Intention–behaviour relationship within community running clubs: examining the moderating influence of leisure constraints and facilitators within the environment

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ABSTRACT

While intention is considered the proximal determinant of behaviour, scholars point to an intention–behaviour gap, calling for research that accounts for the environmental moderators that constrain or facilitate the intention–behaviour relationship. Adopting an ecological perspective, the study examined the potential moderating influence of five leisure constraints and facilitators on the running intention–behaviour relationship within the context of community running clubs. Employing a repeated measures design with members of four community running clubs across the Midwest United States, results of the multi-level modelling indicate running intentions and time significantly predict actual running behaviours. The findings provide no evidence that the leisure constraints and facilitators (leisure constraints, leader autonomy support, perceived motivational climate, club operations and club programmes) influenced the relationship between running intention and running behaviour. These results add further evidence to support the intention–behaviour relationship and suggest this relationship may fluctuate across contexts.

Introduction

Researchers and clinicians point to regular physical activity as a critical health promotion mechanism, contributing to positive health benefits (e.g. physical function, quality of life, wellness) while reducing risk for serious health conditions (e.g. obesity, diabetes, cardiovascular disease; Warburton & Bredin, 2017). To promote engagement in physical activity, scholars have sought to understand the antecedents of physical activity, with theory and research highlighting the importance of behavioural intentions (Rhodes & de Bruijn, 2013). While behavioural intentions are considered the proximal determinant of physical activity behaviour (Rebar et al., 2019; Rhodes & Yao, 2015), empirical evidence suggests intentions may be insufficient to enact actual behaviour (DellaVigna &

Malmendier, 2006; Hagger et al., 2002; Rhodes & de Bruijn, 2013). This intention–behaviour gap suggests possible intervening factors or moderating mechanisms constraining and/or facilitating the intention–behaviour relationship (Rhodes & Dickau, 2013). To fully understand how intention translates into behaviour, the influence of the environment in which behaviours are enacted must be accounted for (Giles-Corti, 2006).

An ecological framework considers multiple levels of influence on individual behaviour within the environment (intrapersonal, interpersonal, institutional, community, public policy; McLeroy et al., 1988), and can account for environmental influences on behaviour currently absent in the literature (Rhodes & Dickau, 2013). Leisure research that has examined the direct and indirect influence of the environment on physical activity behaviour has predominantly adopted a constraint paradigm, failing to account for environmental facilitators or moderating effects (Raymore, 2002; Rhodes & Dickau, 2013). A greater understanding of how the environment constrains and/or facilitates the intention–behaviour relationship can improve efforts to successfully translate physical activity intention into behaviour.

Serious leisure is a particularly pertinent context in which to study environmental influences on the intention–behaviour relationship (Stebbins, 1992). Though leisure facilitators and constraints are embedded in the everyday lives of serious leisure participants, the connection between serious leisure and the environment remains underresearched (Kennelly et al., 2013). In recent decades, marathon running, cycling and mountain climbing have become popular serious leisure pursuits (Qui et al., 2020). Shipway and Jones (2007) concluded runners take an almost professional approach to their training, attitude and preparation and advocated for more research on their behaviours and routines. Marathon runners must continuously train for months to prepare for a marathon event, encountering fluctuating obstacles and supports that can impact their training (Qui et al., 2020). In light of the persistence needed to train for a marathon, the environmental moderators constraining and/or facilitating runners' translation of intentions into behaviours are pertinent. Within the current study, community running clubs served as the context to examine leisure constraints and facilitators influencing the running intention–behaviour relationship over the course of a marathon training season.

Community running clubs play an important role in mitigating leisure constraints and facilitating leisure opportunities for runners in the community (Wegner et al., 2016). Though the literature lacks a clear conceptualization of community running clubs, they are akin to community sport organizations, which are "nonprofit, voluntary organizations whose essential goal is to provide a range of opportunities for people of various ages to participate in sport and physical activity" (Misener & Doherty, 2009, p. 457). Community running clubs diminish social barriers to leisure participation through creating a structure for social support, where individuals share a sense of belonging, experiences and connection to a group congruent with their social identity as a runner (Lizzo & Liechty, 2020). The support network provided by community running clubs, increases runners' psychological connection to the club, which in turn facilitates enhanced attitudes and behaviours toward the sport of running (Wegner et al., 2016). To facilitate leisure opportunities, community running clubs host organized group runs, create specified training programmes, promote social gatherings and organize running events for club members in the local community (Hambrick et al., 2018).

Through decreasing social barriers and increasing access to the sport of running, community running clubs are well positioned to help strengthen the running intention–behaviour relationship among their members. As community running clubs can serve upwards of hundreds of thousands of members through multiple running groups dispersed geographically across the country (Wegner et al., 2016), running clubs are a prevalent and important organizational structure within runners' immediate environment. The purpose of this manuscript was to examine the potential moderating influence of five leisure constraints and facilitators on the running intention–behaviour relationship within the context of community running clubs, through an ecological perspective.

Literature review

Sport and leisure research investigating physical activity largely uses behavioural intentions as a proxy for actual behaviours due to challenges and costs associated with collecting behavioural data (Baker et al., 2018; Kim et al., 2014). However, theories commonly applied to health behaviour identify intention as the proximal determinant (not proxy) of physical activity behaviour (Rebar et al., 2019; Rhodes & Yao, 2015). For example, the theory of reasoned action (Ajzen & Fishbein, 1980) and theory of planned behaviour (Ajzen, 1991) postulate behavioural intention is the most important predictor of behaviour. Scholarship has also confirmed behavioural intentions and actual behaviour function differently (Baker et al., 2018). In an attempt to promote physical activity behaviours, scholars have sought to understand the predictive value of the intention–behaviour relationship and identify environmental factors that may strengthen or attenuate this relationship (Rhodes & de Bruijn, 2013).

Despite the relative importance of intention in relation to physical activity behaviours, empirical evidence of the intention–behaviour relationship has produced inconsistent findings (Rhodes & Dickau, 2013). Meta-analyses of correlational studies examining physical activity have found the intention–behaviour relationship reliable and strong (Hagger et al., 2002; Symons Downs & Hausenblas, 2005). Empirical evidence has demonstrated a medium-to-large change in physical activity intention leads to change in physical activity behaviour, albeit a small change (Rhodes & Dickau, 2012; Web & Sheeran, 2006). Conversely, Rhodes and de Bruijn's (2013) meta-analysis found 48% of individuals with positive physical activity intentions failed to act. Further, McEachan et al.'s (2011) meta-analysis revealed intention only explains about 33% of the variance in future physical activity behaviour, illustrating the considerable variability in physical activity not explained by intention. Rebar et al. (2019) defined this intention–behaviour discordance as the *intention–behaviour gap*.

Research into the intention–behaviour gap illustrates intention is necessary but perhaps insufficient for physical activity behavioural enactment (Rhodes & de Bruijn, 2013). Moreover, participation in serious leisure requires considerable personal physical and psychological resources (e.g. injury free, commitment), financial costs to access the activity (e.g. equipment, race fees, travel, club membership), physical space to train (e.g. running trails, bike paths) and time spent away from family and other obligations (Moularde & Weaver, 2016). These intrapersonal, interpersonal and structural factors can constrain and/or facilitate individuals' ability to translate their leisure intention into behaviour. Though the literature suggests behavioural intentions can be supported or

thwarted by environmental contingencies (Hagger & Chatzisarantis, 2009), many theoretical frameworks used to study the intention–behaviour gap focus simply on intrapersonal influences. There is an opportunity to extend scholarship by accounting for the multiple levels of influence on individual behaviour within the environment through an ecological perspective (Bronfenbrenner, 1977).

Ecological perspective

From an ecological perspective, individual behaviour is influenced by the individual, physical and socio-cultural environment (Bronfenbrenner, 1977). In Bronfenbrenner's (1977) ecological systems theory, environmental influences on individual behaviour are classified into micro-, meso-, exo- and macrosystem levels. The microsystem reflects the individual's immediate environment (e.g. family, social networks, work groups), while the mesosystem refers to interrelations among various microsystems. The exosystem focuses on larger social structures and societal institutions in which the individual is embedded. Lastly, the macrosystem consists of cultural beliefs and values that influence the micro-, meso- and exosystems.

A key assumption of an ecological framework is that individual behaviour is influenced by multiple factors (Sato et al., 2019). McLeroy et al. (1988) asserted individual health behaviour is determined by intrapersonal factors (e.g. knowledge, attitudes, behaviour, skills, intentions), interpersonal processes (e.g. social networks and support systems), institutional factors (e.g. organizational structures and processes), community factors (e.g. mediating/power structures) and public policy (e.g. laws and policies). Giles-Corti (2006) argued to fully understand physical activity behaviours, the individual, social and physical environment must be considered for several reasons: (a) interventions focusing exclusively on psychosocial antecedents of physical activity behaviour have performed poorly; (b) the social environment has the potential to facilitate or discourage physical activity behaviours and (c) the physical environment (infrastructure, programmes, facilities) can facilitate or hinder physical activity participation.

Researchers have widely adopted a constraint approach to understanding how the environment influences physical activity intentions and behaviours (e.g. Wegner et al., 2015). The constraints paradigm assumes one's basic human condition involves a desire to participate in activities (Raymore, 2002). Therefore, if someone does not participate in an activity it is because they cannot (i.e. constraint) and if they do participate they must have overcome (i.e. negotiated) constraints in order to participate. Though the constraints approach accounts for what inhibits participation, it fails to recognize the resources that help individuals access and participate in sport and leisure. Raymore (2002) proposed an extended framework, positing that while constraints *limit*, *inhibit* or *prohibit* behaviour, facilitators *enable*, *promote*, *encourage* or *enhance* behaviour (Raymore, 2002).

To date, research examining constraints and facilitators to physical activity behaviour have primarily considered their direct and indirect influence (e.g. Cleland et al., 2010; Giles-Corti & Donovan, 2002; Haughton McNeill et al., 2006; Pan et al., 2009; Rhodes et al., 2006), which contradict theoretical and empirical evidence that intention is the proximal determinant of physical activity behaviour (Rhodes & Dickau, 2013). An alternative possibility is the presence of moderating mechanisms constraining and

facilitating the intention–behaviour relationship. A moderator approach does not challenge intention as the proximal determinant of physical activity, but rather aims to improve the successful translation of physical activity intention into physical activity behaviour (Rhodes & Dickau, 2013). Through an ecological lens, environmental moderators of the intention–behaviour relationship can be examined, accounting for the multiple direct, indirect, and interactive influences that may close the intention–behaviour gap (Rhodes et al., 2019).

Leisure constraints

Within the context of community running clubs, leisure constraints may influence a member's control over their performance of intended running behaviours and thus weaken the intention–behaviour relationship. Kim and Trail (2010) argued leisure constraints may delimit an individual's participatory behaviours or associated benefits, while others have found those engaged in serious leisure are likely to persevere through constraints (Kennelly et al., 2013). In particular, marathon runners previously have noted several constraint negotiation techniques (Goodsell & Harris, 2011), with their level of involvement or commitment to the sport indicative of their ability to overcome these constraints (Ridinger et al., 2012).

   Crawford and Godbey (1987) established three categories of leisure constraints: (a) intrapersonal (physical skills, abilities, and psychological attributes), (b) interpersonal (relationships' impact on participation) and (c) structural (time, resources, and access), which align with the individual, social and physical environmental factors reflected in most ecological frameworks. The factors within these categories are associated with the resources available and required to participate as well as factors within the environment, which has led to a proliferation of constraint measurements for a number of contexts (Casper et al., 2011). Researchers have established constraints may vary in intensity or importance, stage of leisure pursuit, age or other socio-demographic variables (Chen & Wu, 2009). Given the context and sample dependent nature of perceived constraints, a common practice is to take a holistic approach to measuring constraints specific to the context and sample (Mannell & Iwasaki, 2005).

   Research in serious leisure, and aligned with the current context, has established the presence of constraints among triathletes (Kennelly et al., 2013) and marathon runners (Ridinger et al., 2012). Among both groups, common constraints included work, family, participation conflict, time, and financial, which could be categorized as structural and interpersonal constraints. Pritchard et al. (2009) suggest these constraints do not affect one's intention to engage in an activity but rather the amount of engagement. Furthermore, Alexandris et al. (2002) argued constraints may serve as moderators between motivation and actual behaviours. Combined, these studies support the proposition that the intention–behaviour relationship may be attenuated by leisure constraints.

Leisure facilitators

Community running clubs serve a critical role in facilitating opportunities for individuals to engage in intentional running behaviour, and thus, may strengthen the intention–behaviour relationship. Community sport clubs have expanded efforts to build social capital, promote social inclusion, and develop a socially supportive environment (Frost et al., 2013: Maxwell et al., 2013), considered an antecedent of sport participation (e.g.

Nicholson et al., 2011). Coaches have been recognized as critical agents shaping the social-psychological environment through their facilitation of sport and leisure activities and interpersonal interactions with participants (Lafrenière et al., 2011). Within the social environment, coach facilitated leader autonomy support and mastery-motivational climate have been identified as important leisure facilitators positively influencing physical activity behaviour (Curran et al., 2015; Kinnafick et al., 2014).

Club coaches who are autonomy supportive provide members choices, acknowledge members' feelings and perspectives, avoid controlling behaviours, and foster a mastery-motivational climate focused on effort and improvement, enhancing members' intrinsic motivation to participate (Mageau & Vallerand, 2003). The degree to which leader autonomy support and perceived motivational climate influence the intention–behaviour relationship among club members is dependent upon individual members' social needs. Moreover, motive disposition theory postulates individuals have varied "capacity to experience the attainment of a certain type of incentive [in the environment] as rewarding" (Schultheiss & Hale, 2007, p. 13). Therefore, club members must recognize leader autonomy support and mastery-motivational climate as valuable in order for these social influences to impact their running intentions and behaviours. These social constructs have primarily been studied in a team environment and might function differently in a community running club context, warranting further investigation.

Along with the social environment, research has found the physical environment – such as sport operations (Lim et al., 2011; Wicker et al., 2013) and sport programmes (Inoue et al., 2013; Lower et al., 2015) – significantly impacts sport participation. Scholarship examining the influence of the physical environment on physical activity behaviour has primarily focused on neighbourhood quality, cohesion, safety and aesthetics (Cleland et al., 2010; Patnode et al., 2010; Rhodes et al., 2006), access to recreation facilities (Giles-Corti & Donovan, 2002; Haughton McNeill et al., 2006), access to available equipment (Patnode et al., 2010), availability of physical activity programmes and opportunities (Humpel et al., 2002; Pan et al., 2009) and weather (Humpel et al., 2002; Patnode et al., 2010). When considering the context of community sport clubs, club operations (i.e. the organization, management, programme delivery and environment of the club) and club programmes (i.e. the quality, accessibility and range of programmes and services provided by the club) are recognized as critical for promoting the health of club members (Doherty et al., 2014). However, the degree to which club operations and programmes influence members' running intentions and behaviours is likely influenced by the service quality and associated member satisfaction (Cabello-Manrique et al., 2021). A club that is managed efficiently and provides a range of accessible programmes/services in a positive environment can produce a positive affective response among members that increases their intentions to engage in club programmes/services, such as training sessions.

Research investigating the influence of community running clubs on member's running intentions and behaviours can inform efforts to support behavioural enactment within this sport setting. As a whole, environmental variables have received little attention as potential moderators of the intention–behaviour relationship (Rhodes & Dickau, 2013). The current study fills this gap by examining leisure constraints (holistically) and leisure facilitators (i.e. leader autonomy support, perceived motivational climate, club

operations and club programmes) within the social, structural, and physical environment that may moderate the running intention–behaviour relationship within the context of community running clubs.

Method

Research design

The researchers employed a repeated measures survey research design to examine the potential moderating influence of five leisure constraints and facilitators on the running intention–behaviour relationship of community running club members over time. More specifically, the research design is reflective of a prospective cohort panel study (Caruana et al., 2015), consisting of five rounds of data collection with four community running clubs over a 16-week marathon training season. Though longitudinal studies are infrequent in social sciences due to elevated time and resources required of researchers (White & Arzi, 2005), the repeated measures design has several advantages. Cohort studies afford researchers the ability to: (1) relate events to particular exposures, (2) establish a sequence of events, (3) follow change over time, (4) reduce recall bias by collecting data prior to a subsequent event and (5) make corrections for the cohort effect (Caruana et al., 2015; White & Arzi, 2005).

Participant characteristics

A total of 112 individuals, who are members of a community running club, participated in the study. Previous research and industry reports have established a fairly homogenous group within distance runners, such that their characteristics suggest they are 35–45 years old, White, and affluent (Kennedy et al., 2019; Running USA, 2019). Participants in our sample mirror this data as they were predominantly female (73.8%), White (95.1%), and reported a high annual household income (41.8% over $100,000). A majority was married or partnered (58.8%) and did not have children living in the household (62.4%). The average respondent had participated in organized running events approximately bimonthly in the previous year (M = 6.49 events, SD = 6.04; median = 5 events), while a minority (10.9%) participated in races more often than monthly. Participant demographics are reported in Table 1.

Data collection procedures

The researchers received executive board approval from four community running clubs in the Midwestern U.S. and institutional review board approval from the principal investigator's university. Adopting a census sampling technique (Bryman, 2012), the community running clubs distributed the first online survey link to club members via email. Club members provided informed consent online to gain access to the survey questions through Qualtrics. As contact information was solicited through the first survey, the researchers were able to distribute four subsequent online surveys via email directly to participants. The following timeline outlines data collection: week 1 (time 1), week 5 (time 2), week 9 (time 3), week 13 (time 4), week 17 (time 5; after marathon event). A

Table 1. Participant demographics.

Characteristic	Percentage	Characteristic	Percentage
Gender		Children in household	
Male	26.2	Zero	62.4
Female	73.8	1	13.9
		2	16.8
Ethnicity		3+	6.9
White	95.1		
Black or African American	2.9	Household income	
Asian	1.0	Less than $40,000	7.1
Native Hawaiian or	1.0	$40,000–$59,999	19.4
Other Pacific Islander		$60,000–$79,999	18.4
		$80,000–$99,999	13.3
Age		$100,000–$149,999	26.5
18–24	4.9	More than $150,000	15.3
25–29	18.4		
30–34	13.6	Running events participated in, last 12 months	
35–39	18.4	Zero	7.9
40–44	11.7	1	5.0
45–49	10.7	2	15.8
50–54	8.7	3	6.9
55–59	5.8	4	10.9
60–64	4.9	5	12.9
65+	2.9	6	7.9
		7	2.0
Marital/household status		8	3.0
Single, never married	30.4	9	3.0
Married or	53.6	10	8.9
domestic partnership		12	5.0
Widowed	1.8	More than 12	10.9
Divorced	5.4		

Note: Percentages reported are valid percentages; Gender and Ethnicity included additional options that were not selected by any respondents.

reminder e-mail was sent four days after the initial distribution in times 2–5. The researchers created a random identification number for each participant to match the data across the five time periods. To incentivize participation and reduce mortality threat to internal validity (Bryman, 2012; Fowler, 2009), a $50 giftcard to the community running club's sponsor (e.g. Fleet Feet) was randomly administered to participants (one per club) in each round of data collection.

Measures

The survey battery consisted of 51 items divided into five primary sections: demographics (7 items), running intentions (1 item), running behaviours (1 item), leisure constraints (14 items), leisure facilitators (leader autonomy support – 6 items, motivational climate – 14 items, club operations – 5 items, club programmes – 3 items). Out of concern for survey fatigue and attrition (Fowler, 2009), the researchers utilized a subset of these items for each survey in a modular survey design (see Table 2 for breakdown). In total, the researchers administered five surveys, consisting of a compilation of developed items and established scales.

Johnson et al. (2012) proposed modular survey designs, where a survey is split into multiple parts, or modules, with each module administered at a different time. Survey modularization differs from matrix sampling or split questionnaire designs (see Peytchev & Peytcheva, 2017; Raghunathan & Grizzle, 1995), in that all participants complete all

Table 2. Study measures.

Survey items	Survey 1 (week 1)	Survey 2 (week 5)	Survey 3 (week 9)	Survey 4 (week 13)	Survey 5 (week 17)
*Demographics	X				
*Running intentions	X	X	X	X	X
*Running behaviours		X	X	X	X
Leisure constraints					
†Leisure constraint scale (Shinew et al., 2004)	X		X		X
Leader autonomy support					
†Sport climate questionnaire (Deci & Ryan, 2006)		X		X	
Motivational climate					
†Perceived motivational climate in sport questionnaire-2 (Newton et al., 2000)		X		X	
Club operations					
†Community sport capacity scale – club operations subscale (Doherty & Cuskelly, 2020)		X		X	
Club programmes					
†Community sport capacity scale – club programmes subscale (Doherty & Cuskelly, 2020)		X		X	

Note: *Survey items were developed for the purpose of the study. †Survey items came from established scales.

items across multiple waves spread over time (Johnson et al., 2012). The chief benefit is reducing the burden placed on study participants at each data collection, with concomitant benefits from reduced participant fatigue and dropout (Toepoel & Lugtig, 2022). Previous methodological research has found that study participants find modular surveys significantly easier to complete (West et al., 2015) and the method is associated with improved data quality, including reduced straight-lining and item missingness (Toepoel & Lugtig, 2022).

Measures assessed in different data collections were joined to form two four-week periods. Period one comprised running intention and leisure constraint variables measured in week one and running behaviour and leisure facilitator variables measured in week five. Period two comprised the same variables measured in weeks nine and thirteen. Multi-item scales were mean averaged to create composite measures.

Running intentions and behaviours

To capture club members' running intentions and behaviours, single items were developed for the purpose of the study: "over the next month, how many miles do you plan to run each week?" (i.e. running intention) and "over the past month, on average how many miles did you run each week?" (i.e. running behaviour). Running intention reported at the start of each four-week period was paired with running behaviour reported at the end of each four-week period. Single-item measures are appropriate when both the object of the measure and the attribute of measurement are clear and unambiguous (Bergkvist & Rossiter, 2007). Experienced runners, such as those participating in our study, know both what average weekly mileage is intended to capture and what a mile measures. Thus, weekly running distance, whether intended or past behaviour, represents a nearly ideal scenario for adopting a single-item measure. Use of a single-item to measure physical activity behaviour has also been supported in the literature (Hagger et al., 2002).

Leisure constraints

The 14-item leisure constraint scale developed by Shinew et al. (2004) was employed, using a 7-point Likert scale ranging from 1 (not a lot) to 7 (a lot). Example items include: "too busy with family", "costs too much" and "lack of skill". The researchers slightly modified the prompt to specify the leisure activity of interest and time frame (i.e. "To what degree did each of the following reasons impact the amount of time you spent running in the past month?") to capture current perceived constraints within the context of running (Giles-Corti et al., 2005). Previous research using the scale, and measuring leisure constraints more broadly, has analyzed the factor structure of these items using structural equation modelling, with the results indicating a single-factor ($\alpha = 0.72$; Hubbard & Mannell, 2001) or highly correlated three-factor structure ($\chi^2/df = 1.633$, GFI = .938, RMSR = .054; Raymore et al., 1993). Mannell and Iwasaki (2005) argued the cross loadings of factors is rather problematic, and the inconsistent results across studies may be indicative of the various sampling frames. Casper et al. (2011) contended it is necessary to go beyond the traditional psychometric evaluations (e.g. internal consistency, predictive validity) as they are not sufficient in determining the factor present within the sample. As common practice – and prior scholarship on leisure constraints (Aicher et al., 2018; Hubbard & Mannell, 2001) – calls for a holistic approach (Mannell & Iwasaki, 2005), the leisure constraints measure was treated as a composite variable.

Leisure facilitators

Four leisure facilitators were measured: leader autonomy support, perceived motivational climate, club operations and club programmes. Leader autonomy support was measured through Deci and Ryan's (2006) 6-item version of the Sport Climate Questionnaire (SCQ), adopting the 7-point Likert scale (1 = strongly disagree to 7 = strongly agree). Example items include: "I feel understood by my club", "my coach encourages me to ask questions" and "my coach listens to how I would like to do things". The researchers added the instruction, "If your team does not have a formal coach, think about your club leader", to accommodate varying club organizational structures. The SCQ has demonstrated strong internal reliability in previous studies (e.g. $\alpha = 0.933$; Noble et al., 2016).

A modified version of the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton et al., 2000) was employed to measure perceptions of the coach-created motivational climate, as the coach (or club leader) plays a critical role in shaping the club's social environment, whereas peers (club members) are typically more transitory. The PMCSQ-2 includes six dimensions reflecting mastery and performance motivational climates, and has demonstrated acceptable construct validity (RMSEA = .054, CFI = .90, GFI = .90) and internal consistency ($\alpha = 0.74–0.88$; Newton et al., 2000). For the current study, the researchers utilized the 14 items that explicitly identified perceptions of the coach and created a composite motivational climate variable. Example items include: "the coach wants us to try new skills", "the coach has his or her own favorites" and "the coach emphasizes always trying your best". Items associated with the punishment for mistakes, unequal recognition, and intra-team rivalry dimensions were reverse coded so higher scale scores were associated with a more positive climate.

Items associated with the cooperative learning, important role, and effort/improvement dimensions were retained in their original form.

The Community Sport Capacity Scale outcomes dimension reflects the goals of community sport clubs, including club operations that are efficient, well organized, and create a positive environment as well as quality and accessibility of club programmes (Doherty & Cuskelly, 2020), The outcomes dimension consists of three subscales: club operations (5 items), club programmes (3 items), and community presence (3 items), measured on a 7-point Likert scale ranging from 1 (not at all) to 4 (somewhat) to 7 (to a great extent). The researchers slightly modified the scaling from 1 (not at all) to 7 (a lot) for consistency across the measures. Further, the researchers only adopted the club operations and club programmes subscales, as community presence of the club was considered unrelated to the physical environment and unlikely to impact member running intentions and behaviours. The club operations subscale consists of five items, such as "our club is run efficiently", "our club is well organized" and "day-to-day operations of the club are effective", with evidence of construct validity (χ^2/df = 1.008, GFI = .994, RMSR = .00) and internal consistency ($\alpha < 0.80$). While the club programmes subscale includes the following three items – "our club provides quality programs and services", "our club offers a range of programs" and "our club offers accessible programs" – and has demonstrated evidence of construct validity (χ^2/df = 1.991, GFI = .996, RMSR = .54) and internal consistency ($\alpha < 0.80$).

Data analysis

In the current study, we used multi-level modelling to analyze our data and account for interdependence of observations from the same participants and nesting of participants within specific running clubs. The concept behind treating repeated measures as multi-level data is that characteristics of each individual are linked and this non-independence needs to be incorporated into statistical estimation (Raudenbush & Bryk, 2002). Violations of the independence assumption in multiple regression leads to parameter misestimation, inaccurate standard errors and increased risk of Type I errors (Raudenbush & Bryk, 2002; Tabachnick & Fidell, 2019).

Level one comprised individual responses including running intention, running behaviour, leisure constraints, leisure facilitators, and measurement period. We also created level one interaction terms between running intention and each of the five proposed moderators (i.e. leisure constraint and facilitator variables) after grand mean centering each variable. Level two grouped level one data by individual respondent while level three grouped individuals by their running club. In total, our data comprised 166 cases from 112 individuals – 54 participants with data in both periods, 53 with data only in period 1, and five with data only in period 2, meeting Tabachnick and Fidell's (2019) suggestion of at least 20 cases at level two. Multi-level modelling allowed us to assess relationships between study variables while accounting for interdependencies between multiple responses from the same individual, unbalanced data between individuals, and controlling for unobserved idiosyncratic characteristics of individual respondents (Raudenbush & Bryk, 2002; Tabachnick & Fidell, 2019).

Results

Construct measurement

Prior to further analysis, we calculated bivariate correlations between each of the constructs and measures. In addition, we calculated Cronbach's alpha for each scale to assess internal reliability within our sample. All measures included in the study demonstrated satisfactory internal reliability (Nunnally, 1978). Descriptive statistics, reliability measures, and bivariate correlations are reported in Table 3.

Intention–behaviour gap

We examined antecedents for running behaviour, measured as average weekly mileage over the preceding month. Model 1 included running intention, time period, leisure constraints, and four leisure facilitators as independent variables. Model 2 additionally included interaction terms between running intention and each of the five potential moderators to assess the possibility that each influenced the relationship between running intention and running behaviour. Model results are summarized in Table 4.

The only two predictors statistically significantly related ($p < .05$) to running behaviour were running intention and period. Running intention was positively associated with running behaviour, indicating the greater distance a runner intended to run during a four-week period, the greater distance actually run. Every additional mile per week an individual intended to run was associated with actually running an additional 0.651 miles (model 1) each week. Period 1 was negatively associated with running behaviour, indicating runners ran fewer miles at the start of their training cycle (weeks 1–5) than later (weeks 9–13). On average, individuals ran 4.032 (model 1) fewer miles per week at the start of their training cycle than later in their training. In both models, leisure constraints and the four leisure facilitators had coefficients that were not statistically significantly different from zero, indicating they were not directly associated with

Table 3. Construct descriptive statistics and bivariate correlations.

		Mean (SD)	Cronbach's Alpha	1	2	3	4	5	6
1.	Running behaviour	24.452 (11.285)	–	–					
2.	Running intention	26.672 (9.756)	–	.661***	–				
3.	Leisure constraints	2.102 (0.739)	.796	−.243**	−.207*	–			
4.	Club operations	6.195 (0.943)	.929	−.219**	−.343***	−.008	–		
5.	Club programmes	5.977 (1.135)	.841	−.268**	−.332***	−.090	.883***	–	
6.	Leader autonomy support	5.869 (1.107)	.939	−.097	−.212*	.026	.708***	.675***	–
7.	Motivational climate	6.242 (0.749)	.877	−.086	−.162	.051	.548***	.504***	.724***

Note: Running behaviour and running intention are measured in miles/week; all other constructs are measured on a seven-point scale.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 4. Results of the multi-level model for running behaviour.

	Model 1				Model 2			
			95% CI				95% CI	
	Coeff. (SE)	p-Value	Lower bound	Upper bound	Coeff. (SE)	p-Value	Lower bound	Upper bound
Intercept	2.413 (1.311)	.101	−0.579	5.404	2.042 (1.675)	.313	−3.422	7.508
Running intention	**0.651 (0.101)**	**.000**	**0.448**	**0.853**	**.617 (0.107)**	**.000**	**0.395**	**0.839**
Period 1	**−4.032 (1.364)**	**.005**	**−6.774**	**−1.289**	**−4.031 (1.313)**	**.003**	**−6.666**	**−1.397**
Leisure constraints	−1.089 (0.874)	.216	−2.825	0.647	−1.592 (1.008)	.117	−3.594	0.409
Motivational climate	−0.035 (1.264)	.978	−2.457	2.477	−0.452 (1.400)	.747	−3.236	2.332
Club operations	−0.248 (1.563)	.874	−3.349	2.853	−1.259 (1.775)	.476	−4.791	2.254
Club programmes	−0.259 (1.265)	.838	−2.768	2.251	0.003 (1.379)	.998	−2.730	2.737
Leader autonomy support	0.254 (1.047)	.809	−1.824	2.331	0.776 (1.143)	.499	−1.494	3.045
Running intention X leisure constraints					−0.155 (0.135)	.257	−0.425	0.116
Running intention X motivational climate					0.155 (0.216)	.474	−0.273	0.583
Running intention X club operations					0.049 (0.206)	.714	−0.362	0.459
Running intention X club programmes					−0.092 (0.172)	.594	−0.437	0.253
Running intention X leader autonomy support					−0.006 (0.173)	.973	−0.351	0.340
−2 log likelihood	835.072				834.696			
AIC	863.072				872.696			
BIC	902.442				926.128			

Note: Period 2 is the baseline period; CI = Confidence Interval; Coeff. = coefficient; SE = standard error; AIC = Akaike's Information Criterion; BIC = Bayesian Information Criterion; Coefficients statistically significantly different than zero ($p < .05$) are marked in bold.

running behaviour. Model 2 additionally incorporated interaction terms between running intention and each of the five potential moderators; none of the interaction terms were statistically significantly different from zero, providing no evidence that they influenced the relationship between running intention and running behaviour.

We additionally compared the two models based on −2 log likelihood, the Akaike information criterion (AIC; Akaike, 1973), and the Bayesian information criterion (BIC; Schwarz, 1978). Each of these is a measure of the relative quality of statistical models in explaining particular data, capturing a trade-off between goodness of fit and model complexity with differing magnitude penalization for model complexity (Burnham & Anderson, 2004). Penalizing model complexity counterbalances overfitting to specific data, which can lead to models that generalize poorly (Dziak et al., 2012). Based on χ^2 difference tests ($df = 5$), model 1 and model 2 did not significantly differ on −2 log likelihood ($p = .996$) or AIC ($p = .086$), while model 1 was significantly better based on BIC ($p < .001$). These results and non-significant coefficients on the interaction terms in model 2 indicate the more parsimonious model 1 is preferable to model 2.

Discussion

This study centred on evaluating how leisure constraints and facilitators moderate relationships between running intentions and actual running behaviours of running club members over a 16-week marathon training season. The results revealed running intention and time period related to running behaviour were the only significant predictors of running behaviour, with leisure constraints and leisure facilitators (leader autonomy support, motivational climate, club operations and club programmes) non-significant moderators of the running intention and behaviour relationship. These findings will be discussed in relation to their theoretical and practical significance.

Intention–behaviour relationship

Model 1 demonstrates support for the theory of reasoned action (Ajzen & Fishbein, 1980) and the theory of planned behaviour (Ajzen, 1991), which collectively posit behavioural intention as the proximal antecedent of behaviour. Club members who recorded intended running weekly mileage at the beginning of the month reported equivalent – though slightly overestimated (DellaVigna & Malmendier, 2006) – weekly mileage achieved at the end of the month, with mileage steadily increasing as training progressed. The correlation between running intention and behaviour was relatively large ($r = .66$), with the amount of variance in running behaviour explained by running intention (44%) larger than previous research (e.g. 33% found in McEachan et al., 2011). These findings suggest the intention–behaviour gap is smaller among marathon runners, which may be characteristic of the serious leisure setting which emphasizes dedication, perseverance, and constraints negotiation (Shipway & Jones, 2007; Stebbins, 1992). Given the substantial remaining unexplained variance in running behaviour, an ecological perspective remains a viable approach to understand the environmental factors influencing running behaviour (Bronfenbrenner, 1977; Giles-Corti, 2006; McLeroy et al., 1988), despite the moderators in the current study being non-significant.

While the theories applied to health behaviour identify behavioural intention as the most important determinant of behaviour (Rhodes & Yao, 2015), this relationship has been drawn into question (Baker et al., 2018; DellaVigna & Malmendier, 2006). Extending the debate through rigorous methods, the current study measured intention prospectively at the beginning of the month and behaviour retrospectively at the end of the month to reduce common method bias (Podsakoff et al., 2003). Further, these data were collected multiple times from the same individuals to control for unobserved inter-individual heterogeneity. Previous research on marathon training groups found fluctuations in running intentions synchronized with fluctuations in running behaviours, suggesting higher intention stability is critical for long-term maintenance of serious leisure participation (Scholz et al., 2008). Through a repeated measures design, the current study captured the runners' fluctuating behavioural intentions across the marathon training season for a more accurate behavioural prediction (Conroy et al., 2011). Researchers have suggested the intention–behaviour relationship is malleable (Chandon et al., 2005; Seiders et al., 2005) and potentially context-dependent (Cleland et al., 2010; Conroy et al., 2011). Community running clubs may provide the structure, social support, and goal-oriented achievement context that facilitates the intention–

behaviour relationship more so than unstructured settings (DellaVigna & Malmendier, 2006; Spink et al., 2012), which has implications for alternative leisure settings.

Influence of leisure constraints and facilitators

An ecological perspective posits the social, structural, and physical environment may either constrain or facilitate running intention translation to behaviour (McLeroy et al., 1988; Rhodes & Yao, 2015). Though the moderators were non-significant, the bivariate relationships between leisure constraints and running intention and behaviour were statistically significant and negative, supporting previous research that found perceived constraints act as a de-motivating force or obstacle impeding physical activity behaviour (Alexandris et al., 2002; Siddiqi et al., 2011). Despite the leisure facilitators reported, Model 2 found the four leisure facilitators non-significant moderators of the intention–behaviour relationship, with the bivariate relationships between club-level leisure facilitators and running intentions and behaviours statistically significant and negative. Collectively, these findings are contrary to ecological theory (Bronfenbrenner, 1977; Giles-Corti, 2006; McLeroy et al., 1988) and prior scholarship demonstrating the influence of environmental constraints and facilitators on physical activity behaviour (Haughton McNeill et al., 2006; Pan et al., 2009; Rhodes et al., 2006), warranting focused discussion on each variable studied.

Descriptive statistics revealed fairly low perceived leisure constraints and high perceived leisure facilitators, which is consistent with previous research on long-distance runners (Aicher et al., 2018; Sa et al., 2015). The low perceived constraints of marathon runners suggest serious leisure activities with flexible training programmes, schedules and spaces may be associated with fewer constraints. The high perceived facilitators support previous research identifying social support (Frost et al., 2013; Maxwell et al., 2013), sport operations (Lim et al., 2011; Wicker et al., 2013) and sport programmes (Inoue et al., 2013; Lower et al., 2015) as critical community sport club features supporting member behaviours. Participation in a community running club may remove many of the interpersonal and structural barriers that can inhibit running behaviours and serve as an extrinsic regulator promoting adherence to a structured training programme (Kennelly et al., 2013; Kim & Trail, 2010). For instance, a running club provides people with whom to run in a safe structured environment, and provides training programmes to improve skill and motivate continued participation.

Motive disposition theory may explain the varying degree to which club leader behaviours influence the intention–behaviour relationship among running club members (McClelland, 1985). Though literature supports an autonomy-supportive (e.g. Kinnafick et al., 2014), mastery-oriented sport environment (e.g. Curran et al., 2015), if an individual does not want or need this type of social environment, they are less likely to experience its benefits. Schüler et al. (2014) demonstrated some people need coach autonomy support more than others within the sport context, while others highlight social affiliation, social belonging, and social recognition as primary motivations of participation (Deelen et al., 2018). Perhaps running club members participate in club activities for the social and motivational function of clubs more so than the sport function (Kennelly et al., 2013; Misener & Doherty, 2009). As such, participants may want

club access rather than leadership support, lessening the role of the club in moderating running behaviours.

Programme dosage (i.e. number, duration, frequency, intensity of club sessions) may explain the non-significant interaction between running intentions and club-level leisure facilitators (i.e. club operations, club programmes; Nation et al., 2003). While running club programmes help facilitate running behaviours, they are typically limited in scope. For example, the clubs studied offered up to three workouts per week primarily consisting of a tempo run, speed workout, and long-distance run. Further, a club's influence on members' running intentions and behaviours through facilitating club pro-grammes/services is largely dependent upon member engagement and satisfaction in the club (Cabello-Manrique et al., 2021). When considering marathon training programmes, the schedule generally includes 16 weeks of training with progressively increasing mileage ranging from 12 to 65 miles per week (Abbate, 2019). Even if club members are consistently participating in their club's training programme, club activities alone are insufficient to meet standard marathon training regimes. Thus, additional running behaviours outside the club are necessary, which requires initiative and commitment from the individual runner. As individual goal setting and goal achievement are integral components of marathon training (Fulton et al., 2017), the running club may affect individual running behaviours less than the individuals themselves.

Contrary to the literature presented above, the club-level environmental variables actually demonstrated negative correlations with running intention and behaviour (cf. Table 3). While these findings do not indicate a causal relationship, they do reveal high volume runners reported lower scores for club-level environmental variables. There are potential capacity limitations of community running clubs that may inhibit elite running behaviours. Moreover, running clubs are often limited to a few workouts per week, possess pace groups reflective of the collective, and are typically led by volunteer coaches (Hambrick et al., 2018), which may not be conducive for serious runners' planned behaviours. Though competitive running was historically reserved for the elite, the running phenomenon has become increasingly more inclusive and accessible for recreational runners of varying abilities (Scheerder et al., 2015). As such, community running clubs may have a greater influence on the intention–behaviour relationship for novice or casual runners acclimating to the sport rather than serious leisure participants.

Implications

As demonstrated by Model 1 and Model 2, if the relationship between intention and behaviour is strong, leisure constraints and facilitators may have less impact on individual behaviour and are secondary to behavioural intention. Scholarship suggests the influence of the environment fluctuates depending on the type of behaviour and context (Cleland et al., 2010; Conroy et al., 2011). In contexts where there is a strong intention–behaviour relationship, such as community running clubs, promoting intention should be sufficient to produce desired behaviour. Within such contexts, club administrators can facilitate goal setting, tailored training programmes, and accountability through the social group.

Club coaches (or leaders) can use Gollwitzer and Sheeran's (2006) model of action – consisting of predecisional (goal intentions), preactional (goal planning), actional

(implementing goal-directed behaviours) and postactional (goal attainment) phases – as a guide to help club members translate goal intentions into goal attainment. Prior to the start of a marathon training programme (or alternative structured running programme), the club coach can facilitate goal setting by directing club members to reflect upon what they wish to achieve through the training programme and deliberately choose the most desirable and feasible goals to strive for. Goals may focus on the outcome (achieving a specified result), performance (improving one's ability), and/or process (behaviours needed to achieve a desired outcome or performance) based on individual interests, and should follow the SMART criteria: specific, measurable, achievable, realistic and time-tabled (McCarthy & Gupta, 2022). Club members should be encouraged to share their goals with the coach and other members to foster a mastery-motivational climate characterized by goal striving, accountability, and support.

Once club members have committed to a goal(s), the club coach can help members develop a tailored training programme based upon their specified goal(s) that clarifies what, when, where and how they can implement appropriate goal-directed behaviours (Gollwitzer & Sheeran, 2006). Running training programmes often have similar features such as a speed workout and long run, but should vary in dosage (duration, intensity, frequency, spacing; Nation et al., 2003) to account for the members' goal(s), running experience/skills, and anticipated constraints. For novice runners, club coaches may need to take a more active role in instructing them on training workouts (e.g. speed workout on a track) and techniques (e.g. running form) to ensure they are able to follow the tailored training programme and implement the planned goal-directed behaviours (Janssen et al., 2020).

Training programmes should be flexible and adaptable to account for potential individual (e.g. injury) and environmental (e.g. time constraints) threats to goal progress, so that members' goal striving is not derailed (Gollwitzer & Sheeran, 2006). Club coaches can seek to reduce structural running constraints by choosing safe spaces (outdoor track, parks, trails) to host training workouts; developing specific, clear training programmes and individual workouts to reduce members' burden of goal planning and implementation; and maintaining low club fees. To reduce interpersonal constraints, club coaches can coordinate club social events (e.g. beer run, club dinner) to build camaraderie; provide group and individual instruction to enhance members' running ability; create adaptations to training workouts based upon member abilities; and provide goal-oriented, constructive, specific, timely feedback to enhance members' self-efficacy. To foster goal-striving in the midst of constraints, club coaches should encourage members to assess their goals periodically (weekly or monthly), evaluate goal progress and modify goals or goal-directed behaviours when necessary to promote goal attainment.

At the conclusion of the marathon training programme, club coaches can facilitate time for reflection during which members evaluate goal attainment (Gollwitzer & Sheeran, 2006). By comparing what was achieved with one's original (or modified) goals, club members can gain valuable information about their set goals (e.g. were they too easy or too challenging?) and goal-directed behaviours (e.g. was the training programme dosage appropriate?) to guide future courses of action. For serious leisure participants who may not rely upon or need their running club or club coach to translate goal intentions into goal attainment, through the strategies listed above a club coach or

leader can create an enjoyable running experience that fuels members' persistence in the club and sport.

Limitations and future directions

The current study extends the debate surrounding the intention–behaviour relationship, however, results of the study must be interpreted with study limitations in mind. The data were generated from four community running clubs across the Midwestern U.S., and therefore, cannot be generalized outside this context. Furthermore, the sample was fairly affluent and racially homogenous and perceived similar low levels of constraints and high levels of facilitators, which may have reduced their susceptibility to environmental factors influencing running engagement. Future research may seek to extend these results by conducting a population-level survey among a greater number of individuals – with varying physical activity motivations and participation levels – from a range of communities that differ in environmental factors. Scholars should also examine a more comprehensive set of environmental factors to identify the environmental moderators that constrain or facilitate the intention–behaviour relationship.

Running intention and behaviour were measured one month apart, which – though superior to cross-sectional data – can contribute to observed differences between the two variables (Baker et al., 2018). For accurate behavioural prediction, intention must remain stable from when it is assessed to when the actual behaviour occurs (Ajzen, 1991). Within the context of marathon training, prescribed weekly mileage changes regularly throughout the training programme (Abbate, 2019). Therefore, a measure of anticipated weekly mileage for the upcoming month may not accurately capture the fluctuations in marathon training that occur throughout the month. Future research examining the intention–behaviour relationship within the context of marathon training may consider utilizing a running log to capture running intentions and behaviours weekly if not daily.

Relatedly, both running intention and behaviour were captured through self-report measures, which may be subject to bias due to recall errors or social desirability bias. Non-self-report data are preferable for constructs that are prone to impression management or self-deception and that are readily externally observable (Chan, 2009). Future research should measure running behaviour through external, objective data where possible. Examples include capturing weekly mileage through a mechanism such as a wearable fitness device (e.g. Fitbit, GPS-enabled watch, smartphone app) carried by study participants on all runs.

Consistent with a repeated measures research design, mortality was a limitation of the study (Andrew et al., 2011). Even with the monetary incentive, only 54 of the 112 participants completed data across time periods. The online survey method may have exacerbated the participant dropout rate (Andrew et al., 2011). Subject attrition can lead to spurious, overestimated or underestimated relationships among the study variables (Goodman & Blum, 1996). Based on a one-way MANOVA, study participants who responded in the first period did not differ from those who continued in the study and responded in the second period on any demographic variables ($F(6,132) = .331$, $p = .919$). This suggests that participant mortality did not alter the make-up of our sample. To reduce attrition, future research may consider securing sponsorship

or endorsement of the research project, enhancing ease of survey completion, reducing survey fatigue, and/or incentivizing participation for all subjects (Andrew et al., 2011).

The results found leisure constraints and facilitators have less impact on behaviour than behavioural intentions in community running club settings. Based upon these findings and prior scholarship (Cleland et al., 2010; Conroy et al., 2011), the authors assert determinants of behaviour may fluctuate across diverse behaviours and contexts. To explore this supposition, future research may consider examining the intention–behaviour relationship through the lens of an ecological model across multiple behavioural types or sport contexts. Another logical extension of the current study is to examine within-group differences. Moreover, the researchers suggest varying environmental effects based upon the type of runner (e.g. elite vs. novice). With a greater understanding of how the intention–behaviour relationship functions within diverse settings, sport managers will be more equipped to promote desired behaviours.

Conclusion

Adopting an ecological framework, the researchers assessed the possibility leisure constraints and facilitators moderate the relationship between running intention and behaviour within the context of community running clubs. Through a repeated measures research design, two models were empirically tested using multi-level modelling. Model 1 examined running intention, time period, leisure constraints, and four leisure facilitators (leader autonomy support, motivational climate, club operations and club programmes) as predictors of running behaviour and found only running intention and time period related to running behaviour. When examining interaction terms in Model 2, none of the leisure constraints or facilitators significantly moderated the relationship between running intention and behaviour. Model 1 was a better quality statistical model based on goodness of fit and model complexity. Collectively, these results provide evidence in support of the debated intention–behaviour relationship and suggest promoting intention is sufficient to produce desired behaviour in the context of community running clubs.

Disclosure statement

Funding

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