negative cues. However, univalent individuals' attitude responses may vary to a low extent because they only hold one side of the attitude. This prediction remains inconclusive based on current results. For example, Bargh et al. (1992) found a negative correlation between formula-based ambivalence and attitude stability (measured within a time frame); however, Bassili (1996) was not able to obtain the same results using either formula-based or experienced ambivalence.

The second prediction pertaining to information processing states that structural evaluative inconsistency (formula-based/objective ambivalence) should be associated with less biased processing as well as no enhanced elaboration due to the lack of readily accessible attitude, whereas experienced ambivalence should be linked to more systematic processing in HSM due to the discrepancy in actual confidence and desired confidence. This prediction also remains inconclusive based on current research because the prediction requires measuring ambivalence in both senses and comparing information

processing from these measures. However, research shows that a higher level of ambivalence is associated with more elaboration of the information (Bromer, 1998; Maio et al., 1996) when ambivalence is only measured in one way (subjective ambivalence).

Lastly, in terms of behavioral consequences, it is predicted that ambivalence in structural evaluative inconsistency (formula-based/objective ambivalence) should weaken the behavioral intention and behaviors, but the experienced/subjective one should correspond with a stronger attitude-behavior relationship. The first half prediction is based on the expectation that ambivalent attitudes are easily influenced by context so that when behavior is assessed at a later time, it is expected to have a weakened relationship with attitude because of no salient attitude reflection. The second half is based on the fact that systematic processing has been shown to yield an increased relationship between attitude and behavior, and experienced ambivalence is expected to trigger systematic processing. However, the empirical evidence offers contradictory results. For instance, some found no evidence supporting the decreased correspondence between structural evaluative inconsistency and behavioral intention using formula-based ambivalence (Sparks et al., 1992), some found evidence supporting a stronger relationship between attitude and behavioral intention when ambivalence is manipulated and measured using formula (Jonas et al., 1997), and some found weakened relationship between attitude and behavior (Jonas et al., 2000). The previous research indicated that the correspondence between attitude and intention/behavior is unstable and needs further research.

### ***Consequences of Ambivalence***

Ambivalence was oftentimes introduced under the assumption of consistency theory that ambivalence is a temporal state that would pass when inconsistency is

resolved (Jonas, Broemer & Diehl, 2000). The notion of short-lived traits was reflected in more specific contexts of ambivalence, such as racial ambivalence and sexist ambivalence. The first refers to white people's ambivalence toward black people (Katz, 1981), and the second refers to men's attitude toward women (Glick & Fiske, 1996). However, it is important to note that ambivalence, as a general term, is not necessarily a temporal state but rather can be a stable phenomenon (Jonas, Broemer & Diehl, 2000). This notion reflects a shift in our understanding of ambivalence from initially viewing it as a transient state to recognizing its broader and more enduring implications for attitude and behavior. Additionally, when thinking of ambivalence under the assumption of it as a form of weak attitude, research may suggest that it attenuates the relation between attitude and behavioral intention (Lavine et al., 1998; Sparks, Hedderley & Shepherd, 1992). This might not be true as other studies suggests that ambivalence, due to its inconsistency in evaluation, may cultivate unexpected consequences on information processing and behaviors.

Building upon this perspective of ambivalence as an enduring phenomenon, it is essential to explore its role in attitude strength and subsequent impact on information processing, judgment, and behavior. Research suggests that ambivalence leads to more effortful and deliberate processing of information due to the inconsistency in evaluation and discomfort associated with it (Nordgren, van Harreveld & van der Pligt, 2006). For instance, research found that individuals who hold higher level of ambivalence are better at differentiating strong versus weak arguments, which indicates a form of systematic processing (Maio, Bell & Esses, 1996). Additionally, the impact of ambivalence extends to the attitude-behavior relationship that higher ambivalence is associated with stronger

attitude-behavior relation due to the systematic information processing and cognitive elaboration led by ambivalence (Jonas, Diehl & Broemer, 1997). This is particularly interesting because systematic processing is oftentimes associated with strong attitudes (Petty & Krosnick, 1995). However, as shown in past research, ambivalence, as a form of weak attitude can still yield significant impact on information processing and further extends to behavior.

Of particular importance here is the psychological discomfort associated with ambivalence that seems to bridge the type of processing and ambivalence. Although it is suggested and widely assumed that ambivalence, like cognitive dissonance, is an unpleasant and aversive experience that requires necessary resolute (Conner & Sparks, 2002; Jonas, Broemer & Diehl, 2000), only limited studies have lent support for this notion. For instance, through a pill manipulation (participants received either a sugar pill that was told them to have either tense or relaxed effect), Nordgren, van Harreveld, and van der Pligt (2006) found that ambivalent participants who were given the tense pill reported less aversive emotion as they attributed the emotion to the pill, while ambivalent participants who were given relaxed pill reported greater negative emotions. This supported the notion that experiencing ambivalence is unpleasant.

Others think the link between ambivalence and aversive experience is a more complex matter. For instance, a series of studies confirmed the discomfort associated with ambivalence, but only when a decision had to be made, and the association was mediated by other factors such as uncertainty about the decision (Newby-Clark, McGregor & Zanna, 2002; van Harreveld, van der Pligt & De Liver, 2009). The aforementioned conditions are situational factors that compel individuals to make effortful cognitive

processing, inferring a situation when individuals are cognitively aroused by their commitment to a decision. This situation factor of commitment to a decision amplifies the psychological discomfort of ambivalence and thus triggers more effortful processing of information.

Beyond the discussion of the relationship between psychological discomfort and ambivalence, research also explores the possibility of ambivalence is not an aversive state but instead a desirable resolution (Reich & Wheeler, 2016). For example, one study found that when individuals are uncertain if their decisions are correct, cultivating ambivalence becomes a protective state for them to reduce risk aversion (Reich & Wheeler, 2016).

This study also proposes two distinct forms of ambivalence to explore variations of impact of ambivalence. Research that examined discomfort of ambivalence and biased processing triggered by ambivalence also noted that such selective processing happens under the presence of dominant position in ambivalence (holding a stronger preference toward positive or negative) (Nordgren, van Harreveld & van der Pligt, 2006; van Harreveld et al., 2012). While these studies shed light on how ambivalence with a dominant position influence information processing, what happens when ambivalence arises without a clear preference or dominant position. Synder and Tormala (2017) briefly introduced the term balanced to describe ambivalence characterized by equal parts of positive and negative evaluation. In their work, they also outlined a detailed approach to document the dominant evaluation in ambivalence and less dominant position. However, it is not the focus of this study to address skewness in term of valance asymmetry. Thus, I propose a general term “skewed ambivalence” referring to ambivalence that has a dominant position.

The forms of ambivalence provide a nuanced understanding of ambivalence, particularly in its role in information processing. It has to be distinguished from the level of ambivalence. As suggested by the objective measure of ambivalence (formula-based), ambivalence is higher if positive and negative evaluation are equally weighted and exhibit the same ratings compared to when they are rated differently. When both positive and negative evaluations are rated 4 on a 5-point scale, the ambivalence is greater because of the evenly matched opposing evaluations, which leads to heightened tension. In contrast, if the positive evaluation is rated at 2 and the negative evaluation at 4, the imbalance reduces the perception of ambivalence because one evaluation is clearly winning over the other. Thus, a perfect balanced score shall be considered as higher level of ambivalence. However, based on such calculation, it is also true that ambivalence with a rating of 3 on positivity and 5 on negativity has a same score as ambivalence with a rating of 2 on positivity and 2 on negativity. While the level of ambivalence may be the same, the processing strategy and its underlying motivation may not. This highlights that the level of ambivalence, as derived from objective measure, does not capture the full complexity of ambivalence. In the same vein, skewed ambivalence is not equivalent to weak attitude. Although traditionally ambivalent attitude is considered as weaker in the respect of stability and resistance to persuasion compared to non-ambivalent attitudes (De Liver, De Pligt & Wigboldus, 2007), the skewed ambivalence may be stable and persistent in the dominant evaluation. This shall be illustrated with the example of a rating of 5 on positivity and 2 on negativity. Holding a strong preference in one position indicates that one side of evaluation is stronger attitude while the other side is weaker. Generalizing skewed ambivalence as a form of weak attitude could not tell entire story.

By contrast, examining the form of ambivalence offers richer insights into motivation of processing under ambivalence.

### **Motivated Information Processing**

All the previous discussion on attitude, attitude strength, and especially key focus of the current study, attitudinal ambivalence comes down to the implications on motivated information processing of conflicting information. Ambivalence, due to its inherent inconsistency in evaluation, influence information processing in a unique way than univalent attitudes. This influence varies depending on the specific type of ambivalence—balanced or skewed, as proposed by this study. Before discussing the connection between types of ambivalence and types of motivations behind cognitive processing of conflicting information, it is essential to review the theoretical framework guiding motivated information processing.

Research oftentimes adopts the Heuristic- Systematic Model of Information Processing to study the cognitive processing under ambivalence (Chaiken, 1980; Chaiken, Liberman & Eagly, 1989; Jonas, Broemer & Diehl, 1997; 2000). As the Heuristic-Systematic model (HSM) argues, individuals process information through two distinct modes: heuristic processing and systematic processing (Chaiken, 1980). The systematic processing involves effortful elaboration of available information including deep thinking and reasoning of arguments and other factors. Such careful thinking and reason also require significant amount of cognitive effort, which indicates that systematic processing can take place 1) when a person have cognitive capacity and 2) the person is motivated to devote this attention (Chaiken & Ledgerwood, 2012). The heuristic processing, on the other hand involves less cognitive effort and relies heavily on mental

shortcuts to make the judgment. The mental shortcuts are also referred to as heuristics that are similar to knowledge structure stored in our mind but vary based on availability, accessibility, and perceived reliability (Chaiken & Ledgerwood, 2012). They can be activated consciously and unconsciously. These heuristics may include easy-to-notice source characteristics, such as expert versus non expert, or intuitive rules, for example “long arguments are stronger arguments”. The underlying intention for processing using heuristics is to serve the economic purpose and save cognitive energy.

This theory operates based on two principles working together to determine the extent or depth of processing in a given context, *the least effort principle* and *sufficiency principle* (Chaiken, 1980; Chaiken & Ledgerwood, 2012). Guided by the least effort principle, the heuristic processing suggests that individuals tend to be economic driven and would like to minimize possible effort in information processing (Chaiken, 1980; Chaiken & Ledgerwood, 2012; Chen, Duckworth & Chaiken, 1999). As a result, the heuristic processing is often favored over more cognitive-demanding systematic processing. However, the other principle, sufficiency principle also comes into play by balancing minimizing cognitive effort with maximizing confidence of their judgment (Chen, Duckworth & Chaiken, 1999). The sufficiency principle suggests that to put judgmental confidence in a continuum, there is one point representing their desired confidence and the other point reflecting the current level of confidence, one needs to reach the sufficient threshold to be assured that their judgment meets their operative needs (Chen, Duckworth & Chaiken, 1999). Thus, one needs to balance the need to meet sufficiency threshold of

their confidence and the economic motives of saving effort when deciding the extent of information processing.

The model also recognizes three types of motives: accuracy motivation, defense motivation, and impression motivation. Accuracy motivation predicts information processing in an open-minded and objective manner (Chaiken & Ledgerwood, 2012; Chen, Duckworth & Chaiken, 1999). This motive does not predict which mode of processing per se, but with stronger motivation for accuracy and with adequate cognitive capacity, individuals are more likely to engage in systematic processing. This allows them to meet their high preferred level of confidence in their judgment, or so-called sufficiency threshold (Chen, Duckworth & Chaiken, 1999). When motivation or cognitive resources are low, accuracy-motivated individuals may rely on heuristic cues that are perceived as relevant to achieve their accuracy goals (Chen, Duckworth & Chaiken, 1999).

Defense motivation reflects the desire to form judgments congruent with deeply held self-definitional beliefs, those closely tied to an individual's value, social identities, or personal qualities (Chen, Duckworth & Chaiken, 1999). This motivation tends to drive individuals to protect their sense of self, leading them to process information selectively (Giner-Sorolla & Chaiken, 1997). Impression motivation involves the desire to make judgment that achieve social goals in considerations of the interpersonal consequences related to those goals in a given context (Chen, Duckworth & Chaiken, 1999). This motivation, like defensive motivation, is likely to lead to selective processing, but in this case, the focus is on achieving social goals rather than protecting self-definitional beliefs (Chen, Shechter & Chaiken, 1996).

These two motivations, like accuracy motivation, can lead to either heuristic or systematic processing. However, the selective processing rather than open-minded processing is likely to happen under these motives (Chaiken & Ledgerwood, 2012). This selectivity usually occurs without awareness. In defensive motivation, the heuristics that aligned with one's value, belief, and self-interest are selected to confirm one's preferred position (Chen, Duckworth & Chaiken, 1999). Heuristics are used in the same way as they are under accuracy motivation but in a selective manner (Chen, Duckworth & Chaiken, 1999). When cognitive capacity is efficient and preferred confidence is high, then systematic processing is likely to occur but with selectively scrutiny and evaluation of the evidence (Chen, Duckworth & Chaiken, 1999). In this way, evidence that align with one's position will be evaluated more favorably than opposing evidence. Similarly, both heuristic and systematic processing can be adopted under impression motivation. With sufficient cognitive capacity and high motivation, systematic processing is likely to be activated to fulfill social purposes. For instance, Chen and colleagues (1996) found that participants who held impression motivation engaged in systematic processing in a way that aligns with the anticipated attitude of the person they expect to interact with. In this circumstance, sufficiency threshold reflects individual's confidence in justifying their social goals. Heuristic processing can suffice this need as well under the circumstance of minimal impression motivation (Chen, Duckworth & Chaiken, 1999).

While these different types of motivations do not necessarily determine which mode of processing is used, they influence whether information is processed in a biased manner or not. The connection between motivations and modes of information processing arises from the interplay of the two leading principles: the least effort principle and the

sufficiency principle (Bohner, Moskowitz & Chaiken, 1995). As Bohner and colleague (1995) argued, the sufficiency threshold is highly reflective of the underlying motivations. When sufficiency threshold instigated by the motives is low, one follow heuristic processing. On the contrary, when sufficiency threshold influenced by the motive is high, systematic processing can take place. Moreover, the manner in these two modes will be shaped by the motives that triggered it (Bohner, Moskowitz & Chaiken, 1995).

In fact, research suggests that these systematic and heuristic processing can co-pilot in an additive or interactive manner (Bohner, Moskowitz & Chaiken, 1995). The first one is called additive hypothesis (Bohner, Moskowitz & Chaiken, 1995), which states that judgment can be a function of both content-related reasoning (systematic processing) and cue-related reasoning (heuristic processing). However, this additive manner is hard to detect due to the fact that the balance between content-related information and cues-related information can vary drastically. In persuasion studies, the influence of heuristic cues may be overlooked since most persuasion studies featuring both types of information included more persuasive arguments (content-related information) than heuristic (Bohner, Moskowitz & Chaiken, 1995; Chaiken, Liberman & Eagly, 1989). The attenuation effect may come into play, which proposes that systematic processing of content information may attenuate the validity of heuristic cues (Chaiken, Liberman & Eagly, 1989). Thus, although both modes of processing may co-occur, the content-related information may outweigh the heuristic information (Bohner, Moskowitz & Chaiken, 1995).

Another way heuristic and systematic processing can interact is described in the bias hypothesis, which suggest that heuristic processing can influence systematic processing when provided information is ambiguous (Chaiken, Liberman & Eagly, 1989). For example, under high accuracy motivation with adequate processing capacity, heuristic cues may lead individuals to develop expectations about the valence or the strength of the message, which can bias their thoughts about the message if the message is open to multiple interpretation (Bohner, Chaiken & Hunyadi, 1994; Bohner, Crow & Schwarz, 1992).

The contrast hypothesis suggests that heuristic-based expectations can result in contrasting interpretation of individual information (Bohner, Moskowitz & Chaiken, 1995). For instance, if an individual truly values expert credential and the information presents expertise cue, they are likely to expect communicator's arguments to be highly compelling and this initial reaction to the heuristic will be used as a benchmark to evaluate the actual argument presented. If the arguments are only moderately convincing, the individual may critically evaluate more and form a negative judgment of the communicator's position compared to if no expertise cue had been present (Bohner, Moskowitz & Chaiken, 1995). However, this assumption has not received much research attention and yet to be validated in the HSM framework (Bohner, Moskowitz & Chaiken, 1995).

Based on these assumptions, heuristic processing and systematic processing can not only co-occur in an additive way but can also interact with each other. The manner of the interaction is based on various factors, such as ambiguity of information and extremity of the heuristic cues (e.g. level of expertise) (Bohner, Moskowitz & Chaiken,

1995). For instance, more ambiguous content (more open to interpretation) may lead to a biasing effect whereas extremity of heuristic cues, specifically perceive level of expertise can trigger higher expectations about the argument from message recipients, which may lead to an outcome opposite to what the heuristic cue initially implied (Bohner, Moskowitz & Chaiken, 1995).

### **An Attitudinal Ambivalence Perspective**

The HSM provides valuable insights into how information is processed and how attitude change occurs. Although not the focus of current study, research suggests that attitudes formed through systematic processing are stronger and more impactful compared to attitudes formed through heuristic processing (Chaiken, 2014; Eagly & Chaiken, 1993). Conversely, the strength of attitude also influence the depth of information processing and even its underlying motives (Eaton, Majka & Visser, 2008; Krosnick & Petty; 2014; Miller & Peterson, 2004). Considerable research has examined different aspect of attitude strength on information processing, such as knowledge (Wood, Rhodes & Biek, 2014), attitude importance (Boninger, et al., 2014), and personal involvement (Chaiken, 1980; Giner-Sorolla, Chaiken & Lutz, 2002; Meyers & Maheswaran, 2004; Thomsen, Borgida & Lavine, 2014).

Of particular interest is the function of attitude ambivalence in motivated information processing. It is known that people with strong prior beliefs are more likely to process information biasedly to align with their pre-existing position. This tendency is referred to as confirmation bias and is closely related to the defensive motivation in the HSM model (Lieberman & Chaiken, 1992; Maier & Richter, 2013; Nickerson, 1998; Van Strien et al., 2014). Ambivalent individuals, who simultaneously hold both positive and

negative attitude, tend to be more open-minded and accuracy driven. This openness makes them more receptive to both sides of the arguments, potentially leading to a more balanced processing of information, less biased towards a particular side, and higher likelihood of persuasion (Erber et al., 1995). Research suggests that ambivalence is associated with less attitude stability and more elaboration of the information (Bargh et al., 1992; Bromer, 1998; Maio et al., 1996). However, these findings are not definitive because the effect of ambivalence on information processing can also be influenced by other variables.

As mentioned in earlier section, it is essential to recognize that ambivalence can manifest in diverse forms. Ambivalence is measured along a continuum that considers both the intensity of positive and negative evaluations and the similarity in their magnitude. In this vein, when both (positive and negative) components are equivalent in magnitude, ambivalence is in a more balanced form; whereas when either component weighs more than the other, ambivalence exists in a skewed form. I argue that ambivalence should be further broken down into subgroups, distinguishing between equivalent (or balanced) ambivalence (where both components have similar magnitude) and skewed ambivalence (presence of a dominant component). The distinctions in typology might offer a nuanced way to further attenuate the motivations under ambivalence, especially in the context of conflicting risk information and decision-making.

Specifically, in a situation of skewed ambivalence, individuals experience a dominant attitude alongside the feelings of conflict or ambivalence. Under this state, individuals have a clearer preference for their dominant attitude position, which may

drive them to engage in defensive motivation of information processing and selectively attend to information that supports their dominant viewpoints. Previous studies that examined the ambivalence as an unpleasant state oftentimes picked up ambivalence that already have a preferred position, in other words skewed ambivalence (Nordgren, van Harreveld & van der Pligt, 2006; van Harreveld et al., 2012). These studies showed that selective processing plays a role in reducing discomfort associated with ambivalence by reinforcing their preferred position, which allowed to maintain confidence despite opposing attitudes. This is in line with the mechanism of defensive motivation, which aims to protect self-relevant beliefs or preferred position.

On the other hand, balanced ambivalence, which is proposed as the presence of similar magnitude of positive and negative attitude, lacks a clear preference for the position. As a result, individuals with this type of ambivalence are less likely to adopt a defensive motivation but may be motivated by a desire for accuracy in their judgment. Though inconsistent findings in empirical evidence, the true state of ambivalence assumes that individuals are more open-minded to both sides of the arguments, thus pursuing an impartial systematic processing (Rothman et al., 2017). This approach may exist due to a search for clarity and goal for reducing uncertainty in their attitude. By engaging in such exploration, individuals with balanced ambivalence are more likely to reach well-informed decisions.

Furthermore, it is important to note that the psychological experiences associated with ambivalence appear to play a pivotal role (Nordgren, van Harreveld & van der Pligt, 2006; van Harreveld et al., 2012). Research suggests that ambivalence often elicits a feeling of discomfort or aversiveness since holding conflicting thoughts can be mentally

taxing and emotionally upsetting. And this aversiveness may explain why individuals with skewed ambivalence turn to defensive processing, as suggested by previous studies (Nordgren, van Harreveld & van der Pligt, 2006; van Harreveld et al., 2012). Also, this aversiveness may drive individuals with balanced ambivalence into a pursuit of accuracy by acquiring comprehensive information to reduce uncertainty and achieve a sense of resolution.

While the connection between ambivalence and defensive information processing is at least documented in previous research, the link between ambivalence and accuracy-motivated information processing is less developed. Similarly, the mediating role of psychological discomfort in the relationship between ambivalence and types of motivation remain underexplored. Hence, this research aims to examine the impact of types of ambivalence on the choice of processing strategy and whether psychological discomfort (as amplified by the need to make a decision) mediates such relationship. This research takes the assumption from HSM that the extent of processing is likely determined by the level of motivation and hypothesizes that the strength of underlying motivations moderates this relationship.

### ***Hypothesis***

**H1:** Aversiveness will mediate the effect of ambivalence level on motivation type when there is a need to make a decision but not when there is no need to make a decision.

**H1a:** In the case of skewed ambivalence, individuals are more likely to adopt a defensive motivation when there is a need to make a decision than when there is no need to make a decision.

**H1b:** In the case of balanced ambivalence, individuals are more likely to adopt an accuracy motivation when there is a need to make a decision than when there is no need to make a decision.

**H2:** The type of processing is moderated by the level of motivation - when motivation is high systematic processing is likely to occur and when motivation is low heuristic processing is likely to take place.

**H2a:** In the case of skewed ambivalence, individuals with high defensive motivation are more likely to adopt a systematic processing than individuals with low motivation.

**H2b:** In the case of balanced ambivalence, individuals with high accuracy motivation are more likely to adopt a systematic processing than individuals with low motivation.

## CHAPTER 3

### PILOT STUDY METHOD AND RESULTS

#### Experiment Design

The objective of the pilot study was to test a thought-listing priming technique for different forms of ambivalence. Participants were recruited via Prolific for the pilot study, a research sampling panel. Recruitment was conducted in separate batches. The initial batch (N = 288) gave preliminary insights but not yet clear enough results. Therefore, a second batch (N = 120) was recruited, which provided clear results of the effectiveness of the priming technique. A task was generated on Prolific that gives users a title and description of the study including the amount of compensation and the amount of time it takes to complete. Participants are free to choose the task that they are interested in taking from various tasks. Participants who chose this task will see the link to the Qualtrics survey and proceed to participate in the study.

The pilot study was designed to test 1) the optimal number of thoughts listed to generate skewed versus balanced condition and 2) the function of relevance in generating ambivalence attitude. The pilot study used a 6 (number combinations in thought-listing to generate ambivalence<sup>1</sup>) x 2 (relevance: relevant vs. non-relevant) factorial design. While the number of thoughts that were asked to be listed was manipulated as a between subject factor, relevance was manipulated as a within-subject factor. The number of thoughts participants were asked to list was manipulated as a between-subject factor to prevent

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<sup>1</sup> The thought-listing priming technique involved six specific combinations of positive and negative thoughts designed to elicit different forms of ambivalence: 5-1, 4-2, 3-3, 7-1, 6-2, and 4-4. For example, participants assigned to the 5-1 group were instructed either to list 5 positive thoughts and 1 negative thought or, conversely, 5 negative thoughts and 1 positive thought regarding the given topic.

carry-over effect that may arise if participants experienced multiple thought-listing conditions. The relevance (high versus low) was treated as a within-subject factor to allow a direct comparison of the participants' responses to priming ambivalence across relevant and irrelevant topics.

Specifically, upon passing the screening question of residence (currently reside in the United States) and age (at least 18 years old), participants were asked to reflect on a topic that they felt ambivalent about ("having conflict thoughts") and was important to them, then they were assigned to one of the conditions to prime either skewed or balanced ambivalence. After their thought-listing assignment, they were asked to answer questions regarding their general attitude, ambivalence, relevance, and certainty toward the topic of their choice. Next, they were asked to reflect on a topic that they only felt ambivalent ("having conflict thoughts") but not important to them. They went through the same random assignment of one of the thought listing conditions and answered questions regarding their attitude, ambivalence, and certainty toward the second topic of choice.

For the thought listing conditions, 6 items and 8 items were selected as the number for first round testing. Participants were randomly assigned to either 6-item or 8-item thought listing assignments. Within 6-item thought listing groups, participants were randomly assigned to one of the conditions: 1) 5 positive and 1 negative thoughts (N = 25), 2) 1 positive and 5 negative thoughts (N = 26), 3) 4 positive and 2 negative thoughts (N = 27), 4) 2 positive and 4 negative thoughts (N = 26), and 5) 3 positive and 3 negative (n = 49) thoughts about the topic. The last condition with even number of thoughts was designed to elicit balanced ambivalence and the rest was designed to elicit skewed

ambivalence. Within 8-item thought-listing groups, participants were randomly assigned to one of the following conditions: 1) 7 positive and 1 negative thoughts (N = 22), 2) 1 positive and 7 negative thoughts (N = 22), 3) 6 positive and 2 negative thoughts (N = 26) , 4) 2 negative and 6 positive thoughts (N = 22), and 5) 4 positive and 4 negative thoughts (N = 43) on the topic. Similarly, the conditions with uneven number of thoughts were designed to generate skewed ambivalence and last group with even number of thoughts was used to generate balanced ambivalence. Listed thoughts were looked through manually making sure the number of listed thoughts and contents of the thoughts aligned with the condition assigned. Take gun regulation as an example, some of the positive thoughts listed for gun regulation are “Keeping people from obtaining weapons of destruction”, “Showing people they may not need weapons”, and “Enforcing less harmful machinery”. Examples of the negative aspect of gun regulation are “People who do not have harmful intent cannot protect themselves as well”, “Black Market Growth: Tighter regulations can lead to an increase in illegal gun”, and “Economic Impact: The firearms industry, including manufacturing and sales, could suffer significant financial losses, affecting jobs and revenue”.

## **Measures**

**Overall Attitude** toward the topic was measured asking participants their overall attitude toward the topic on a 5-point scale (1= not at all positive to 5 = extremely positive) ( $M=3.31$ ,  $SD=1.26$ ).

**Objective/potential ambivalence** was measured indirectly with two items on a 7-point scale that asks the respondent to rate how positive the positive qualities of e-cigarettes were while ignoring the negative qualities and how negative the negative

qualities of the subject were while ignoring the positive qualities (Kaplan, 1972). The “Griffin” formula (Thompson, Zanna & Griffin, 1995) will be used to calculate an overall ambivalence score by subtracting the absolute difference between two ratings from the average of the two:  $(P + N)/2 - |P - N|$  (the P is the positive rating and the N is the negative rating) The rating will be used to indicate **equivalent/balanced ambivalence** and **skewed ambivalence** on a relative level by comparing their positive ratings against the negative ratings. Furthermore, the positive and negative ratings were also examined independently to assess participants’ overall **positivity** and **negativity** toward the topic separately.

**Subjective/felt ambivalence** was assessed with 3 items on a 5-point scale. The first item asked participant to indicate how conflicted they felt about the topic (1=not conflict at all to 5 = maximum conflict) ( $M = 2.93, SD = 0.96$ ). The remaining two items measured their agreement with the statements “I feel torn between the two sides of (risks and benefits of) the topic” ( $M = 2.93, SD = 0.88$ ) and “I have conflicting thoughts about the topic” ( $M = 3.13, SD = 0.97$ ). (1 = completely disagree to 5 = completely agree) (Priester & Petty, 1996). These three items were average together to create a composite variable ( $M = 3, SD = 0.83$ ; Cronbach’s  $\alpha = 0.73$ ).

**Attitudinal certainty** was measured by asking participants how certain they are of their attitude toward the topic (1= not at all certain to 5 = extremely certain) ( $M = 4.16, SD = 0.92$ ) (Fazio & Zanna, 1978).

**Attitude Correctness** was measured by asking participants how certain they are that their attitude toward the topic is the correct one to have (1= not at all certain to 5 = extremely certain) ( $M = 3.96, SD = 1.04$ ).

**Weight of the attitude** was measured on a five-point scale with 1 anchored as “not at all important” to 5 as “extremely important” separately on each point that participants listed in the thought-listing process.

**Perceived relevance** (manipulation check) was measured with a three-item semantic differential scale anchored at 1 as “not very important to me,” “not personally relevant to me,” and “will not affect me” to 5 as “very important to me”, “very personally relevant to me”, and “will affect me” (Haugtvedt & Wegener, 1994). Items were averaged to create a composite variable ( $M = 3.35$ ,  $SD = 0.72$ ; Cronbach’s  $\alpha = 0.71$ ).

## **Sample**

Participants were recruited through Prolific on a rolling basis based on the preliminary findings and requirements that emerge during the course of the study. A sample of 288 U.S. adults were collected for the first round of data collection. To be eligible for participation, individuals were validated to be over 18 years old and had to reside in the United States. The sample had a median age of 36 and contained 118 males, 165 females, and 3 participants identified as non-binary. The majority of participants had a bachelor’s degree (36.81%) followed by some college credit without degree (19.79%), master’s degree (12.85%), associate degree (10.42%), and high school diploma or equivalent (10.76%). Smaller proportions reported a professional degree (3.82%), trade/technical/vocational training (1.74%), doctorate degree (2.43%) and high school without diploma (1.39%). The majority of the sample was non-Hispanic (91.32%). Sixty-five percent of participants identified as White, 19.13 % as African American, 13.36% as Asian, and the rest as biracial or multiracial. Forty-four percent identified themselves as Democrat, 16.67% were Republican, 35.07% were independent, and the rest were

something else. On the 5-point scale from conservative to liberal, participants were skewed toward liberalism ( $M=3.24$ ,  $SD = 1.31$ ).

### **Results of the First Cohort Data**

To test whether thought-listing activity effectively generated skewed versus balanced ambivalence, Welch's independent sample t-tests were conducted, comparing objective ambivalence scores across different thought-listing conditions. Specifically, objective ambivalence scores were compared between conditions with uneven distribution of positive and negative thoughts (skewed conditions, i.e., 5-positive-1-negative) and conditions with equal distribution of positive and negative thoughts (balanced ambivalence, i.e., 3-positive-3-negative). These tests were performed within 6-item and 8-item groups separately in both relevant and non-relevant conditions. For example, participants in the 5-positive-1-negative group were compared to those in the 3-positive-3-negative group on objective ambivalence; this difference was not significant ( $t(39.87) = 0.40$ ,  $p = 0.69$ ). Similarly, skewed conditions within 6-item groups were compared against balanced condition in 6-item group (3-positive-3-negative group) separately and same comparisons were conducted within 8-item thought listing groups. The results only indicated one marginally significant difference between 1-positive-5-negative and 3-positive-3-negative group ( $t(55.31) = 1.93$ ,  $p = 0.059$ ) and the rest was insignificant. Overall, these results indicate that thought-listing manipulation had limited influence on objective ambivalence scores in skewed and balanced conditions.

To further gauge the difference in objective ambivalence score between skewed and balanced conditions, skewed groups with similar skewness were combined and compared to balanced group. These skewed conditions with similar skewness (i.e., 5-

positive-1-negative and 1-positive-5-negative) were first tested for difference, with no significant difference in any analyses, and then pooled together. For instance, the 5-positive-1-negative and 1-positive-5-negative groups were pooled and then compared with the 3-positive-3-negative group in both relevant and non-relevant conditions. Similarly, the 4-positive-2-negative and 2-positive-4-negative groups were combined and tested against the 3-positive-3-negative group, the 7-positive-1-negative and 1-positive-7-negative groups were combined for comparison with the 4-positive-4-negative group, and 6-positive-2-negative and 2-positive-6-negative groups were pooled together for comparison against 4-positive-4-negative group in both relevant and non-relevant conditions. Of these pooled comparison, only 6-positive-2-negative group was significantly different from 4-positive-4-negative group ( $t(86.4) = -2.09, p < 0.05$ ). No other comparisons were significant. Again, the 8-thoughts-listing had limited effectiveness in generating difference in objective ambivalence score between skewed and balanced conditions.

To further clarify whether skewed and balanced conditions differed specifically on *positive* versus *negative* ratings (rather than only on an overall objective ambivalence score), Welch's independent sample t-tests were conducted comparing participants' positive ratings and negative ratings separately across skewed and balanced conditions. For instance, positive rating in 5-positive-1-negative group was compared against positive ratings in 3-positive-3-negative group, separately within both relevant and non-relevant condition. Neither 5-positive-1-negative or 1-positive-5-negative group was significantly different from 3-positive-3-negative group in neither relevant nor non-relevant conditions. However, when such comparisons were conducted on negative

ratings, a significant difference was found between 1-positive-5-negative group and 3-positive-3-negative group in non-relevant condition ( $t(57.13) = 2.09, p < 0.05$ ).

Comparisons between 4-positive-2-negative and 3-positive-3-negative groups (both relevant and non-relevant) were non-significant for both positive and negative ratings, whereas 2-positive-4-negative differed significantly from 3-positive-3-negative in negative ratings under the non-relevant condition ( $t(50.9) = 2.88, p < 0.01$ ). Same tests were conducted between skewed and balanced conditions in 8-item groups in both relevant and non-relevant condition. Only positive ratings for 1-positive-7-negative group were significantly different from 4-positive-4-negative group ( $t(46.77) = -.22, p < 0.05$ ).

Taken together, these results suggest that only 1-positive-5-negative and 1-positive-7-negative thought-listing conditions created significantly different positive ratings and negative ratings than their corresponding balanced condition.

Despite these largely null findings, the directions of positive and negative ratings provide useful insights (see Table 1). First, the premise for skewed groups was that when the positive thought listing outnumbered the negative ones, positive ratings of the issue should be higher than the negative one, and vice versa. Among the negatively skewed groups (1-positive-5-negative, 2-positive-4-negative, 1-positive-7-negative, and 2-positive-6-negative) in both relevant and non-relevant condition, only negative ratings of the 1-positive-5-negative group in relevant condition and 2-positive-4-negative group in non-relevant conditions strictly followed this prediction that negative ratings would exceed the positive ones. Nevertheless, looking at the negative ratings of the negatively skewed groups and their positively skewed counterparts (5-positive-1-negative, 4-positive-2-negative, 7-positive-1-negative, and 6-positive-2-negative), the negative

ratings were higher and the positive ratings were lower in the negatively skewed groups, suggesting the priming technique exerted an influence in the intended direction.

Moreover, the overall attitude ratings further supported this notion that priming was at least partially effective (see Table 4). Specifically, the overall attitude ratings of the negatively skewed groups were constantly lower than the positive ones, which indicated that even though the skewness is not directly showing in the positive and negative ratings, it is reflected in the overall ratings of attitude.

The 6-item groups appeared more effective in generating higher positive ratings in the positively skewed conditions, higher negative ratings in the negatively skewed conditions, and higher objective ambivalence scores (see Table 1 & 2). For instance, looking at the 5-positive-1-negative group and 7-positive-1-negative group in both relevant and non-relevant conditions, the positive and negative ratings of the 7-positive-1-negative group are lower than the 5-positive-1-negative group. This possibly indicated that it is harder for participants to come up with valid arguments in 8-item groups. Same applies on the 4-positive-2-negative and 2-positive-4-negative groups compared with 6-positive-2-negative and 2-positive-6-negative groups in both relevant and non-relevant conditions. Furthermore, the same pattern exists in the subjective ambivalence score. Together, these observations indicate that 6-item groups yielded more reliable data than the 8-item groups.

Regarding relevance's function on ambivalence, there were no significant difference between relevant and non-relevant conditions in objective ambivalence, except for the 4-positive-4-negative groups ( $t(175.62) = 2.34, p < 0.05$ ). Nevertheless, the positively skewed groups in relevant conditions tended to produce higher positive ratings

than groups in non-relevant conditions, while negatively skewed groups in non-relevant conditions tended to produce higher negative ratings than those in relevant conditions.

This suggests the relevance may have an inconsistency impact on ambivalence. Last but not least, looking at the certainty and correctness of the attitude, groups in relevant conditions had higher score compared to groups in non-relevant conditions.

Altogether, I decided to proceed with relevant condition only with 6-item groups in the second round of data collect for the pilot study to further clarify the pattern in these groups.

Table 1. Descriptives of positive and negative ratings by condition in the first pilot study

		Relevant Group				Non-relevant Group			
		Positive Ratings		Negative Ratings		Positive Rating		Negative Ratings	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
6-item thought listing groups	5 positive 1 negative	4.23	0.99	3.08	1.13	4.04	0.98	3.52	1.29
	1 positive 5 negative	3.48	1.16	3.62	1.13	3.81	1.06	3.73	0.87
	4 positive 2 negative	4.3	1.18	3.22	1.48	4.04	0.85	3.15	1.03
	2 positive 4 negative	4.1	1.07	3.65	1.27	3.46	1.03	3.96	1
	3 positive 3 negative	3.92	1.15	3.15	1.36	3.65	0.99	3.27	1
8 item thought listing group	7 positive 1 negative	4.1	1.22	3.05	1.2	3.77	0.92	3.05	1.09
	1 positive 7 negative	3.41	1.34	3.37	1.28	3.73	0.77	3.27	1.24
	6 positive 2 negative	4.28	1.06	3.4	1.19	3.73	1.15	3.15	1.22
	2 positive 6 negative	3.87	1.1	3.3	1.33	3.86	1.13	2.77	1.48
	4 positive 4 negative	4.08	1.13	3.56	1.38	3.63	0.9	3.32	1.02

Table 2. Descriptives of objective ambivalence score by condition in the first pilot study

		Relevant Group		Non-Relevant Group	
		Mean	SD	Mean	SD
6-item thought listing groups	5 positive 1 negative	2.12	1.55	2.46	1.78
	1 positive 5 negative	2.59	1.29	2.92	1.29
	4 positive 2 negative	1.72	2.03	2.26	1.32
	2 positive 4 negative	2.33	1.62	2.6	1.41
	3 positive 3 negative	2.01	1.74	2.3	1.42
8 item thought listing group	7 positive 1 negative	2.05	1.74	2.32	1.38
	1 positive 7 negative	1.87	1.77	2.32	1.45
	6 positive 2 negative	2.56	1.72	2.1	1.66
	2 positive 6 negative	1.8	1.64	1.32	1.89
	4 positive 4 negative	2.3	1.9	2.43	1.34

Table 3. Descriptives of subjective ambivalence score by condition in the first pilot study

		Relevant Group		Non-Relevant Group	
		Mean	SD	Mean	SD
6-item thought listing groups	5 positive 1 negative	2.87	1.3	2.92	0.88
	1 positive 5 negative	3.07	1.43	3.41	0.97
	4 positive 2 negative	2.65	1.3	3.32	0.94
	2 positive 4 negative	2.77	1.31	3.33	0.91
	3 positive 3 negative	2.95	1.35	2.98	0.94
8 item thought listing group	7 positive 1 negative	2.63	1.29	3.14	0.9
	1 positive 7 negative	2.84	1.17	3.26	0.71
	6 positive 2 negative	3.01	1.14	3.13	1.24
	2 positive 6 negative	2.42	1.14	2.97	1.21
	4 positive 4 negative	3.01	1.25	3.09	0.93

Table 4. Descriptives of overall attitude ratings by condition in the first pilot study

		Relevant Group		Non-Relevant Group	
		Mean	SD	Mean	SD
6-item thought listing groups	5 positive 1 negative	3.92	0.89	3.28	0.84
	1 positive 5 negative	2.88	1.26	2.77	1.03
	4 positive 2 negative	3.52	1.2	2.89	0.7
	2 positive 4 negative	3.5	1.32	2.85	1.01
	3 positive 3 negative	2.96	1.22	2.88	0.97
8 item thought listing group	7 positive 1 negative	3.62	1.07	3.14	0.77
	1 positive 7 negative	2.78	1.31	3	0.93
	6 positive 2 negative	4	0.96	2.88	1.11
	2 positive 6 negative	3.26	1.36	2.77	1.11
	4 positive 4 negative	3.23	1.36	2.88	0.98

Table 5. Descriptives of certainty of the attitude ratings by condition in the first pilot study

		Relevant Group		Non-Relevant Group	
		Mean	SD	Mean	SD
6-item thought listing groups	5 positive 1 negative	4.19	0.8	3.84	0.9
	1 positive 5 negative	4.08	1.06	3.54	1.1
	4 positive 2 negative	4.39	0.78	3.59	0.84
	2 positive 4 negative	4.35	0.81	3.38	0.94
	3 positive 3 negative	4.14	0.87	3.78	0.96
8 item thought listing group	7 positive 1 negative	4	1.1	3.27	1.24
	1 positive 7 negative	3.89	1.25	3.18	1.3
	6 positive 2 negative	4.32	0.63	3.15	1.41
	2 positive 6 negative	4.13	0.92	3.32	1.29
	4 positive 4 negative	4.15	0.9	3.14	0.7

Table 6. Descriptives of correctness of attitude ratings by condition in the first pilot study

		Relevant Group		Non-Relevant Group	
		Mean	SD	Mean	SD
6-item thought listing groups	5 positive 1 negative	3.92	0.98	3.72	1.21
	1 positive 5 negative	3.79	1.06	3.04	1.43
	4 positive 2 negative	4	1.04	3.37	1.11
	2 positive 4 negative	4.2	1.01	3.08	1.13
	3 positive 3 negative	4.06	0.86	3.61	0.98
8 item thought listing group	7 positive 1 negative	3.81	1.25	3	1.07
	1 positive 7 negative	3.78	1.28	3	1.2
	6 positive 2 negative	4.2	0.78	3.12	1.37
	2 positive 6 negative	4.04	1.07	3.23	1.31
	4 positive 4 negative	3.9	1.15	2.84	1.15

### Procedure for the Second Cohort Data Collection

The second cohort data was collected in hope to clarify which thought-listing group(s) in the 6-item groups yields better data quality. Since relevance did not have a consistent and significant impact on generating ambivalence, non-relevant condition was eliminated from the second cohort. Participants were only asked to reflect on a topic that they feel both ambivalent and important to them. Then, they were randomly assigned to one of the 6-item groups for thought-listing assignment<sup>2</sup> and then asked to report their attitude, ambivalence, certainty of the attitude and correctness of their attitude toward the topic of choice. The second cohort consists of 119 responses and was combined with the

<sup>2</sup> These conditions are: 1) 5 positive and 1 negative, 2) 1 positive and 5 negative, and 3) 3 positive and 3 negative

responses from the relevant condition in the first cohort data to form a larger dataset, which resulted in 407 total responses for entire data collection. The following analysis is pertinent to the combined relevant-condition-only dataset. Again, listed thoughts were manually examined to see if the number and valence of the thoughts aligned with assigned condition and questions asked. Using gun regulation as an example, some of the positive aspects listed included: “Reduction of firearm suicides (other methods are less permanent so victims may survive the attempt and rehabilitate)”, “Armed officers are will be able to control situations more easily if aggressors aren't carrying guns as often”, and “Increased background checks will make sure that unstable people are unlikely to have obtain guns”. Negative aspects of gun regulation listed by participants included: “People feel like they can't protect themselves in the event of an attack”, “Doesn't change the fact that illegal guns get used”, and “gun control laws would be discriminatory towards Black and poor people”.

## **Measures**

**Attitude** toward the topic was measured asking participants their overall attitude toward the topic on a 5-point scale (1= not at all positive to 5 = extremely positive) ( $M = 3.23$ ,  $SD = 1.27$ ).

**Objective/potential ambivalence** was measured indirectly with two items on a 7-point scale that asks the respondent to rate how positive the positive qualities of e-cigarettes were while ignoring the negative qualities and how negative the negative qualities of the subject were while ignoring the positive qualities (Kaplan, 1972). The “Griffin” formula (Thompson, Zanna & Griffin, 1995) will be used to calculate an overall ambivalence score by subtracting the absolute difference between two ratings from the

average of the two:  $(P + N)/2 - |P - N|$ . The rating will be used to indicate **equivalent/balanced ambivalence** and **skewed ambivalence** on a relative level by comparing their positive ratings against the negative ratings.

**Subjective/felt ambivalence** was assessed with 3 items on a 5-point scale. The first item asked participant to indicate how conflicted they felt about the topic (1=not conflict at all to 5 = maximum conflict) ( $M = 2.82, SD = 1.42$ ). The remaining two items measured their agreement with the statements “I feel torn between the two sides of (risks and benefits of) the topic” ( $M = 2.98, SD = 1.29$ ) and “I have conflicting thoughts about the topic” ( $M = 3.07, SD = 1.46$ ) (1 = completely disagree to 5 = completely agree) (Priester & Petty, 1996). These three items were average together to create a composite variable ( $M = 2.96, SD = 1.25$ ; Cronbach’s  $\alpha = 0.88$ ).

**Attitudinal certainty** was measured by asking participants how certain they are of their attitude toward the topic (1= not at all certain to 5 = extremely certain) ( $M = 4.15, SD = 0.91$ ) (Fazio & Zanna, 1978).

**Attitude Correctness** was measured by asking participants how certain they are that their attitude toward the topic is the correct one to have (1= not at all certain to 5 = extremely certain) ( $M = 3.9, SD = 1.07$ ).

**Weight of the attitude** was measured on a five-point scale with 1 anchored as “not at all important” and 5 as “extremely important” separately on each point that participants listed in the thought-listing process.

## **Sample**

The second cohort of pilot data had 119 responses and was combined with the first cohort, yielding a total sample of 407 participants. The sample had same median age of 36 and contained 161 male, 238 female, and 8 participants identified as non-binary. Most participants reported having a bachelor's degree (38.3%) followed by some college credit without degree (18.18%), master's degree (13.51%), associate degree (10.57%), and high school diploma or equivalent (10.32%). Smaller proportions reported a professional degree (3.19%), trade/technical/vocational training (2.21%), doctorate degree (2.46%) and high school without diploma (1.23%). Ninety percent of participants were non-Hispanic. Sixty-five percent of the sample were White, 18.13% were African American, 12.44% were Asian, and rest of them were biracial or multi-racial. Similarly, forty-six percent identified as Democrat, 16.96% were Republican, 32.92% were Independent, and 4.18% were something else. Political Ideology was measured on a 5-point scale (1= extremely conservative to 5 = extremely liberal) ( $M = 3.21$ ,  $SD = 1.29$ ).

## **Results for Combined Data – Relevant Group Only**

First, groups in relevant conditions from two cohorts of data were pooled together. Since the second cohort data only included 6-item groups, the 8-item groups were disregarded in the following analysis. The following analysis is only pertinent to relevant conditions with the following thought-listing groups: 1) 5-positive-1-negative thought listing group ( $N = 45$ ), 2) 1-positive-5-negative group ( $N = 46$ ), 3) 4-positive-2-negative group ( $N = 43$ ), 4) 2-positive-4-negative group ( $N = 40$ ), and 5) 3-positive-3-negative group ( $N = 87$ ).

To examine which of the group(s) in 6-item groups elicit more reliable skewed and balanced ambivalent, Welch's independent sample t-tests were conducted using both objective and subjective ambivalence measure to compare conditions with uneven numbers of positive and negative thoughts (i.e., *skewed* conditions) to those with even numbers of positive and negative thoughts (i.e., *balanced* conditions). Five-positive-1-negative group, 1-positive-5-negative group, 4-positive-2-negative group and 2-positive-4-negative group were compared against 3-positive-3-negative group separately. No significant difference was found. However, what was found was that 5-positive-1-negative group ( $M=2.44$ ,  $SD = 1.67$ ) and 1-positive-5-negative group ( $M = 2.71$ ,  $SD = 1.66$ ) elicited higher objective ambivalence score, followed by 3-positive-3-negative group. The 4-positive-2-negative group ( $M = 1.87$ ,  $SD = 1.79$ ) and 2-positive-4-negative group ( $M = 2.3$ ,  $SD = 1.58$ ) generated lowest objective ambivalence score. In terms of subjective ambivalence, 1-positive-5-negative group ( $M = 3.3$ ,  $SD = 1.34$ ) and 3-positive-3-negative group ( $M = 3.1$ ,  $SD = 1.26$ ) generated the highest score, following by 5-positive-1-negative group ( $M = 2.87$ ,  $SD = 1.29$ ), 2-positive-4-negative group ( $M = 2.84$ ,  $SD = 1.23$ ), and 4-positive-2-negative group ( $M = 2.84$ ,  $SD = 1.23$ ).

Additionally, skewed groups with similar skewness were merged together, meaning 5-positive-1-negative was merged with 1-positive-5-negative, and so on for 4-2 groups. First, Welch's independent sample t-tests were conducted using on objective and subjective ambivalence separately to confirm there was no significant difference between 5-positive-1-negative group and 1-positive-5-negative group and between 4-positive-2-negative group and 2-positive-4-negative group. The first two were pooled together and the second two were pooled together and compared against 3-positive-3-negative

separately on objective and subjective ambivalence. No significant result was found, which indicates no differentiation of skewed versus balanced ambivalence regarding objective and subjective ambivalence from this priming technique.

The priming technique, though did not fully activate the intended difference between skewed and balanced ambivalence, some indications of this difference was still observed in the results. For instance, the skewness of the skewed groups was primed as intended direction, especially the 1-positive-5-negative group (see table 7). Welch's independent sample t-test were conducted using positive and negative ratings separately between skewed groups and balanced groups. It was found that the positive ratings of 5-positive-1-negative group was marginally significantly higher than that of 3-positive-3-negative group ( $t(96.32) = -1.94, p = 0.055$ ), otherwise there was no significant difference between skewed and balanced groups on positive or negative ratings.

Additionally, comparisons were conducted between skewed and balanced groups on subjective ambivalence scores. Welch's independent sample t-test results indicated that both 5-positive-1-negative ( $t(86.43) = -3.18, p < 0.01$ ) and 2-positive-4-negative groups ( $t(77.24) = -2.89, p < 0.01$ ) were significantly lower than 3-positive-3-negative group. According to the objective ambivalence formula (which is calculated as  $(P + N)/2 - |P - N|$ ), balanced ambivalence is predicted to yield higher overall ambivalence score. And this heightened ambivalence should also manifest in felt/experienced (subjective ambivalence). This finding aligns with this prediction that participants in two skewed conditions (5-positive-1-negative and 2-positive-4-negative groups) reported less felt/experienced ambivalence, although such difference was not shown in objective ambivalence. Thus, 5-positive-1-negative and 2-positive-4-negative groups in skewed

condition had better outcome in terms of lessened felt/experienced ambivalence compared to the balanced group (3-positive-3-negative group).

Indications of the effectiveness of the priming technique was also observed in the comparison on overall attitude between skewed and balanced groups. The underlying premise was that skewness of the attitude should be also reflected in the overall attitude ratings, with positively skewed groups exhibiting higher overall attitude scores and negatively skewed groups showing lower overall attitude scores. The Welch's independent t-test indicated that 5-positive-1-negative group exerted a significantly higher overall attitude than 3-positive-3-negative group ( $t(96.89) = 2.97, p < 0.01$ ), although the comparisons with rest groups remained insignificant. Thus, the 5-positive-1-negative group in skewed condition had better outcome aligned with the assumption.

As indicated above, the 5-positive-1-negative group generated subjective ambivalence and overall attitude ratings as expected when compared to the balanced group. The counterpart 1-positive-5-negative group, while not producing the same pattern in ambivalence scores as anticipated, did show that negative ratings were higher than positive ratings, as predicted. However, this pattern was not observed in the 2-positive-4-negative group. Thus, the 1-positive-5-negative group successfully produced negatively skewed evaluations.

Taken together, the 5-positive-1-negative group and its counterpart 1-positive-5-negative group yielded better outcome in all parameters compared to the 4-positive-2-negative and 2-positive-4-negative group. In terms of balanced ambivalence generated by 3-positive-3-negative group, the positive and negative ratings did not align as expected. Either did this group generated highest level of objective ambivalence as anticipated.

However, the subjective ambivalence, though not the highest, was higher than most of the skewed groups. Altogether, I decided to proceed with 5-positive-1-negative and 1-positive-5-negative thought-listing strategy to generate skewed ambivalence and 3-positive-3-negative to generate balanced ambivalence in the main study.

Table 7. Descriptives of positive and negative ratings by condition in combined relevant-only data

		Relevant Group			
		Positive Ratings		Negative Ratings	
		Mean	SD	Mean	SD
6-item thought listing groups	5 positive 1 negative	4.33	0.9	3.4	1.25
	1 positive 5 negative	3.83	1.2	3.85	1.2
	4 positive 2 negative	4.09	1.17	3.33	1.49
	2 positive 4 negative	4.1	1.01	3.7	1.3
	3 positive 3 negative	4	0.99	3.61	1.24

Table 8. Descriptives of ambivalence score by condition in combined relevant-only data

		Relevant Group	
		Mean	SD
6-item thought listing groups	5 positive 1 negative	2.44	1.67
	1 positive 5 negative	2.71	1.66
	4 positive 2 negative	1.87	1.79
	2 positive 4 negative	2.3	1.58
	3 positive 3 negative	2.38	1.61

Table 9. Descriptives of subjective ambivalence score by condition in combined relevant-only data

		Relevant Group	
		Mean	SD
6-item thought listing groups	5 positive 1 negative	2.87	1.29
	1 positive 5 negative	3.3	1.34
	4 positive 2 negative	2.84	1.23
	2 positive 4 negative	2.93	1.22
	3 positive 3 negative	3.1	1.26

Table 10. Descriptives of overall attitude ratings by condition in combined relevant-only data

		Relevant Group	
		Mean	SD
6-item thought listing groups	5 positive 1 negative	3.73	1.1
	1 positive 5 negative	2.77	1.27
	4 positive 2 negative	3.23	1.17
	2 positive 4 negative	3.15	1.39
	3 positive 3 negative	3.11	1.2

Table 11. Descriptives of certainty of attitude ratings by condition in combined relevant-only data

		Relevant Group	
		Mean	SD
6-item thought listing groups	5 positive 1 negative	4.16	0.88
	1 positive 5 negative	4.06	0.99
	4 positive 2 negative	4.37	0.76
	2 positive 4 negative	4.35	0.8
	3 positive 3 negative	4.09	0.91

Table 12. Descriptives of correctness of attitude ratings by condition in combined relevant-only data

		Relevant Group	
		Mean	SD
6-item thought listing groups	5 positive 1 negative	3.84	1.13
	1 positive 5 negative	3.74	1.19
	4 positive 2 negative	3.86	1.04
	2 positive 4 negative	4	1.01
	3 positive 3 negative	3.95	0.95

***Topic Selection for the Main Study***

There were topics that mentioned frequently by participants on which they feel conflicted and ambivalent, and those were selected as the topics for the main experiment. Topics that emerged from the pilot studies included: abortion, gun regulation, immigration, and death penalty. A world cloud to display the frequently mentioned topic was generated (see Appendix A).

## CHAPTER 4

### MAIN STUDY METHOD AND RESULTS

#### Experiment Design

The objective of the main experiment was to examine the relationship between ambivalence, motivations, and the extent of processing. Participants were recruited via Prolific (N = 1833). The main experiment was designed to test 1) the role of skewed versus balanced ambivalence on motivations behind processing conflicting information and 2) the role of motivations in the relationship between ambivalence and the extent of processing of conflicting information. The study used 2 (skewed vs. balanced ambivalence) x 2 (need to make a decision vs. no need to make a decision) x 4 topics (abortion, immigration, gun regulation, and death penalty) between subject factorial design. There are 468 participants in topic abortion, 593 participants in topic immigration, 423 participants in topic gun regulation, and 348 participants in topic death penalty. These four topics were chosen based on the pilot study indicating that most participants felt ambivalent about them.

Specifically, upon passing the first set of screening questions of residence (currently reside in the United States) and age (at least 18 years old), participants had to answer two additional screening questions. One question asked in a select-all-that-apply manner which topic(s) they feel ambivalent about (“having conflicting thoughts”). Participants who selected none of the topic from the designated list were screened out. The second question asked them which of the selected topic they feel personally relevant (“care about”) as a continuity from the pilot study, since the priming technique worked better on topic of relevance. Participants who selected none of the topics from the list

were screened out. Participants who selected at least of one the four topics continued to the rest of the study. If they selected only one topic, that topic automatically became the topic for remaining questions. If multiple topics were selected, they had the choice to choose one topic as the topic for remaining question.

Next, participants were randomized into one of the thought-listing conditions to prime either skewed or balanced ambivalence. Randomization was tested within each topic using demographic variables including age, gender, race, ethnicity, education, party, and political ideology. Within skewed condition, then they further randomly put into one of the skewed conditions. In this way, the number of participants in skewed versus balanced condition relatively even. These conditions include: 1) 5 positive and 1 negative thoughts (N = 450), and 2) 1 positive and 5 negative thoughts (N = 457) for skewed condition, and 3) 3-positive-3-negative (N = 925) for balanced condition. Attitude-related measures were given after the thought-listing activity.

Participants were then randomly assigned to either Need-to-Make-Decision or No-Need-to-Make-Decision, followed by a manipulation check for Need-to-Make-Decision as in self-report measure of cognitive arousal. After this, participants were presented with a list of article titles in their chosen topic and were asked to select all the articles they would like to read. Open-ended question was given to let them explain the reason of their choice. Finally, dependent measures, such as motivations, were administered. Demographic measures were administered at the last with a debrief at the end.

## Measures

### *Independent variables*

**Overall Attitude** toward the topic was measured asking participants their overall attitude toward the topic on a 5-point scale (1= not at all positive to 5 = extremely positive) ( $M=3.05$ ,  $SD=1.05$ ).

**Objective/potential ambivalence** was measured indirectly with two items on a 7-point scale that asks the respondent to rate how positive the positive qualities of e-cigarettes were while ignoring the negative qualities and how negative the negative qualities of the subject were while ignoring the positive qualities (Kaplan, 1972). The “Griffin” formula (Thompson, Zanna & Griffin, 1995) will be used to calculate an overall ambivalence score by subtracting the absolute difference between two ratings from the average of the two:  $(P + N)/2 - |P - N|$  (the P is the positive rating and the N is the negative rating) The rating will be used to indicate **equivalent/balanced ambivalence** and **skewed ambivalence** on a relative level by comparing their positive ratings against the negative ratings. Furthermore, the positive and negative ratings were also examined independently to assess participants’ overall **positivity** and **negativity** toward the topic separately.

**Subjective/felt ambivalence** was assessed with 3 items on a 5-point scale. The first item asked participant to indicate how conflicted they felt about the topic (1=not conflict at all to 5 = maximum conflict) ( $M = 3.61$ ,  $SD = 1.18$ ). The remaining two items measured their agreement with the statements “I feel torn between the two sides of (risks and benefits of) the topic” ( $M = 3.44$ ,  $SD = 1$ ) and “I have conflicting thoughts about the

topic” ( $M = 3.75$ ,  $SD = 1.12$ ) (1 = completely disagree to 5 = completely agree) (Priester & Petty, 1996). These three items were average together to create a composite variable ( $M = 3.6$ ,  $SD = 0.93$ ; Cronbach’s  $\alpha = 0.79$ ).

**Attitudinal certainty** was measured by asking participants how certain they are of their attitude toward the topic (1= not at all certain to 5 = extremely certain) ( $M = 3.64$ ,  $SD = 1.08$ ) (Fazio & Zanna, 1978).

**Attitude Correctness** was measured by asking participants how certain they are that their attitude toward the topic is the correct one to have (1= not at all certain to 5 = extremely certain) ( $M = 3.41$ ,  $SD = 1.13$ ).

**Weight of the attitude** was measured on a five-point scale with 1 anchored as “not at all important” and 5 as “extremely important” separately on each point that participants listed in the thought-listing process.

**Arousal** (manipulation check) was measured with four-item bipolar scale anchored at 1 as “relax”, “calm”, “unaroused”, and “dull” to 5 as “stimulated”, “excited”, “aroused”, and “jittery”. Items were averaged to create a composite variable ( $M = 2.86$ ,  $SD = 0.92$ ; Cronbach’s  $\alpha = 0.82$ ).

### ***Dependent Variables***

**Defensive motivation** was measured by asking participants to indicate their considerations when selecting articles to read, using a 5 point-scale anchored at 1 as “not at all important” to 5 as “extremely important”. Participants rated the following statements: “to find arguments to counter opposing viewpoints”, “to pinpoint there are better reasons that aligns with my perspective than the opposing perspective”. “to hear

information from opposing side to refute it”, and “to hear information that aligns with my perspective to support my reasoning”. Items were averaged to create a composite variable ( $M = 3.23$ ,  $SD = 0.82$ ; Cronbach’s  $\alpha = 0.7$ ).

**Accuracy motivation** was assessed the same way as defensive motivation, by having participants rate their considerations when selecting articles to read using the same 5 point-scale (1 as “not important at all” to 5 as “extremely important”). Statements included: “to find most logical view”, “to argue all points of view”, “to seek information indicating a viewpoint closely based on evidence”, “to read arguments that would help me reason”, and “to read arguments to update my viewpoint”. After dropping two items, the remaining items were averaged to create a composite variable ( $M = 4$ ,  $SD = 0.74$ ; Cronbach’s  $\alpha = 0.8$ ).

**Intended effort** for reading the selected articles was assessed on a 10-point scale (1= little effort to 10 as maximum effort). Participants indicated how much effort they were willing to invest in understanding and thinking about the content of the selected article(s).

## **Sample**

According to the power analysis conducted through R using pwr package, the total number of participants needed is 1632 based on a 0.02 effect size, a sample group of 24, a significant level of 0.05, and a power of 0.95. Therefore, a total number of 1833 participants were recruited from Prolific to anticipate incompletes and poor-quality responses.

The sample had a media age of 41 years old and contained 869 males, 943 females, 18 identified as non-binary, and 3 preferred not to disclose. The majority of participants were non-Hispanic (90.5%). Seventy-five percent were white, 13.69% were black, 5.1% were Asian, and the rest as biracial or multiracial. The majority of participants had a bachelor’s degree (38.8%) followed by master’s degree (17.2%), some college credit without a degree degree (17%), and high school diploma or equivalent (10.1%). Smaller proportions reported an associate degree (9.7%), trade/technical/vocational training (2.5%), doctorate degree (2.3%), professional degree (1.5%), and high school without diploma (0.7%). Thirty-seven percent identified themselves as Democrat, 30.8% were Republican, 29.7% were independent, and the rest were something else. On the 5-point scale from conservative to liberal, participants were skewed toward liberalism ( $M=3.18$ ,  $SD = 1.34$ ). One-way ANOVA test indicated no significant differences in age, political and political ideology among conditions (5-positive-1-negative, 1-positive-5-negative, and 3-positive-3-negative) within each topic. However, results indicated that there were significant differences in ethnicity in topic of abortion ( $F(2, 465) = 3.19$ ,  $p < 0.05$ ) and immigration ( $F(2, 590) = 3.34$ ,  $p < 0.05$ ). Thus, ethnicity was included as a controlled variable for analysis within each topic (see Appendix).

## Results

Table 46. Table for Key Findings

<b>Key Findings</b>
Priming technique had limited effect on reported attitudes using topic of high familiarity

Increased accuracy motivation was observed at higher level of balanced ambivalence
Accuracy motivation had directly positive effect on intended effort in processing accounting for balanced ambivalence
Increased defensive motivation was observed at higher level of skewed ambivalence
Skewed ambivalence interacted with Need-to-Make-Decision (cognitive arousal) that increased accuracy motivation at higher level of skewed ambivalence when individuals were not cognitively aroused
Defensive motivation had direct effect on intended effort in processing accounting for skewed ambivalence
Skewed ambivalence interacted with defensive motivation and exerted direct positive impact on intended effort in processing among individuals with high or low defensive motivation
In skewed ambivalence dataset, defensive motivation served as a confounding variable, but did not mediate the relationship between skewed ambivalence and intended effort in processing
In balanced ambivalence, accuracy motivation fully mediated the relationship between ambivalence and intended effort in processing
Skewed ambivalence is negatively correlated with certainty of the attitude and correctness of the attitude

Table 46. (continued)

<b>Key Findings</b>
Balanced ambivalence is positively correlated with certainty of the attitude and correctness of the attitude

***Results for Priming Skewed Versus Balanced Ambivalence***

To assess the effectiveness of priming technique, measures of objective ambivalence score, subjective ambivalence score, positive ratings, and negative ratings were obtained from each condition in each topic separately in R. Results indicated that priming for skewed versus balanced ambivalence had little effect on actual positive and negative ratings of the subject (see Table 1 in Appendix B). Participants’ pre-existing attitude (positive and negative evaluation) still hold dominant power on positive and negative ratings regardless of the priming condition. Similarly, objective ambivalence scores reflected little impact from priming given that the objective ambivalence was calculated based on positive and negative ratings. The only measure reflecting the intended effect of the priming manipulation was subjective ambivalence. Across all topics except the death penalty, subjective ambivalence scores were higher in balanced conditions (3-positive-3-negative) compared to skewed conditions in corresponding topics. This finding aligns with the assumption that balanced ambivalence, as having equally strong but opposing evaluation, would trigger greater experienced conflict, shown in both objective and subjective ambivalence. Nonetheless, based on overall results, the priming condition had limited effect on reported ambivalence. Analysis using

ambivalence scores based on the priming conditions are included in the appendix for further details.

Therefore, the subsequent analyses use measured positive and negative ratings to categorize conditions into “truly” balanced conditions (when positive rating is equal to negative rating) in all topics, and skewed condition (when positive and negative ratings are different). The skewed condition was further divided into positively skewed condition (when positive rating is greater than negative one) and negatively skewed condition, when negative rating is greater than positive one).

### *Results for Testing Hypothesis*

**H1a: In the case of skewed ambivalence, individuals are more likely to adopt a defensive motivation when there is a need to make a decision than when there is no need to make a decision.**

To test **H1a**, participants were filtered out if their positive rating is greater than the negative rating across all topics, which is called positively skewed ambivalence group (N=701). Participants whose negative rating is greater than their positive rating across all topics is filtered out as negatively skewed group (N=648). Combining these two groups, a group of participants whose positive and negative ratings differ is called skewed ambivalence group (N=1349).

First, analyses were conducted within positively skewed ambivalence group and negatively skewed ambivalence group separately.

To examine the relationship between positively skewed ambivalence and motivations, Pearson correlation tests were conducted separately using objective and subjective ambivalence score with accuracy motivation and defensive motivation. Results indicated no significant correlation between objective ambivalence scores and either type of motivation. However, subjective ambivalence showed a significant but weak positive correlation with defensive motivation in the positively skewed ambivalence group ( $r = 0.07$ ,  $p < 0.05$ ). No significant relationship was found between subjective ambivalence and accuracy motivation.

Further analyses explored whether individuals with skewed ambivalence adopt different motivations when they are cognitively aroused (when there is need to make a decision). First, the Need-to-Make-Decision manipulated was checked using Welch two sample t-test comparing Need-to-Make-Decision and No-Need-to-Make-Decision conditions, which showed a significant difference between condition in Need-to-Make-Decision and No-Need-to-Make-Decision using cognitive arousal measure ( $t(1158.7) = 3.69$ ,  $p < 0.001$ ). Subsequent independent sample t-test compared motivations (defensive and accuracy separately) between the Need-to-Make-Decision and No-Need-to-Make Decision conditions. Neither result was significant.

Next, two-way ANOVA tests were conducted to test whether objective ambivalence and Need-to-Make-Decision condition, as well as their interaction, predict motivations in positively skewed ambivalence group. For defensive motivation, objective ambivalence, Need-to-Make-Decision conditions, and their interactions were all non-significant. Similarly, for accuracy motivation, there was no significant effect in objective

ambivalence, Need-to-Make-Decision conditions, nor their interaction (see Table 6 in Appendix B). However, when examining subjective ambivalence interacted with Need-to-Make-Decision condition to influence motivations, significant results were found. Specifically, in analysis predicting defensive motivation, there was a significant effect of subjective ambivalence ( $F(1,434) = 6.36, p < 0.05$ ), indicating that increased defensive motivation at higher level of subjective ambivalence. This leans partial support for H1a. However, neither Need-to-Make-Decision condition nor its interaction with subjective ambivalence reached significance. None of the predictors significantly influenced accuracy motivation. Overall, although Need-to-Make-Decision did not significantly influence motivations, skewed ambivalence (measured in subjective ambivalence) could play a significant role in defensive motivation.

Similarly, aforementioned tests were conducted in negatively skewed ambivalence group. Specifically, to test the relationship between ambivalence and motivations in negatively skewed ambivalence group, Pearson correlation analyses were conducted using objective and subjective ambivalence separately with defensive and accuracy motivation. There was no significant correlation between objective ambivalence and motivations. Subjective ambivalence is positively but weakly correlated with accuracy motivation ( $r = 0.13, p < 0.001$ ). No significant relationship was found between subjective ambivalence and defensive motivation.

Next, two-way ANOVA tests were conducted to test whether objective ambivalence and Need-to-Make-Decision condition, as well as their interaction, predict motivations in negatively skewed ambivalence group. Results found increased defensive

motivation at higher level of objective ambivalence ( $F(1,427) = 6.18$   $p < 0.05$ ), which again partially supports H1a (see Table 7 in Appendix B). However, no significant effect of Need-to-Make-Decision condition nor its interaction with objective ambivalence was found. Additionally, two-way ANNOVA tests were conducted using subjective ambivalence instead of objective ambivalence with Need-to-Make-Decision condition on motivations. An increased accuracy motivation was found at higher level of subjective ambivalence ( $F(1,426) = 10.68$ ,  $p < 0.01$ ) but not defensive motivation (see Table 8 in Appendix B), which contradicts the H1a. Likewise, neither Need-to-Make-Decision condition nor its interaction predicts either motivation. Overall, although Need-to-Make-Decision did not significantly influence motivations, subjective ambivalence in negatively skewed group had significant positive effect on accuracy motivation, but objective ambivalence in the same group had significant effect on defensive motivation.

Last but not least, in skewed ambivalence group (merging positively skewed and negatively skewed ambivalence group), Pearson correlation analyses were conducted between objective ambivalence and motivations. Objective ambivalence was significantly but negatively and weakly correlated with defensive motivation ( $r(1347) = -0.05$ ,  $p < 0.05$ ), which contradicts with H1a.

Next, in two-way ANOVA tests were conducted to see whether objective ambivalence and Need-to-Make-Decision condition, as well as their interaction, predict motivations in skewed ambivalence group. Increased defensive motivation was found at higher level of objective ambivalence (see Table 9 in Appendix B) ( $F(1, 865) = 7.78$   $p < 0.01$ ), which support H1a partially. No significant effect was found with Need-to-Make-

Decision condition nor its interaction. Subjective ambivalence (see Table 11 in the Appendix B) Both increased defensive motivation ( $F(1,865) = 4.21, p < 0.05$ ) and accuracy motivation ( $F(1,861) = 8.57, p < 0.01$ ) were found at higher level of subjective ambivalence. Particularly, a significant main effect of Need-to-Make-Decision condition was also found with defensive motivation ( $F(1, 861) = 5.18, p < 0.05$ ). Moreover, the interaction between subjective and Need-to-Make-Decision condition was also significant ( $F(1, 861) = 5.40, p < 0.05$ ). Probing the interaction using simple slopes analysis, it was found that for participants in No-Need-to-Make-Decision within lower cognitive arousal level, the slope of subjective ambivalence on accuracy motivation was significant, indicating increased accuracy motivation at higher subjective ambivalence ( $\beta = 0.14, SE = 0.04, 95\% CI [0.07, 0.22], p = 0.02$ ). On the contrary, for participants in Need-to-Make-Decision condition with higher cognitive arousal level, subjective ambivalence's effect on accuracy motivation was not significant. Comparison between Need-to-Make-Decision and No-Need-to-Make-Decision condition indicated that the effect of subjective ambivalence on accuracy motivation was significantly stronger in No-Need-to-Make-Decision condition ( $\beta = 0.13, SE = 0.0545, t(861) = 2.33, p = 0.02$ ). In the skewed ambivalence, objectively ambivalence positively predicted defensive motivation. Subjective ambivalence predicted both accuracy and defensive motivation. Importantly, Need-to-Make-Decision moderated the relationship between subjective ambivalence and accuracy motivation, with subjective ambivalence increasing accuracy motivation in No-Need-to-Make-Decision condition.

In general, the results in different skewed group (positively skewed, negatively skewed, combination of two) partially supported the H1a, suggesting that individuals

with skewed ambivalence, no matter it is positively or negatively skewed, are more likely to adopt a defensive motivation. Specifically, subjective ambivalence consistently predicted defensive motivation and objective ambivalence offered mixed findings. The Need-to-Make-Decision moderated the relationship between ambivalence (subjective ambivalence) and motivation. In contrary to the hypothesis, Need-to-Make-Decision moderated the relationship between subjective ambivalence and accuracy motivation instead of defensive motivation. And subjective ambivalence predicted accuracy motivation among individuals with No-Need-to-Make-Decision condition.

**H1b: In the case of balanced ambivalence, individuals are more likely to adopt an accuracy motivation when there is a need to make a decision than when there is no need to make a decision.**

To test the H1b, balanced ambivalence group was formed by filtering participants who gave equal positive and negative ratings ( $n=482$ ). Pearson correlation between ambivalence and motivations indicated ambivalence is positively correlated with accuracy motivation using both objective ambivalence score ( $r = 0.2, p < 0.0001$ ) and subjective ambivalence score ( $r = 0.17, p < 0.001$ ). No significant relationship was found between ambivalence and defensive motivation in balanced ambivalence group using either objective or subjective ambivalence score.

Further two-way ANOVA tests (see Table 12 & 13 in Appendix B) revealed an increased accuracy motivation at higher level of both objective ( $F(1, 297) = 7.21, p < 0.01$ ) and subjective ambivalence ( $F(1, 297) = 10.81, p < 0.01$ ). Such relationship was not observed in defensive motivation. Situational factor Need-to-Make-Decision did not have

direct impact nor interactive effect with ambivalence on either motivation. Therefore, other than the moderating effect of Need-to-Make-Decision, H1b was partially supported.

**H2a: In the case of skewed ambivalence, individuals with high defensive motivation are more likely to adopt a systematic processing than individuals with low motivation**

In the positively skewed ambivalence group, the two-way ANOVA test (see table 15 in Appendix B) indicated that subjective ambivalence had directly positive impact on intended effort in reading articles (or effort in processing) ( $F(1, 697) = 7.4, p < 0.01$ ). However, such direct impact was not observed using objective ambivalence (see table 14 in Appendix B). Defensive motivation also had direct positive effect on intended effort in both analyses using objective ( $F(1, 697) = 77.41, p < 0.0001$ ) and subjective ambivalence ( $F(1, 697) = 74.29, p < 0.0001$ ). There was no interactive effect between ambivalence (in either objective or subjective measure) and defensive motivation. Thus, the moderation (H2a) was not supported.

In negative skewed ambivalence group, two-way ANOVA analysis showed that subjective ambivalence had direct and positive effect on intended effort in processing ( $F(1, 644) = 11.98, p < 0.001$ ) while objective ambivalence's impact was not significant (see table 16 & 17 in Appendix B). Defensive motivation had similarly positive and direct impact on intended effort in processing in both analyses using objective ( $F(1, 644) = 86.84, p < 0.0001$ ) and subjective ambivalence ( $F(1, 697) = 82.35, p < 0.0001$ ). The interactive effect was also observed in analysis using objective ambivalence ( $F(1, 644) =$

18.18,  $p < 0.0001$ ). Probing the moderation (see Figure 1 in the Appendix B), the Johnson-Neyman analysis indicated that the effect of ambivalence on intended effort became significant when defensive motivation is lower (below 3.33) or higher (above 4.46). Among individuals with moderate defensive motivation (between 3.33 and 4.46), ambivalence did not have significant impact on intended effort. Thus, the moderation effect was partially supported H2a.

In skewed ambivalence group (merging positively and negatively skewed groups), two-way ANOVA tests (see table 19 in Appendix B) revealed that ambivalence had directly positive impact on intended effort in processing using subjective ambivalence ( $F(1, 1345) = 15.49, p < 0.0001$ ). Similarly to positive and negatively skewed groups, defensive motivation had directly positive effect on intended effort in processing in Two-way ANOVA using both objective ( $F(1, 1345) = 164.61, p < 0.0001$ ). and subjective ambivalence ( $F(1, 1345) = 158.18, p < 0.0001$ ). Likewise, the interaction between subjective ambivalence and defensive motivation was significant. Probing the moderation (see Figure 2 in the Appendix B), it was found that ambivalence had significant impact on intended effort in processing among individuals with higher (above 4.85) or lower (below 3.32) defensive motivation. Ambivalence did not significantly impact intended effort in processing among individuals with moderate (between 3.32 and 4.85) defensive motivation. This indicated that for skewed ambivalence, either extremely lower or extremely higher defensive motivation can trigger people's intended effort, which partially supported the H2a.

**H2b: In the case of balanced ambivalence, individuals with high accuracy motivation are more likely to adopt a systematic processing than individuals with low motivation.**

To examine the moderation effect of accuracy motivation in the relationship between ambivalence and intended effort in reading articles, two-way ANOVA tests (see table 20 & 21 in Appendix B) were conducted using objective and subjective ambivalence separately with accuracy motivation on intended effort in processing. The objective ambivalence showed a directly positive effect on intended effort in processing ( $F(1, 478) = 15.07, p < 0.001$ ). Subjective had a similar but only marginally significant effect ( $F(1, 478) = 3.37, p = 0.067$ ). Accuracy motivation had directly positive effect on intended effort in processing in analyses using both objective ( $F(1, 478) = 143.75, p < 0.0001$ ) and subjective ambivalence ( $F(1, 478) = 152.3, p < 0.0001$ ). However, there was no interactive effect found, Thus, moderation H2b was not supported.

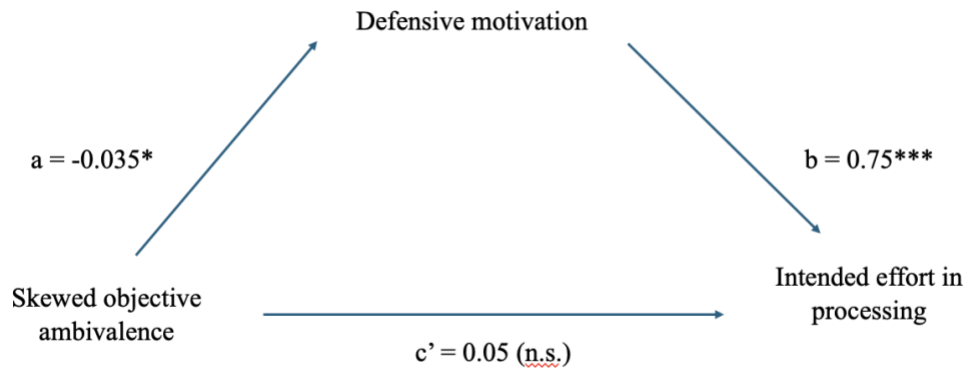
### ***Other Explorations***

**Mediation Role of Motivations.** Mediating role of motivations in between ambivalence and intended effort in processing was also test in skewed and balanced groups using R's PROCESS macro model 4 (Hayes, 2022). The model uses ordinary least squares regression to estimate both direct and indirect effect of the ambivalence and motivations on effort of processing.

In skewed ambivalence, a simple mediation model examining the degree to which defensive motivation mediated the relation of ambivalence on intended effort in

processing (see table 22 in Appendix B). With 95% level of confidence intervals and using 10,000 bootstrapping samples, the model results indicated that skewed ambivalence significantly decreased defensive motivation ( $b = -0,035 (0.017)$ ,  $p < 0.05$ ). Controlling for defensive motivation, skewed ambivalence significantly increased intended effort in processing ( $b = 0.082 (0.037)$ ,  $p < 0.05$ ), however, ambivalence along did not have an effect on intended effort in processing. Additionally, the indirect effect of skewed ambivalence on intended effort of processing through defensive motivation was not statistically significant (point estimate =  $-0.027 (0.014)$ , 95% [CI:  $-0.055, 0,0009$ ]). Thus, the results suggest that defensive motivation did not mediate the relationship between skewed ambivalence and intended effort in processing, instead, it serves as a confounding variable.

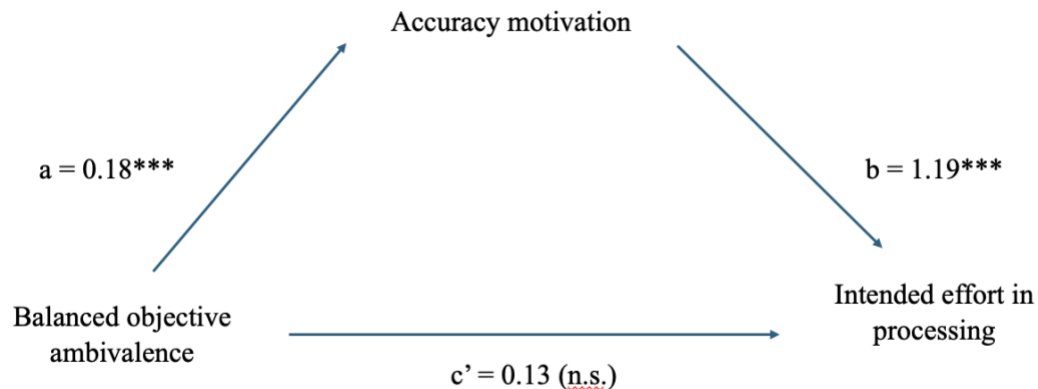
Figure 4. Effect of objective ambivalence and defensive motivation on intended effort in processing in skewed ambivalence group.



In balanced ambivalence group, a similar analysis was conducted to examine whether accuracy motivation mediated the relation of ambivalence on intended effort in processing (see table 23 in Appendix B). The model results indicated that balanced ambivalence significantly increased accuracy motivation ( $b = 0.18 (0.041)$ ,  $p < 0.001$ ).

The total effect of balanced ambivalence on intended effort in processing was also significant, indicating balanced ambivalence significantly increased intended effort of processing ( $b = 0.35 (0.10)$ ,  $p < 0.001$ ). However, accounting for accuracy motivation, the effect of balanced ambivalence on intended effort of processing became non-significant. The indirect effect of balanced ambivalence on intended effort of processing through accuracy motivation was statistically significant (point estimate =  $0.22 (0.051)$ , 95% [CI:0.12, 0.32]). Thus, the finding suggests that accuracy motivation fully mediates the relationship between ambivalence and intended effort in processing in balanced ambivalence group.

Figure 5. Effect of objective ambivalence and accuracy motivation on intended effort in processing in balanced ambivalence group.



**Certainty and Correctness of the Attitude.** To further understand the nature of skewed versus balanced ambivalence, attitude certainty and attitude correctness were analyzed separately in skewed versus balanced ambivalence group. Pearson correlation tests were conducted between ambivalence and certainty and correctness separately using

objective ambivalence in skewed and balanced ambivalence group. Results indicated that both attitude certainty ( $r = -0.15, p < 0.0001$ ) and correctness ( $r = -0.19, p < 0.0001$ ) were negatively and significantly correlated with objective ambivalence in skewed ambivalence group. However, both attitude certainty ( $r = 0.11, p < 0.05$ ) and correctness ( $r = 0.13, p < 0.01$ ) were positively correlated with objective ambivalence in balanced ambivalence group. Additionally, both attitude certainty and attitude correctness were positively correlated with subjective ambivalence in both skewed (attitude certainty  $r = -0.27, p < 0.0001$ ; attitude correctness  $r = -0.34, p < 0.0001$ ) and balanced ambivalence group (attitude certainty  $r = -0.25, p < 0.0001$ ; attitude correctness  $r = -0.17, p < 0.001$ ). This suggests that the methodologically objective ambivalence and subjective ambivalence are distinct concept, as conceptually, objective ambivalence reflects how much positive and negative evaluation an ambivalent attitude contains and subjective ambivalence reflect this feeling of holding conflicting evaluation. Such distinction was reflected in the attitude certainty and corrected related to ambivalence, as illustrated in the difference between skewed ambivalence and balanced ambivalence using objective measure. Conceptually, holding ambivalent attitude in balanced group may reflect a state of certainty and confidence, but such state was not shown in skewed ambivalence. However, subjectively, holding both balanced and skewed ambivalence reflects the same conflicted feeling, which is related to lower level of attitude certainty and correctness.

## CHAPTER 5

### DISCUSSION

#### Summary and Contribution

Every day we face various decisions - some we are absolutely sure of, others with hesitation. For those decisions we are hesitant to make, it may arise due to insufficient knowledge regarding the matter or too much conflicting information. The prevalence of conflicting information has exacerbated ambivalence (Nagler, Yzer & Rothman, 2018; Pang et al., 2016; Siddiqi, Sun & Akhtar, 2020; Rudolph, 2011), influencing our response to conflicting information. Pre-existing attitudes impacts information processing, attitude change, and persuasion outcomes (Krosnick & Petty, 2014; Petty, Tormala & Rucker, 2004). Ambivalence, as one of the attitude strength dimensions, is a pivotal attitudinal state that influence the upcoming attitude change and persuasion outcome due to the simultaneous existence of positive and negative evaluation, especially amid environment surrounding conflicting information (Jonas, Diehl & Bromer, 1997; Nordgren, Van Harreveld & Van der Pligt, 2006; Rudolph, 2007; Sawicki et al., 2013).

Communication scholars have been trying to understand the communication effort under ambivalence. Some suggests ambivalence will motivate a comprehensive and objective/balanced processing (Lavine, Parker-Stephen & Settenbergen as cited in Rudolph, 2007; Meffert, Guge & Lodge, 2004; Yang), while others argue that ambivalence is an unpleasant state biasing processing in order to resolve its discomfort (Nordgren, Van Harreveld & Van der Pligt, 2006; Sawicki et al., 2013). The inconsistency in observations reflects differences in ambivalent states. For instance, findings that

support ambivalence leading to biased information processing was hinged upon holding ambivalence while having a preferred/dominant evaluation (For instance, in Maio and colleagues' experiment (1996), ambivalence towards Asians was observed along with a generally favorable attitude toward Asians at 71.45 on a 100-point scale, where 100 = extremely favorable; in Newby-Clark and colleagues' (2002) experiment, ambivalence toward abortion was accompanied with a preferred position,  $M=5.23$  on a 7-point scale, where 7 = extremely important). In similar vein, these findings were hinged on ambivalence with a preferred/dominant position in positive or negative evaluation. Therefore, it is essential to further elucidate the complexity of ambivalence and gauge the effect of ambivalence on information processing.

In particular, this study proposed ambivalence to be further divided into balanced ambivalence versus skewed ambivalence. Balanced ambivalence is characterized by similarity in bivalent evaluations, whereas skewed ambivalence features the presence of dominant position in bivalent evaluations. Drawing on the HSM, this study further clarifies the relation between ambivalence and motivations when processing of conflicting information. This study posited that skewed ambivalence can act similarly to univalent attitude that motivates people to pursue a resolution for ambivalence and form an univalent attitude, thereby adopting a defensive motivation. In contrast, balanced ambivalence fosters an accuracy motivation since the positive and negative evaluation are at equal strength.

The problem of current study was examined by two parts 1) an experiment to testing priming technique of different types of ambivalence and 2) the main experiment to gauge the relationship. The main experiment tested the relationship between ambivalence

and motivated information processing using 4 different topics: abortion, immigration, gun regulation, and death penalty. Though significant difference in level of experienced ambivalence and attitude certainty and correctness<sup>3</sup> were found in different topics, no significant difference was found in objective ambivalence among topics in any conditions. In addition, there was no significant relationship between ambivalence and motivations found in none of the topic alone using primed ambivalence conditions. This was likely due to the fact that priming technique did not successfully yield skewed or balanced ambivalence as expected.

While results revealed that priming technique had limited impact on different types of ambivalence, ambivalence in different types (skewed versus balanced) did exert different influence on motivations behind processing of conflicting information using measured ambivalence, which supports most of the hypotheses. The following sections discuss the explanations and implications related to the findings. In addition, it also addresses the possible reasons of failure in priming technique and possibilities for future research.

### **Motivations under Different Types of Ambivalence**

The results of the main experiment indicated that, in general, skewed ambivalence was associated with increased defensive motivation while balanced ambivalence was associated with increased accuracy motivation. This can be explained by the nature of two distinct types of ambivalence. Since skewed ambivalence is characterized by the

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<sup>3</sup> In 5-positive-1-negative condition, ANOVA test indicated that there was significant difference among topics on subjective ambivalence ( $F(3, 442) = 4.41, p = 0.005$ ). Similarly, topics were significantly different on attitude certainty ( $F(3, 442) = 5.85, p = 0.00064$ ) and attitude correctness ( $F(3, 442) = 4.97, p = 0.0021$ ). In 1-positive-5-negative condition, topics were significantly different on attitude certainty ( $F(3, 449) = 5.27, p = 0.0014$ ) and attitude correctness ( $F(3, 449) = 4.5, p = 0.001$ ). Lastly, in 3-positive-3-negative condition, topics were significantly different on attitude certainty ( $F(3, 917) = 3.52, p = 0.014$ ) and attitude correctness ( $F(3, 917) = 3.41, p = 0.045$ ) as well.

existence of dominant evaluation, it is easier and more comfortable for individuals to bolster the dominant evaluation and reduce ambivalence due to the preference of evaluative consistency (Van Harreveld et al., 2009). This preference for evaluative consistency, as demonstrated by balanced theory (Heider, 1946 as cited in Newby-Clark, McGregor & Zanna, 2002) and cognitive dissonance theory (Festinger, 1962), compels individuals to search for resolution under evaluative conflict. Skewed ambivalence, as demonstrated in previous research, is a state with evaluative conflict due to the simultaneous existence of positive and negative evaluations (Nordgren, Van Harreveld & Van der Pligt, 2006; Van Harreveld, Van der Pligt, & De Liver, 2009). Bolstering the dominant evaluation may be the easiest way to resolve such discomfort associated with skewed ambivalence. This was observed in previous research where biased selection and processing of pro-attitudinal messages and univalent thought-listing were found with individuals who hold skewed ambivalence (Clark, Wegener & Fabrigar, 2008; Nordgren, Van Harreveld & Van der Pligt, 2006; Sawicki et al., 2013; Van Harreveld, Van der Pligt, & De Liver, 2009). Defensive motivation, in a similar vein, reflects such desire to reach evaluative consistency in terms of protecting and bolstering the dominant evaluation under ambivalence (Chen, Duckworth & Chaiken, 1999). Therefore, defending the dominant evaluation within skewed ambivalence serves as the go-to strategy for individuals who hold such ambivalent state.

In contrast, balanced ambivalence, as characterized by the similar strength in bivalent evaluations, should reflect less of a state of discomfort but a state of resolution amid uncertain situations. This is reflected in the attitudinal certainty and correctness, as balanced ambivalence was associated with increased certainty as well as correctness of

the attitude while skewed ambivalence was associated with decreased certainty and correctness of the attitude. Reich & Wheeler (2016) suggest that ambivalence is a cultivated state of self-protection when desired outcome is uncertain. In this regard, balanced ambivalence can be viewed as a state of mind where people comfortably maintain these mixed thoughts while waiting for more information or a clearer picture of the issue. Especially, with debatable issue such as abortion, immigration, gun regulation, and death penalty, balanced ambivalence may be the strategy for people to avoid making any decisions and represents their acknowledgment regarding understandable benefits and risks on both sides of the arguments. Accuracy motivation, as characterized by an open-minded and balanced judgement of information from both sides, reflects the same goal as balanced ambivalence, pursuing an acquisition of knowledge rather than simply seeking decisions (Chen, Duckworth & Chaiken, 1999).

These motivations, associated with two distinct type of ambivalence, further impact on the processing of information. The results showed partial support for moderation role of defensive motivation in relation between skewed ambivalence and intended effort of processing. In both negatively skewed dataset and overall skewed dataset, ambivalence increased intended effort of processing conflicting information when defensive motivation was at extreme levels, either very high or very low. While high defensive motivation was hypothesized to boost effort in processing, low defensive motivation was not accounted in the hypotheses. The results may occur as high defensive motivation leading to increased effort due to the desire to protect the dominant evaluation. It may also indicate that when defensive motivation is low, such desire may decrease, and individuals may switch an open-minded systematic processing instead of

biased systematic processing. However, there was lack of support of moderation effect of accuracy motivation in between balanced ambivalence and intended effort of processing, although accuracy was positively associated with intended effort in processing, This could suggest that while accuracy-oriented individuals consistently pursue comprehensive processing regardless of ambivalent or not.

To further gauge the relationship, the mediation effect of two types of motivations was conducted. The results indicated that while skewed ambivalence directly predicted intended effort in processing of conflicting information, the mediation role of defensive motivation was only marginally significant. This may suggest that there could be other factors or mechanisms involved in the processing translating skewed ambivalence to effort in processing. However, balanced ambivalence affected effort entirely through accuracy motivation. This could suggest that in balanced scenarios, individuals are inherently motivated to understand the issue rather than taking any stance and thus accuracy motivation is a critical pathway in such process. The results also lend support for the nature of balanced motivation as a form of resolution while seeking truth.

The current research contributes to theoretically understanding of ambivalence, motivated information processing, and situations amid conflicting information. First, results of this research deepen our understanding the nature of ambivalence and its distinct types. Specifically, skewed and balanced ambivalence each possesses unique qualities, which exerts distinct impact on information processing. This distinction in its type may explain the inconsistency in previous finding regarding ambivalence's impact on information processing, especially address the question whether ambivalence is an amendable state for persuasion. Based on the findings from this research, ambivalence

does need to be considered further into different types to understand the persuasion dynamics under ambivalence. For instance, skewed ambivalence may represent an uneasy state, more easily influenced by upcoming communication. Balanced ambivalence, on the other hand, may be less susceptible to change at least without further clarification in evidence and information.

It also sheds the light on motivated information processing of conflicting information. As shown in the results of the main experiment, both defensive and accuracy motivation were associated with increased effort in processing, which lends additional support for the motivated HSM model (Chen, Duckworth & Chaiken, 1999). As suggested by the HSM model, when defensive and accuracy motivations are high with enough cognitive capacity, individuals are more likely to engage in systematic processing. While this research did not directly measure systematic processing, the intended effort in processing does provide indirect support for this assumption.

This research also lends support for methodological implication of measuring ambivalence. Ambivalence as measured by subjective (experienced) ambivalence and objective (formula-based) potential ambivalence revealed notable differences in individual's responses. As shown in the results, subjective ambivalence consistently predicted increased intended effort in processing of conflicting information in both skewed and balanced group while objective ambivalence received inconsistent results. This may suggest that the internal, experienced conflict is the driven force for processing effort instead of potential, objective conflict. This can be explained by the nature of subjective and objective ambivalence. Subjective ambivalence represents the self-report awareness with holding conflicting thoughts and feelings, whereas objective

ambivalence, as obtained from calculation based on positive and negative evaluations separately, does not reflect any awareness when individuals answer the question (Costarelli, 2011; Jonas, Bromer, Diehl, 2000; Jonas & Ziegler, 2007). In addition, as Newby-Clark and colleagues (2002) argue, ambivalence is only unpleasant when it is accessible. In other words, only when individuals are aware of the internal, experience conflict, can they feel the discomfort associated with ambivalence. Increased intended effort in processing of conflicting information may serve as the strategy to resolve such discomfort (Van Harreveld et al., 2012).

Aforementioned findings can be translated into implications for communication effort in combating conflicting information. Based on the nature of different types of ambivalence, communication experts may tailor communication strategies differently. At least, in the context of highly debatable issues, creating an opportunity for people to realize their inherent mixed feelings may stimulate their motivations to engage in more effortful processing of upcoming information. Although, their motivations may vary based on different types of ambivalence, the outcome is at least more effort in learning information rather than mindlessly use heuristics to make a quick decision. Content creators could leverage the perceived ambivalence to promote more engagement with the content. The simple strategy of marking post as “fake news” may receive defensive responses, however, acknowledging the debates and arguments from both sides may in turn offer an opportunity for people to reflect on their stance more carefully. By all means, this research offers some strategical implications for communication experts to rethink about the strategy to combat prevalent misinformation and fake news.

Additionally, it may provide individuals some comfort to feel better in the uncertain social environment.

### **Limitations and Future Studies**

One major methodological limitation of this study concerns the effectiveness of priming ambivalence for familiar topic. While previous research oftentimes uses novel topics or less familiar topics to prime attitude (e.g., junk food taxation, Sawicki et al., 2013) they faced methodological limitation of external validity, specially, whether such findings are still valid in in real-world scenarios in which people may hold pre-existing attitudes regarding various topics. The current study attempted to advance the priming technique by give participants the choice to select their own topic of ambivalence and further prime their ambivalence into two distinct types. While this method held its optimistic expectations, the results indicated that pre-existing attitudes retained a dominant power in the evaluation. Additionally, this study was conducted online with less control over the thought-listing process and participants. Thus, this limited effectiveness of priming technique could stem from the strength and stability in pre-existing attitudes or could also be partially due to the lack of control over experiment process. Future research can explore this priming technique on novel topics (emerging topics, topic of little familiarity, i.e., the COVID-19 vaccine when it first came out). This could further clarify the effectiveness of this priming technique.

Additionally, the salience of the ambivalent attitude or both sides of evaluation should also be considered when using the priming techniques. Before measuring both sides of the evaluations separately, such ambivalent attitude may not be salient in the mind of participants. Priming them with the task that asks them to list even or uneven

number of thoughts from two sides and measuring their attitudes subsequently may trigger such ambivalent attitude be salient and further influence their experience with the ambivalent attitude. Thus, one limitation of the current study is not including a measure of salience of the attitude and examine the interactive effect of salience and ambivalence on motivated information processing. Future research could take another strategy to limit the impact of salience by manipulating the number of information pieces from both sides and measure their subsequent attitudes. In this way, the attitude was not triggered by asking them to think about evaluations from both side but rather triggered by the information pieces.

Interestingly, although relevance was proposed as an influential factor in priming different type of ambivalence at the pilot study stage, there was no significant findings between relevant and non-relevant condition. Thus, relevance was disregarded in the main study. There was ample research on the effect of relevance on the level of information processing (Chaiken, 1989; Todorov, Chaiken & Henderson, 2002), and due to limited scope of current study, relevance was not accounted in the relationship between ambivalence and motivated information process. Future study can explore the role of relevance in comparison with ambivalence to see the difference in its impact on motivated information processing. It could also examine the interaction between ambivalence and relevance on motivated information processing.

Moreover, research finding ambivalence impact on processing of information relies heavily on experiments (see Clark, Wegener & Fabrigar, 2008; Nordgren, Van Harreveld & Van der Pligt, 2006; Sawicki et al., 2013; Van Harreveld, Van der Pligt, & De Liver, 2009). While experiment allows the possibility to gauge the casual relationship

among variables, it may face the question of external validity. Future research can thus consider investigating the experience of ambivalence using survey research to better capture nature of ambivalence in its natural setting. Furthermore, research on the information processing under ambivalence argues the pivotal role of discomfort or aversion associated with ambivalence (Nordgren, Van Harreveld & Van der Pligt, 2006; Van Harreveld, Van der Pligt, & De Liver, 2009). This research did not measure the aversion due to operational concerns, such as the length of the study and respondents' fatigue. Future research can explore the key role of aversion in relation to ambivalence and motivations. This can further elucidate the cognitive processing of conflicting information.

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## APPENDIX B

### MAIN STUDY RESULTS

Table 13. Positive ratings, negative ratings, objective ambivalence, and subjective ambivalence by topic

a. Abortion

	Positive Ratings		Negative Ratings		Objective Ambivalence		Subjective Ambivalence	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
5 positive 1 negative	3.51	1.22	3.94	1.15	2.43	1.66	3.59	1.03
1 positive 5 negative	3.64	1.22	3.92	1.18	2.4	1.68	3.53	1.1
3 positive 3 negative	3.61	1.09	3.84	1.13	2.4	1.51	3.61	0.98

b. Immigration

	Positive Ratings		Negative Ratings		Objective Ambivalence		Subjective Ambivalence	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
5 positive 1 negative	4.07	0.86	3.82	1.09	2.79	1.4	3.52	0.9
1 positive 5 negative	4.03	0.93	3.73	1.05	2.77	1.47	3.57	0.88
3 positive 3 negative	3.95	0.99	3.62	1.02	2.58	1.35	3.59	0.85

c. Gun Regulation

	Positive Ratings		Negative Ratings		Objective Ambivalence		Subjective Ambivalence	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
5 positive 1 negative	4.13	0.93	3.39	1.22	2.34	1.55	3.38	1.03

c. (continued)

	Positive Ratings		Negative Ratings		Objective Ambivalence		Subjective Ambivalence	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1 positive 5 negative	4.06	0.9	3.45	1.19	2.55	1.52	3.46	0.95
3 positive 3 negative	4.02	0.92	3.54	1.17	2.51	1.47	3.62	0.87

d. Death Penalty

	Positive Ratings		Negative Ratings		Objective Ambivalence		Subjective Ambivalence	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
5 positive 1 negative	3.4	1.1	4.15	1.01	2.52	1.58	3.87	0.86
1 positive 5 negative	3.42	1.03	4.08	0.99	2.39	1.38	3.7	0.78
3 positive 3 negative	3.41	1.07	3.93	1.1	2.29	1.47	3.78	0.87

**H1a: In the case of skewed ambivalence, individuals are more likely to adopt a defensive motivation when there is a need to make a decision than when there is no need to make a decision.**

Table 14. Measures within positively skewed ambivalence group (N = 701)

	Mean	SD
objective ambivalence <sup>4</sup>	1.87	1.2
subjective ambivalence <sup>5</sup>	3.34	0.94

<sup>4</sup> Calculated by  $((P + N)/2 - |P - N|)$ , where P stands for positive evaluation of the topic and N stands for negative evaluation of the topic.

<sup>5</sup> Subjective/felt ambivalence was assessed with 3 items on a 5-point scale. The first item asked participant to indicate how conflicted they felt about the topic (1=not conflict at all to 5 = maximum conflict) ( $M = 3.61, SD = 1.18$ ). The remaining two items measured their agreement with the statements “I feel torn between the two sides of (risks and benefits of) the topic” ( $M = 3.44, SD = 1$ ) and “I have conflicting thoughts about the topic” ( $M = 3.75, SD = 1.12$ ) (1 = completely disagree to 5 = completely agree) (Priester & Petty, 1996). These three items were average together to create a composite variable ( $M = 3.6, SD = 0.93$ ; Cronbach’s  $\alpha = 0.79$ ).

Table 14. (continued)

	Mean	SD
accuracy motivation <sup>6</sup>	4.03	0.71
defensive motivation <sup>7</sup>	3.25	0.75
intended effort in reading articles <sup>8</sup>	7.8	1.78

Table 15. Measures within negatively skewed ambivalence group (N = 648)

	Mean	SD
objective ambivalence	2.03	1.32
subjective ambivalence	3.68	0.92
accuracy motivation	4	0.74
defensive motivation	3.21	0.85
intended effort in reading articles	7.62	1.87

Table 16. Measures within skewed ambivalence group (N = 1349)

	Mean	SD
objective ambivalence	1.95	1.26
subjective ambivalence	3.5	0.94
accuracy motivation	4.02	0.73
defensive motivation	3.23	0.8
intended effort in reading articles	7.72	1.83

<sup>6</sup> Accuracy motivation was assessed the same way as defensive motivation, by having participants rate their considerations when selecting articles to read using the same 5 point-scale (1 as “not important at all” to 5 as “extremely important”). Statements included: “to find most logical view”, “to argue all points of view”, “to seek information indicating a viewpoint closely based on evidence”, “to read arguments that would help me reason”, and “to read arguments to update my viewpoint”. After dropping two items, the remaining items were averaged to create a composite variable ( $M = 4$ ,  $SD = 0.74$ ; Cronbach’s  $\alpha = 0.8$ ).

<sup>7</sup> Defensive motivation was measured by asking participants to indicate their considerations when selecting articles to read, using a 5 point-scale anchored at 1 as “not at all important” to 5 as “extremely important”. Participants rated the following statements: “to find arguments to counter opposing viewpoints”, “to pinpoint there are better reasons that aligns with my perspective than the opposing perspective”, “to hear information from opposing side to refute it”, and “to hear information that aligns with my perspective to support my reasoning”. Items were averaged to create a composite variable ( $M = 3.23$ ,  $SD = 0.82$ ; Cronbach’s  $\alpha = 0.7$ ).

<sup>8</sup> Intended effort for reading the selected articles was assessed on a 10-point scale (1= little effort to 10 as maximum effort). Participants indicated how much effort they were willing to invest in understanding and thinking about the content of the selected article(s).

Table 17. Measures within balanced ambivalence group (N = 482)

	Mean	SD
objective ambivalence	4.06	0.83
subjective ambivalence	3.86	0.82
accuracy motivation	3.95	0.77
defensive motivation	3.23	0.89
intended effort in reading articles	7.67	1.9

Table 18. two-way ANOVA showing the effects of subjective ambivalence and Need-to-Make-Decision condition on defensive motivation in positively skewed ambivalence group

	df	Sum Sq	Mean Sq	F	P
Subjective ambivalence	1	3.72	3.76	6.36	0.012*
Need-to-Make-Decision condition	1	0.64	0.64	1.10	0.3
Subjective : Need-to-Make-Decision condition	1	1.10	1.10	1.88	0.17

Table 19. two-way ANOVA showing the effects of objective ambivalence and Need-to-Make-Decision condition on defensive motivation in negatively skewed ambivalence group

	df	Sum Sq	Mean Sq	F	P
Subjective ambivalence	1	4.12	4.12	6.18	0.01*
Need-to-Make-Decision condition	1	0.00	0.004	0.006	0.94

Table 19. (continued)

Subjective: Need-to- Make- Decision condition	1	0.77	0.77	1.15	0.28
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Table 20. two-way ANOVA showing the effects of subjective ambivalence and Need-to-Make-Decision condition on accuracy motivation in negatively skewed ambivalence group

	df	Sum Sq	Mean Sq	F	P
Subjective ambivalence	1	5.47	5.47	10.68	0.0012**
Need-to-Make-Decision condition	1	1.2	1.2	2.35	0.13
Subjective : Need-to-Make-Decision condition	1	1.55	1.55	3.02	0.08

Table 21. two-way ANOVA showing the effects of objective ambivalence and Need-to-Make-Decision condition on defensive motivation in skewed ambivalence group

	df	Sum Sq	Mean Sq	F	P
Subjective ambivalence	1	4.9	4.89	7.78	0.005*
Need-to-Make-Decision condition	1	0.4	0.42	0.67	0.41
Subjective : Need-to-Make-Decision condition	1	0.9	0.9	1.44	0.23

Table 22. two-way ANOVA showing the effects of subjective ambivalence and Need-to-Make-Decision condition on accuracy motivation in skewed ambivalence group

	df	Sum Sq	Mean Sq	F	P
Subjective ambivalence	1	4.5	4.52	8.57	0.004**
Need-to-Make-Decision condition	1	2.7	2.73	5.18	0.02*
Subjective : Need-to-Make-Decision condition	1	2.8	2.85	5.4	0.02*

Table 23. two-way ANOVA showing the effects of subjective ambivalence and Need-to-Make-Decision condition on defensive motivation in skewed ambivalence group

	df	Sum Sq	Mean Sq	F	P
Subjective ambivalence	1	2.7	2.66	4.21	0.04*
Need-to-Make-Decision condition	1	0.4	0.36	0.56	0.45
Subjective : Need-to-Make-Decision condition	1	0.1	1.4	0.22	0.64

**H1b: In the case of balanced ambivalence, individuals are more likely to adopt an accuracy motivation when there is a need to make a decision than when there is no need to make a decision.**

Table 24. two-way ANOVA showing the effects of objective ambivalence and Need-to-Make-Decision condition on accuracy motivation in balanced ambivalence group

	df	Sum Sq	Mean Sq	F	P
objective ambivalence	1	4.56	4.56	7.21	0.008**
Need-to-Make-Decision condition	1	0.3	0.3	0.47	0.49
Subjective : Need-to-Make-Decision condition	1	0.01	0.02	0.02	0.88

Table 25. two-way ANOVA showing the effects of subjective ambivalence and Need-to-Make-Decision condition on accuracy motivation in balanced ambivalence group

	df	Sum Sq	Mean Sq	F	P
Subjective ambivalence	1	6.76	6.76	10.81	0.001**
Need-to-Make-Decision condition	1	0.46	0.46	0.73	0.39
Subjective : Need-to-Make-Decision condition	1	0.06	0.06	0.1	0.75

**H2a: In the case of skewed ambivalence, individuals with high defensive motivation are more likely to adopt a systematic processing than individuals with low motivation**

Table 26. two-way ANOVA showing the effects of objective ambivalence and defensive motivation on intended effort in reading articles in positively skewed ambivalence group

	df	Sum Sq	Mean Sq	F	P
Objective ambivalence	1	0.6	0.56	0.2	0.66
Defensive motivation	1	211.9	221.93	77.41	< 2e-16 ***
Objective ambivalence : Defensive motivation	1	0.1	0.07	0.03	0.87

Table 27. two-way ANOVA showing the effects of subjective ambivalence and defensive motivation on intended effort in reading articles in positively skewed ambivalence group

	df	Sum Sq	Mean Sq	F	P
Subjective ambivalence	1	21.1	21.11	7.4	0.001**
Defensive motivation	1	211.8	211.85	74.29	< 2e-16 ***
Subjective ambivalence : Defensive motivation	1	0.2	0,2	0.07	0.79

Table 28. two-way ANOVA showing the effects of objective ambivalence and defensive motivation on intended effort in reading articles in negatively skewed ambivalence group

	df	Sum Sq	Mean Sq	F	P
Objective ambivalence	1	9.6	9.59	3.18	0.14
Defensive motivation	1	262.1	262.11	86.84	< 2e-16***
Objective ambivalence : Defensive motivation	1	54.9	54.88	18.18	2.31e-05 ***

Table 29. two-way ANOVA showing the effects of subjective ambivalence and defensive motivation on intended effort in reading articles in negatively skewed ambivalence group

	df	Sum Sq	Mean Sq	F	P
Subjective ambivalence	1	36.7	36.73	11.98	0.00057 ***
Defensive motivation	1	252.5	252.52	82.35	< 2e-16 ***
Subjective ambivalence : Defensive motivation	1	6.2	6.19	2.02	0.15

Figure.2 Moderation effect of subjective ambivalence on intended effort in processing by defensive motivation in negatively skewed ambivalence group

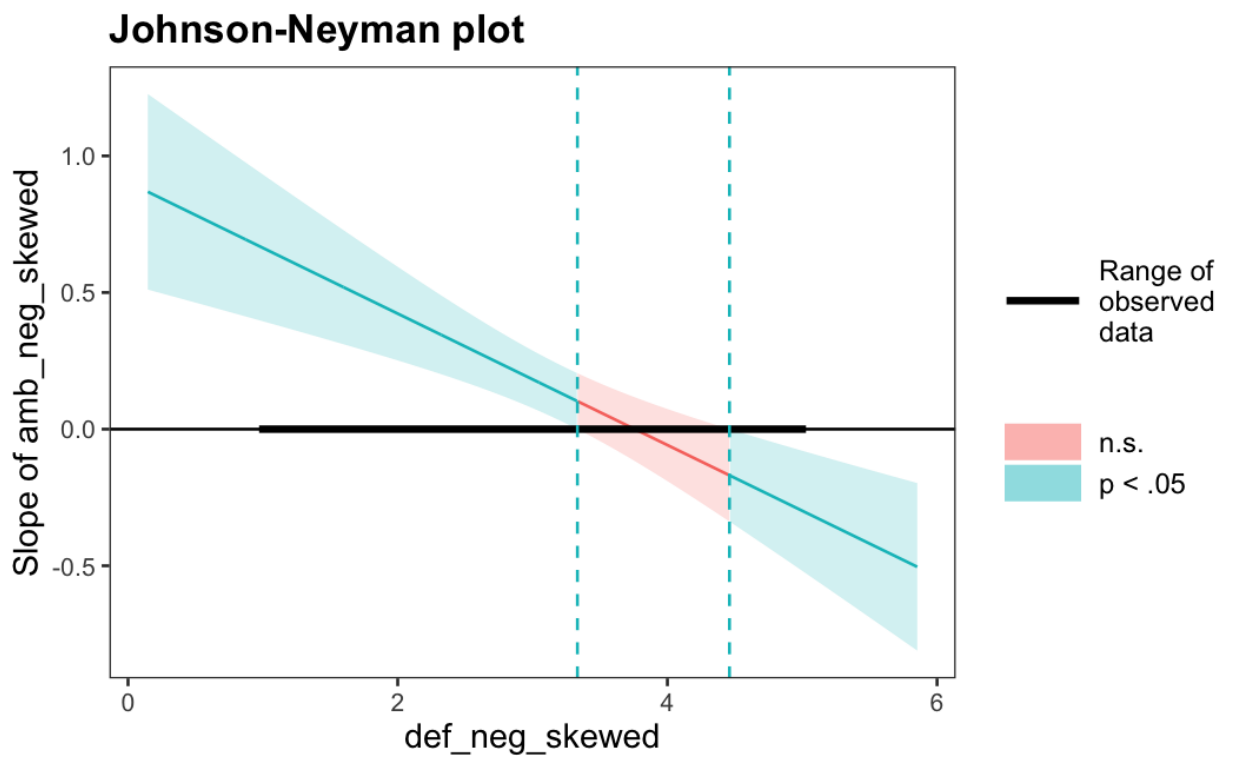


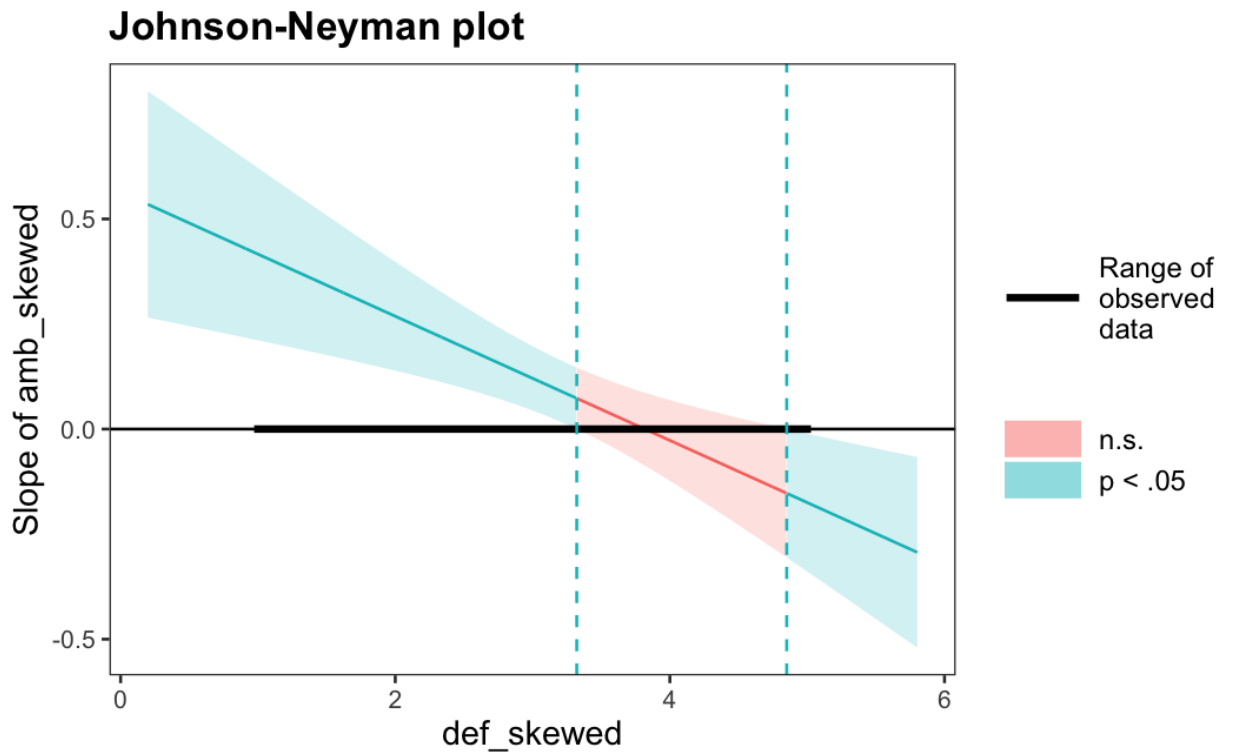
Table 30. two-way ANOVA showing the effects of objective ambivalence and defensive motivation on intended effort in reading articles in skewed ambivalence group

	df	Sum Sq	Mean Sq	F	P
Objective ambivalence	1	7	6.5	2.21	0.14
Defensive motivation	1	486	486.4	164.61	< 2e-16***
Objective ambivalence : Defensive motivation	1	35	34.7	11.74	0.0006***

Table 31. two-way ANOVA showing the effects of subjective ambivalence and defensive motivation on intended effort in reading articles in skewed ambivalence group

	df	Sum Sq	Mean Sq	F	P
Subjective ambivalence	1	46	45.9	15.49	8.71e-05 ***
Defensive motivation	1	469	468.7	158.18	< 2e-16 ***
Subjective ambivalence : Defensive motivation	1	2	1.9	0.65	0.42

Figure 3. Moderation effect of subjective ambivalence on intended effort in processing by defensive motivation in skewed ambivalence group



**H2b: In the case of balanced ambivalence, individuals with high accuracy motivation are more likely to adopt a systematic processing than individuals with low motivation.**

Table 32. two-way ANOVA showing the effects of objective ambivalence and accuracy motivation on intended effort in reading articles in balanced ambivalence group

	df	Sum Sq	Mean Sq	F	P
Objective ambivalence	1	40.9	40.9	15.07	0.00012***
Accuracy motivation	1	390.5	390.5	143.75	< 2e-16 ***
Objective ambivalence : Accuracy motivation	1	4.1	4.1	1.51	0.02*

Table 33. two-way ANOVA showing the effects of subjective ambivalence and accuracy motivation on intended effort in reading articles in balanced ambivalence group

	df	Sum Sq	Mean Sq	F	P
Subjective ambivalence	1	9.2	9.2	3.37	0.067
Accuracy motivation	1	416.7	416.7	152.3	< 2e-16 ***
Subjective ambivalence : Accuracy motivation	1	0.6	0.6	0.21	0.65

## Other Explorations

### *Mediation Analysis*

Table 34. Model coefficients assessing defensive motivation as a mediator between objective ambivalence and intended effort in reading articles

	Defensive Motivation (M)		Intended Effort in Processing	
	B	SE	B	SE
Objective Ambivalence	-0.035	0.017*	0.082	0.037*

Note: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .  $N = 1349$ .

Table 35. Model coefficients assessing accuracy motivation as a mediator between objective ambivalence and intended effort in reading articles

	Accuracy Motivation (M)		Intended Effort in Processing	
	B	SE	B	SE
Objective Ambivalence	0.18	0.041***	1.19	0.1***

Note: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .  $N = 482$ .

## APPENDIX C

### RESULTS FROM PRIMED AMBIVALENCE

First, Welch two sample t-test was conducted using positive evaluation, negative evaluation, objective ambivalence, and subjective ambivalence between skewed ambivalence conditions (5-positive-1-negative and 1-positive-5-negative separately) and balanced ambivalence condition. Results indicated that there was no difference between skewed ambivalence conditions (either 5-positive-1-negative or 1-positive-5-negative) and balanced ambivalence condition for any measure. Additionally, Welch two-sample t-test indicated there was no difference between 5-positive-1-negative and 1 positive-5-negative on any of the measures.

**H1a: In the case of skewed ambivalence, individuals are more likely to adopt a defensive motivation when there is a need to make a decision than when there is no need to make a decision.**

To test H1a, multiple linear regression was conducted to see if either defensive or accuracy motivation change as a function of objective ambivalence and its interaction with Need-to-Make-Decision in two skewed ambivalence conditions separately. Ethnicity was controlled since randomization test results (Chi-square) indicated that conditions that got abortion ( $F(2, 465) = 3.19, p < 0.050$ ) and immigration ( $F(2, 590) = 3.34, p < 0.05$ ) as topic were significantly different on ethnicity. Results indicated ambivalence, Need-to-Make-Decision, and its interaction did not predict defensive motivation in either 5-positive-1-negative or 1 positive-5-negative condition. Same multiple linear regression

analyses were conducted using subjective ambivalence instead of objective ambivalence and there was no significant findings. Thus, H1a was not supported.

Since skewed ambivalence conditions were not significantly different in objective ambivalence, 5-positive-1-negative and 1-positive-5-negative, were combined to create the skewed group. Multiple linear regression was conducted to see if objective ambivalence, Need-to-Make-Decision, and its interaction predict either motivation, controlling ethnicity. Results indicated that objective ambivalence in skewed group did not predict either motivation. Same multiple linear regression analyses were conducted using subjective ambivalence instead of objective ambivalence and there was no significant findings, which further indicated that H1a was not supported. The null findings in these results were likely due to the little effectiveness in primed ambivalence. Thus, further tests were conducted in topics where skewness were primed as expected.

Positive and negative evaluations in some primed skewed ambivalence conditions, such as abortion and death penalty in 1-positive-5-negative and immigration and gun regulation in 5-positive-1-negative (see Table 1) aligned with participant's pre-existing attitude, yielding seemingly effective primed skewness. Specifically, abortion and death penalty manifested as negatively skewed attitudes toward the topic and immigration and gun regulation manifested in the positively skewed direction. These conditions for the topic with same skewness were pulled out and analyzed individually and as pairs.

In 1-positive-5-negative condition for abortion and death penalty, separate multiple linear regression analyses were conducted within each topic to examine if ambivalence (using both objective and subjective ambivalence separately), Need-to-Make-Decision,

and their interaction predicted either motivation. Results indicated that there was no significant effect of any of the variables in either topic. Thus, H1a was not supported. Data from two topics in the same condition was compared for difference in objective and subjective ambivalence. Results indicated there was no significant difference between abortion's 1-positive-5-negative condition and death penalty's 1-positive-5-negative condition. Data from two topics for the same condition was combined and analyzed. Multiple linear regression was conducted to examine if ambivalence, Need-to-Make-Decision, and their interaction predicted either motivation. Results indicated no significant impact of any variables, which further indicated that H1a was not supported.

Similarly, immigration and gun regulation's 5-positive-1-negative condition was analyzed separately to test the H1a. Multiple linear regression indicated no impact of ambivalence, need-to-make-decision and their interaction on either motivation for gun regulation using either objective or subjective ambivalence. However, in the same condition for immigration (see Table 2), subjective ambivalence significantly predicted defensive motivation ( $F(4, 137) = 1.51, p < 0.05, R^2 = 0.0043$ ), though interactive effect with need-to-make-decision was not supported. Thus, results offer limited support for H1a.

Table 36. Multiple regression predicting the effect of subjective ambivalence and Need-to-Make-Decision on defensive motivation in immigration's 5-positive-1-negative condition

	b	SE	t	p
Intercept	2.243	0.891	2.517	0.013
Subjective ambivalence	0.408	0.202	2.020	0.045*
Need-to-Make-Decision	0.432	0.254	1.698	0.092
Ethnicity	-0.128	0.290	-0.441	0.660
Subjective ambivalence x need-to-make-decision	-0.135	0.069	-1.960	0.052

Note. \*p < 0.05

**H1b: In the case of balanced ambivalence, individuals are more likely to adopt an accuracy motivation when there is a need to make a decision than when there is no need to make a decision.**

To test the H1b, multiple linear regression was conducted in balanced ambivalence condition to see if objective ambivalence, Need-to-Make-Decision, and its interaction predict either motivation, controlling for ethnicity. Results indicated that while objective ambivalence and its interaction with need-to-make-decision did not predict either motivation, Need-to-Make-Decision significantly predicted increased accuracy motivation ( $F(4, 919) = 4.11, p < 0.05, R^2 = 0.013$ ). Multiple linear regression was repeated with subjective ambivalence instead of objective ambivalence and there was no significant findings. Thus, H2a was not supported.

Table 37. Multiple regression predicting the effect of objective ambivalence and Need-to-Make-Decision on accuracy motivation in balanced ambivalence condition

	B	SE	t	p
	3.750	0.208	18.041	<2e-16 ***
Objective ambivalence	-0.010	0.050	-0.189	0.850
Need-to-Make-Decision	0.102	0.051	2.028	0.043*
Ethnicity	-0.024	0.078	-0.312	0.756
Objective ambivalence x need-to-make-decision	0.002	0.017	0.110	0.913

Note. \*p < .05. \*\*\* p < .001.

**H2a: In the case of skewed ambivalence, individuals with high defensive motivation are more likely to adopt a systematic processing than individuals with low motivation**

To test if ambivalence, motivations and their interaction predict the intended effort in reading articles, multiple linear regression was conducted using objective ambivalence and defensive and accuracy motivation separately in the combined skewed ambivalence group, controlling for ethnicity. Results indicated either objective ambivalence or its interaction with motivations predicted the intended effort in processing. However, defensive ( $F(4, 901) = 29.14, p < 0.001, R^2 = 0.11$ ) significantly predicted the intended effort in processing (see Table 3). Thus, the H2a was partially supported.

Table 38. Multiple regression predicting the effect of objective ambivalence and defensive motivation on intended effort in processing in combined skewed ambivalence group

	B	SE	t	p
Intercept	5.486	0.588	9.33	< 2e-16 ***
Objective ambivalence	0.114	0.145	0.79	0.431
Defensive motivation	0.791	0.131	6.05	2.17e-09 ***
Ethnicity	-0.214	0.205	-1.04	0.298
Ambivalence × Defensive	-0.022	0.042	-0.52	0.601

Note. \*\*\*  $p < .001$ .

Separate multiple linear regression was conducted within 5-positive-1-negative and 1-positive-5-negative condition. Similarly, no effect of the objective ambivalence and its interaction with either motivation were found on intended effort in processing. However, significant effect of defensive (5p1n:  $F(4, 445) = 14.43, p < 0.001, R^2 = 0.11$ ; 1p5n:  $F(4, 451) = 15.73, p < 0.001, R^2 = 0.11$ ) was found on the intended effort of processing in both condition (see Table 4 & 5). Thus, only relationship between motivations and intended effort of processing was supported in H2a.

Table 39. Multiple regression predicting the effect of objective ambivalence and defensive motivation on intended effort in processing in 5-positive-1-negative condition

	b	SE	t	p
Intercept	5.864	0.858	6.835	2.72e-11 ***
Objective ambivalence	0.077	0.214	0.362	0.717
Defensive motivation	0.671	0.189	3.554	0.00042 ***
Ethnicity	-0.321	0.317	-1.010	0.313
Ambivalence × Defensive	0.009	0.063	0.138	0.890

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Table 40. Multiple regression predicting the effect of objective ambivalence and defensive motivation on intended effort in processing in 1-positive-5-negative condition

	b	SE	t	p
Intercept	5.250	0.816	6.430	3.25e-10 ***
Objective ambivalence	0.109	0.200	0.546	0.585
Defensive motivation	0.866	0.184	4.714	3.24e-06 ***
Ethnicity	-0.107	0.270	-0.395	0.693
Ambivalence × Defensive	-0.039	0.057	-0.685	0.493

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Using combined 5-positive-1-negative conditions in immigration and gun regulation, same multiple linear regression analyses were conducted using objective and subjective ambivalence separately (see Table 5 & 6). Significant impact of defensive motivation was found in analyses using both objective ( $F(4, 259) = 7.08, p < 0.001, R^2 = 0.08$ ) and subjective ambivalence ( $F(4, 259) = 9.57, p < 0.001, R^2 = 0.12$ ). In addition, results revealed that subjective ambivalence ( $F(4, 259) = 9.57, p < 0.01, R^2 = 0.12$ ) and its interaction with defensive motivation ( $F(4, 259) = 9.57, p < 0.01, R^2 = 0.12$ ) significant predicted intended effort in processing (see Table 6 & 7). Therefore, H2a was supported.

Table 41. Multiple regression predicting the effect of objective ambivalence and defensive motivation on intended effort in processing in combined immigration and gun regulation's 5-positive-1-negative condition

	b	SE	t	p
Intercept	5.363 ***	1.228	4.365	1.83e-05 ***
Objective ambivalence	0.100	0.294	0.341	0.733
Defensive motivation	0.596 *	0.264	2.256	0.025*
Ethnicity	0.012	0.447	0.028	0.978
Objective ambivalence x Defensive motivation	0.006	0.085	0.074	0.941

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Table 42. Multiple regression predicting the effect of subjective ambivalence and defensive motivation on intended effort in processing in combined immigration and gun regulation's 5-positive-1-negative condition

	b	SE	t	p
Intercept	0.772	1.816	0.425	0.671
Subjective ambivalence	1.364 **	0.434	3.144	0.002**
Defensive motivation	1.854 ***	0.478	3.879	0.000133 ***
Ethnicity	-0.020	0.440	-0.046	0.964
Subjective ambivalence x Defensive motivation	-0.341 **	0.127	-2.686	0.008**

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Using combined 1-positive-5-negative condition from abortion and death penalty, same multiple linear regression analyses were repeated using both objective and subjective ambivalence. Only significant impact of defensive motivation on intended effort of processing was found in analysis with objective ambivalence ( $F(4, 196) = 6.16$ ,  $p$

< 0.001,  $R^2 = 0.09$ ) (see Table 8). No significant result was found in analysis with subjective ambivalence. Thus, H2a was partially supported.

Table 43. Multiple regression predicting the effect of objective ambivalence and defensive motivation on intended effort in processing in combined abortion and death penalty's 1-positive-5-negative condition

	b	SE	t	p
Intercept	7.343	1.303	5.636	5.99e-08 ***
Objective ambivalence	0.016	0.302	0.053	0.958
Defensive motivation	0.702	0.259	2.707	0.007 **
Ethnicity	-0.881	0.493	-1.788	0.075
Objective ambivalence x Defensive motivation	-0.012	0.086	-0.145	0.885

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

**H2b: In the case of balanced ambivalence, individuals with high accuracy motivation are more likely to adopt a systematic processing than individuals with low motivation.**

To test if ambivalence, motivations and their interaction predict the intended effort in reading articles, multiple linear regression was conducted using objective ambivalence and defensive and accuracy motivation separately in the balanced ambivalence group, controlling for ethnicity. Results indicated objective ambivalence did not the intended effort in processing when accounting for accuracy motivation, its interaction, and ethnicity. The interaction between objective ambivalence and accuracy motivation was also insignificant. When accounting for defensive motivation, objective ambivalence significantly predicted ( $F(4, 919) = 32.08, p < 0.05, R^2 = 0.12$ ) intended

effort in processing. Additionally, both defensive ( $F(4, 919) = 32.08, p < 0.001, R^2 = 0.12$ ) and accuracy motivation ( $F(4, 919) = 39.21, p < 0.001, R^2 = 0.14$ ) predicted the intended effort in processing (see Table 9 & 10). Thus, the H2b was partially supported.

Table 44. Multiple regression predicting the effect of objective ambivalence and accuracy motivation on intended effort in processing in balanced ambivalence group

	B	SE	t	p
Intercept	4.399	0.721	6.1	1.52e-09 ***
Ambivalence (amb_3p3n)	-0.149	0.214	-0.69	0.488
Accuracy motivation (acu_3p3n)	0.827	0.151	5.48	5.43e-08 ***
History of involvement (his)	-0.105	0.186	-0.57	0.573
Ambivalence × Accuracy	0.054	0.052	1.04	0.297

Note.  $N = 924, R^2 = 0.142, *** p < 0.001$ .

Table 45. Multiple regression predicting the effect of objective ambivalence and defensive motivation in effort of processing in processing in balanced ambivalence group

Predictor	B	SE	t	p
Intercept	4.17	0.594	7.02	4.30e-12 ***
Ambivalence (amb_3p3n)	0.349	0.149	2.34	0.0193 *
Defensive motivation (def_3p3n)	0.985	0.131	7.51	1.37e-13 ***
History of involvement (his)	0.055	0.189	0.29	0.771
Ambivalence × Defensive	-0.081	0.044	-1.84	0.066

Note.  $N = 924, R^2 = 0.119, * p < 0.05; *** p < 0.001$ .

## **Discussion**

The priming conditions had little effect on participants' evaluation when the topics were ones about which they held strong attitudes, such as abortion and death penalty. Hence, future research should avoid using topic of high familiarity and instead use novel topic (i.e., fictional topics or unfamiliar topics).

Due to the largely ineffectiveness of priming conditions, the results using primed ambivalence had little insight on its impact on motivated information processing. Using conditions that aligned with directions of primed condition (i.e., abortion and death penalty's 1-positive-1-negative and immigration and gun regulation's 5-positive-1-negative condition), there was modest support for the impact of subjective ambivalence in skewed conditions and defensive motivation on intended effort in processing when combining the conditions that had same direction of skewness. Thus, future research should prioritize developing stronger priming techniques and then examine how effectively primed distinct types of ambivalence influence motivated information processing.

## APPENDIX D

### TABLE FOR KEY FINDINGS

Table 46. Table of key findings

<b>Key Findings</b>
Priming technique had limited effect on reported attitudes using topic of high familiarity
Increased accuracy motivation was observed at higher level of balanced ambivalence
Accuracy motivation had directly positive effect on intended effort in processing accounting for balanced ambivalence
Increased defensive motivation was observed at higher level of skewed ambivalence
Skewed ambivalence interacted with Need-to-Make-Decision (cognitive arousal) that increased accuracy motivation at higher level of skewed ambivalence when individuals were not cognitively aroused
Defensive motivation had direct effect on intended effort in processing accounting for skewed ambivalence
Skewed ambivalence interacted with defensive motivation and exerted direct positive impact on intended effort in processing among individuals with high or low defensive motivation

Table 46. (continued)

<b>Key Findings</b>
In skewed ambivalence dataset, defensive motivation served as a confounding variable, but did not mediate the relationship between skewed ambivalence and intended effort in processing
In balanced ambivalence, accuracy motivation fully mediated the relationship between ambivalence and intended effort in processing
Skewed ambivalence is negatively correlated with certainty of the attitude and correctness of the attitude
Balanced ambivalence is positively correlated with certainty of the attitude and correctness of the attitude