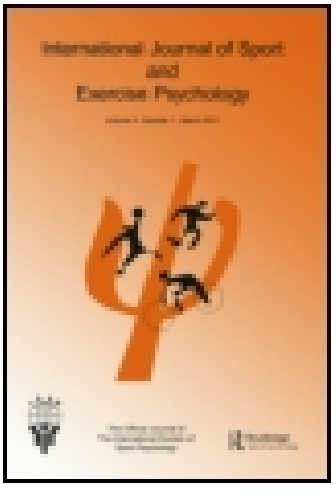

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Examining the relationship between children's active play imagery and basic psychological needs

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The present study examined relationships between the three types of active play imagery (fun, capability, and social) and the three basic psychological needs (autonomy, competence, and relatedness). A total of 253 children (118 males; 134 females; 1 missing) aged 7–14 years old ($M_{age} = 10.35$, SD = 2.26) completed the Children's Active Play Imagery Questionnaire and the Basic Needs Questionnaire for Children. Results of the structural equation modelling analysis revealed that capability imagery was positively related to the need for competence, social imagery was positively related to the need for relatedness, and fun imagery was positively associated with the need for competence. The results from this study suggest that imagery can serve a motivating role in children's active play.

Keywords: active play; imagery; self-determination theory; structural equation modelling

For many years, researchers have been interested in sport imagery. Imagery can be defined as an "experience that mimics real experiences. It differs from a dream in that we are awake and conscious when we form an image" (White & Hardy, 1998, p. 389). Imagery enables individuals to create or recreate experiences in their minds. Paivio (1985) established a conceptual framework for imagery use in sport which incorporates cognitive and motivation functions that operate at either a general or specific level. It is widely accepted that imagery use is effective for improving athletic performance (e.g. Hall, 2001), and that positive performance benefits can be obtained through the employment of mental imagery in sport. With respect to specific outcomes, imagery has been found to improve sport skills and strategies, enhance confidence and efficacy, and manage or reduce anxiety (cf. Munroe-Chandler & Morris, 2011).

Hall (1995) was the first to suggest that imagery is likely to have a motivating role in adult's exercise behaviour, similar to its role in sport. Hausenblas, Hall, Rodgers, and Munroe (1999) further explored Hall's proposal by investigating the nature of exercise imagery and established that exercisers used imagery for both cognitive and motivational purposes. Based on their research, three types of exercise imagery were distinguished: technique, appearance, and energy. Technique imagery incorporates imaging proper exercise technique and steps. Appearance imagery includes imaging oneself healthy and improving physical appearance. Finally, energy imagery includes images for energising oneself or becoming psyched up (Hausenblas et al., 1999). By employing imagery, exercisers can obtain a variety of outcomes including

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becoming energised, learn exercise tasks, set appearance related goals, cope with exercise barriers, and increase their self-efficacy (Gammage, Hall, & Rodgers, 2000; Giacobbi, Hausenblas, Fallon, & Hall, 2003; Hausenblas et al., 1999).

Given the motivational function of imagery, it is important to examine this function more in depth, using a well-established motivational framework. Self-determination theory (SDT; Deci & Ryan, 2002) is a popular framework used to understand the motivational basis of exercise participation (Hagger & Chatzisarantis, 2007). SDT proposes that motivation can be intrinsic, extrinsic, or amotivated. Situated at one extreme of the continuum is amotivation, which refers to the lack or absence of motivation. Opposite of amotivation is intrinsic motivation, which is recognised as the most self-determined form of motivation. Extrinsic motivation lies between the extremes and varies in the different levels of motivation, from the highly controlled behaviour regulations (i.e. external regulation and introjected regulation) to more autonomous behaviour regulations (i.e. identified regulation and integrated regulation; Deci & Ryan, 2002).

SDT also proposes that there are essential conditions to ensure the growth in one's personality and cognitive structure, which are referred to as the three basic psychological needs: autonomy, competence, and relatedness (Deci & Ryan, 2002). Autonomy refers to being the origin or source of one's own behaviour. Competence refers to feelings of effectiveness in association with an individual's interaction with the social environment and in experiencing opportunities to exemplify confidence in one's global capacity. Relatedness refers to having a sense of belonging and connection to other individuals and is reflected in the tendency to feel integral and connected to the lives of others (Deci & Ryan, 2002). SDT posits that these needs are universal and thereby function across gender, age, culture, and time. Indeed, when these needs are met and satisfied, it can facilitate internalisation and increase intrinsic motivation.

Wilson, Rodgers, Hall, and Gammage (2003) showed that exercise imagery is related to the behavioural regulations proposed in SDT in predictable ways. For example, more autonomous regulations were associated with task-oriented imagery. More recently, Stanley, Cumming, Standage, and Duda (2012) examined the relationship between exercise imagery, motivation, and exercise intention and behaviour. They found comparable results to those of Wilson, Rodgers, Hall et al. (2003). Technique and enjoyment imagery were positively associated with more autonomous motivation, while appearance imagery was positively related to controlled motivation. In addition, and consistent with previous research, autonomous motivation was related to both exercise intention (e.g. Wilson & Rodgers, 2004) and behaviour (e.g. Wilson, Rodgers, Blanchard, & Gessel, 2003). Stanley et al. suggested that imagery aimed to enhance autonomous motivation is a viable strategy that may facilitate the internalisation of exercise behaviour. They further suggested that future research should consider the role of the basic psychological needs when examining how the various types of imagery influence one's exercise motivation.

When children engage in leisure-time physical activity, the behaviour is referred to as active play rather than exercise. Active play can be defined as "unstructured physical activity that takes place [outdoors] in a child's free time" (Veitch, Salmon, & Ball, 2008, p. 870). Although active play can occur indoors, outdoor play, as highlighted in the definition, allows children to develop a sense of independence from parents (Ginsberg, 2007). Active play can include any form of unorganised play, such as playing tag with friends, playing catch, or skipping rope. Active play imagery is defined as picturing oneself engaging in unstructured play (Cooke, Munroe-Chandler, Hall, Tobin, & Guerrero, 2014). Recent findings indicated that children use imagery during their active play (Tobin, Nadalin, Munroe-Chandler, & Hall, 2013). It has been demonstrated that children use imagery, before and after active play, as well as for both motivational purposes and for skill improvement (Tobin et al., 2013). Cooke et al. (2014) identified three types of active play imagery: fun (i.e. images associated with enjoyment and interest), capability (i.e. imagery

associated with feelings of competence), and social (i.e. images associated with playing with others).

Like adults' exercise imagery, can imagery also serve a motivating role in children's active play? Our recent research provides some preliminary evidence to the affirmative. Tobin et al. (2013) demonstrated that children's active play imagery facilitated the satisfaction of the basic psychological needs proposed by SDT. With respect to perceived autonomy, the children placed an emphasis on imaging enjoyable activities, favourite activities, and activities they did frequently. In terms of perceived competence, the children reported imaging themselves competent in their active play with many imaging themselves being better than they actually are physically. Furthermore, perceived relatedness was found to be supported by children imaging themselves with friends, family, and others (e.g. neighbours and professional athletes).

The purpose of the present study was to examine the specific relationships between the three types of active play imagery (fun, capability, and social) and the three basic psychological needs (autonomy, competence, and relatedness). Because fun imagery incorporates concepts of enjoyment and doing activities out of interest (Tobin et al., 2013), it was hypothesised that fun imagery would be positively related to perceived autonomy. Based on previous literature demonstrating that imagery related to feeling capable in active play is linked to competence (Tobin et al., 2013), it was hypothesised that capability imagery would be positively related to perceived competence. Finally, given that social support is an important factor in physical activity (Duncan, Duncan, & Strycker, 2005) and that children often image themselves doing active play with others (Tobin et al., 2013), it was hypothesised that social imagery would be positively related to perceived relatedness.

Method

Participants

The participants included 253 (males, $n = 118$; females, $n = 134$; 1 missing) children aged 7–14 years old ($M_{age} = 10.35$ years; SD = 2.26). The participants were recruited from various summer activity programmes (e.g. chess, web design, and multi-sport) in South-western Ontario between the months of July and August.

Measures

Active play imagery. The Children's Active Play Imagery Questionnaire (CAPIQ; Cooke et al., 2014) was used to assess children's use of active play imagery. The questionnaire comprises 11 items representing fun imagery (e.g. "When thinking about active play, I picture myself having fun"), capability imagery (e.g. "When thinking about active play, I imagine the moves that are needed"), and social imagery (e.g. "When thinking about active play, I see myself with my friends"). The CAPIQ is rated on a 5-point scale (1 = *not at all*; 5 = *very often*) and possesses adequate psychometric properties (comparative fit index, CFI = .95; normative fit index = .92; Tucker-Lewis index = .93; root-mean-square error of approximation, RMSEA = .07; and standardised root-mean-square residual, SRMR = .06, α's > .70; Cooke et al., 2014).

Basic psychological needs. The Basic Needs Questionnaire for Children (BNQ-C; Gray, Prapavessis, & McGowan, 2009) is derived from the Psychological Need Satisfaction in Exercise Scale (Wilson, Rogers, Rodgers, & Wild, 2006). The questionnaire comprises 16 items assessing the three basic psychological needs (autonomy, competence, and relatedness) in an active play context. An example item of autonomy reads, "I choose what I am going to do for active play." An example item of competence is, "I am good at active play" and an example item of relatedness reads, "I like the kids who do active play with me." The BNQ-C is measured on a 7-point

scale (1 = *do not agree at all*; 7 = *strongly agree*) and was originally created for children 10 years of age and older.

Procedure

Given that the present study included participants as young as seven years old, some of the items from both questionnaires used were slightly modified following the Flesch–Kincaid grade level readability test to fit the youngest reading level. For example, with respect to the CAPIQ, we simply changed the words "imagine" or "picture" (e.g. "I imagine the moves that are needed") to "see" (e.g. "I see the moves that are needed"). In regard to the BNQ-C, an example of item modification would be changing the word "complete" to "to do" ("I am able to complete active play that is hard" vs. "I am able to do active play that is hard").

Upon receiving ethical approval from the research ethics boards and upon receiving approval from the summer camp coordinators, data collection began. Children and their parents were approached during drop off and pick-up times at the camps and informed about the study. Once consent from parents and assent from the participants were obtained, the questionnaires (CAPIQ and BNQ-C) and demographic questions (i.e. age, gender, and favourite activities to play) were completed. The time to complete the questionnaires was approximately 15 minutes. The investigator remained at the venue until all questionnaires were returned and inquiries were answered.

Data analyses

These data were screened for missing values, multivariate outliers, and multicollinearity. Descriptive statistics (i.e. means and standard deviations), internal consistency estimates, and correlations were also calculated using SPSS version 22. Further data analyses were conducted using structural equation modelling. Specifically, the maximum likelihood estimation provided by AMOS 21.0 (Arbuckle, 2012) was used to examine the data. Prior to testing the hypothesised structural model, confirmatory factor analysis (CFA) was used to examine the factor structure of the two inventories used in the current study, since both are relatively new instruments. Following this, a latent factor model was tested to examine the relationships between the three types of active play imagery and the three basic psychological needs with the items of each subscale serving as the observed variables. This approach was taken based on previous research (Reinboth, Duda, & Ntoumanis, 2004; Sheldon & Bettencourt, 2002; Standage, Duda, & Ntoumanis, 2003) and theoretical support that the basic needs coexist (Deci & Ryan, 1985).

The current study proposed a unidirectional relationship between active play imagery and the basic psychological needs. However, an alternative model was estimated based on the possibility of reciprocal determinism, whereby "cognitive and personal factors, behavior, and environmental events all operate as interacting determinants that influence each other bidirectionally" (Bandura, 1991, p. 267). Perhaps children's use of active play imagery is a consequence of their basic needs being met in active play. For example, a child may experience a sense of belonging and connectedness with others in active play (relatedness), which may prompt favourable images of interacting and playing with others in active play (social imagery). Therefore, the alternative model included pathways from perceived competence to capability imagery, perceived relatedness to social imagery, and perceived autonomy to fun imagery. Similar to the hypothesised model, the residual terms of the three types of active play imagery were allowed to co-vary given that they are related.

Evaluation of model fit for the measurement and structural models was determined using several fit indices. The chi-square (χ^2) statistic was used to assess an acceptable fit of the

hypothesised model and the data, wherein a non-significant ($p > .05$) χ^2 value is recommended. However, given the well-known caveat that χ^2 is sensitive to sample size (e.g. Kline, 2005; Marsh, 2007), absolute and incremental fit indices were also used to determine model accuracy (Hu & Bentler, 1999). Absolute fit indices included the RMSEA and SRMR, while incremental fit indices included the CFI. RMSEA and SRMR values equal to or less than .08 and .06 represent reasonable and good model fit, respectively. Similarly, CFI values equal to or exceeding .90 and .95 indicate reasonable and good model fit, respectively (Hu & Bentler, 1999; Marsh, 2007).

Results

Preliminary analyses

The results of the missing data analysis revealed that less than 5% of the data were missing, and that these values were missing completely at random. Missing values were replaced using an imputation technique (expectation maximisation). Mahalanobis distance values were assessed to determine multivariate outliers and were evaluated using χ^2 distribution at $p < .001$, with the degrees of freedom equal to the number of variables in the entire data set (Tabachnick & Fidell, 2007). Three cases had values greater than $\chi^2(6) = 22.46$ and therefore were deemed outliers. The degree to which these outliers were influential cases was determined by Cook's distance values greater than 1. Given that Cook's distance values ranged from .00 to .108, the three outliers were retained in the data set (Tabachnick & Fidell, 2007). Finally, the absence of multicollinearity was obtained, as all condition index values were less than 30 (Tabachnick & Fidell, 2007).

Descriptive statistics

Means, standard deviations, internal consistencies, and Pearson correlations for the study variables are presented in Table 1. Internal reliability for all the subscales was assessed through Cronbach's alpha coefficient. All alpha coefficients were above .70 (Nunnally & Bernstein, 1994).

Measurement model

The results of the CFA demonstrated a good model fit for both the CAPIQ, χ^2 (41) = 93.88, $p < .01$, RMSEA = .07; SRMR = .06; CFI = .95; and the BNQ-C, χ^2 (101) = 246.81, $p < .01$; RMSEA = .08; SRMR = .06; CFI = .92.

Table 1. Means, standard deviations, internal consistencies, and correlations for all study variables.

Variable	*M*	SD	α	(1)	(2)	(3)	(4)	(5)	(6)
CAPIQ									
(1) Capability	3.30	1.01	.82	–	.32**	.35**	.26**	.13*	.08
(2) Social	3.76	0.81	.73		–	.54**	.19**	.35**	.09
(3) Fun	4.27	0.83	.82			–	.31**	.39**	.13*
BNQ-C									
(4) Competence	5.92	1.00	.88				–	.38**	.41**
(5) Relatedness	5.64	1.12	.85					–	.40**
(6) Autonomy	5.18	1.14	.80						–

Notes: The CAPIQ is rated on a 5-point Likert scale with 1 = *not at all*; 5 = *very often*; the BNQ-C is rated on a 7-point Likert scale with 1 = *do not agree at all*; 7 = *strongly agree.*
*$p < .05$.
**$p < .01$.

The hypothesised model

The hypothesised model examining the relationship between active play imagery and the basic psychological needs showed an adequate fit to the data, χ^2 (314) = 566.16, $p < .01$; RMSEA = .06; SRMR = .08; CFI = .92. The pathway from fun imagery to perceived autonomy was non-significant and therefore trimmed from the model (Byrne, 2010). Upon the examination of the modification indices, a pathway was added between fun imagery and perceived competence. It is important to note that the path linking fun imagery to perceived competence can be theoretically supported. Considerable evidence (Biddle, Wang, Chatzisarantis, & Spray, 2003; Cairney et al., 2012; Carroll & Loumidis, 2001; Fairclough, 2003; Hashim, Grove, & Whipp, 2008) has revealed that enjoyment in physical activity is linked with perceived physical competence (the desire to interact effectively within one's environment and to acquire desirable outcomes; Deci & Ryan, 1985). The results of the revised model revealed a slight improvement to the model fit, χ^2 (202) = 383.87, $p < .01$; RMSEA = .06; SRMR = .07; CFI = .93. Results demonstrated positive relationships among capability imagery and perceived competence, social imagery and perceived relatedness, and fun imagery and perceived competence (see Figure 1). Overall, the model accounted for 12.1% of the variance in perceived competence and 25.5% of the variance in perceived relatedness.

Alternative hypothesised model

Results of the alternative model produced a satisfactory fit to the data, χ^2 (315) = 615.08, $p < .01$; RMSEA = .06; SRMR = .09; CFI = .90. All three pathways examined in the alternative model were significant (see Figure 2). In order to determine the most parsimonious model, the Akaike information criterion (AIC) fit index was assessed. Hu and Bentler (1999) suggested that the model with the smaller AIC value reflects a better fit of the hypothesised model. Results indicated the hypothesised model (AIC = 485.87) was more parsimonious than the

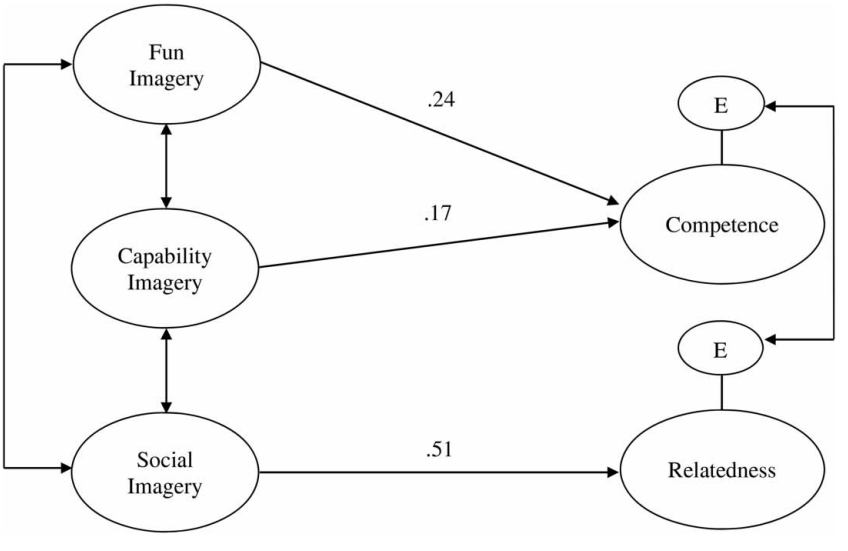

Figure 1. The structural model depicting the relationships between active play imagery and the basic psychological needs.
Notes: All path coefficients presented are standardised and significant. Item indicators are not presented for simplicity reasons.

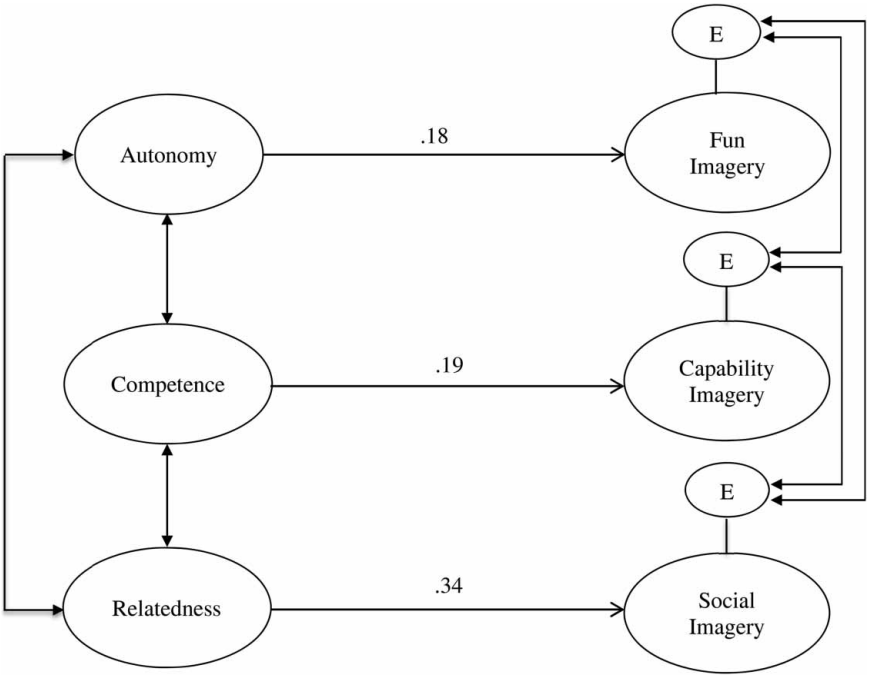

Figure 2. Alternative model depicting the relationships between the basic psychological needs and active play imagery.
Notes: All path coefficients presented are standardised and significant. Item indicators are not presented for simplicity reasons.

alternative model (AIC = 741.08), and therefore more likely to be replicated in future studies using the same population (Bandalos, 1993). Based on the AIC index, the hypothesised model was deemed as the best-fitting model.

Discussion

The purpose of the present study was to examine the relationships between the three types of active play imagery (fun, capability, and social) as assessed by the CAPIQ (Cooke et al., 2014) and the three basic psychological needs (autonomy, competence, and relatedness) proposed in SDT (Deci & Ryan, 2002). It was hypothesised that capability imagery would be positively related to perceived competence, social imagery to perceived relatedness, and fun imagery to perceived autonomy. The results from the present study partially support our hypotheses. Positive relationships between capability imagery and competence, as well as social imagery and relatedness were supported. Fun imagery was not found to be related to perceived autonomy, and rather was found to be positively associated with perceived competence.

SDT is a theory of human motivation which incorporates the basic psychological needs (Deci & Ryan, 2002). The findings from the present study follow previous research demonstrating that the motivation for adult's imagery use in physical activity setting is consistent with the SDT literature (Wilson, Rodgers, Hall et al., 2003). Earlier research from Tobin et al. (2013) demonstrated an association between active play imagery and the basic psychological needs. The present study looked to further examine that association.

The current findings indicated that capability imagery is associated with the basic psychological need of competence. Capability imagery incorporates perceived competence, achievement orientation, intention to be active, and rehearsal of movement (Cooke et al., 2014), while the need for competence is described as feeling successful in achieving a challenging task and engaging in occasion to express one's capabilities (Deci & Ryan, 2002). Competence also includes experiencing a sense of competence in producing desired outcomes (Deci, 1975; Deci & Ryan, 1985). Imaging being capable in an active play setting could be associated with wanting to produce a desired outcome; which would include being competent in active play. In addition, our results support Tobin et al. (2013), who found participants reporting images of being capable in active play to be connected to feelings of effectiveness in their environment. In a practical sense, if children are imaging themselves being good at active play, it would be linked to them feeling effective and capable in that active play environment. More specifically, a child who images herself being good at dribbling a basketball may feel more competent regarding that skill when she executes that same skill in her active play. When the need for competence is achieved in physical activity, it will lead to an increase in motivation towards that activity (Ryan, Williams, Patrick, & Deci, 2009).

The present study also revealed a positive relationship between social imagery and relatedness. Social imagery incorporates images associated with encouragement from significant others, friend participation, and social support. The need for relatedness involves feeling connected, or feeling that one belongs in a social environment (Baumeister & Leary, 1995; Deci & Ryan, 1985). Given the description of both constructs, it is not surprising that an association between the two was found. Research indicates that children prefer imaging themselves in active play settings with others, and that those images lead to a sense of perceived relatedness (Tobin et al., 2013). Therefore, if children are imaging themselves in active play with others (i.e. social imagery), it can facilitate a sense of togetherness with others (i.e. perceived relatedness). Indeed, if children are able to get a sense of togetherness with others through their imagery, it may push them to fulfil the need for relatedness through their active play.

The present study also found that fun imagery was associated with perceived competence. Previous research has established that fun is the most prominent reason for children's engagement in physical activity (Gould, Feltz, & Weiss, 1985; Miller & Kuhaneck, 2008). Qualitative research by Tobin et al. (2013) indicated that fun is a major component in children's active play imagery. Furthermore, Miller and Kuhaneck (2008) found that children perceive activities to be fun based on the challenge level; they prefer play that offers a suitable challenge level (i.e. not too easy and not too difficult), and judge an activity as being fun by the level of success they can achieve from the activity itself. Also consistent with the findings from the present study, previous research has demonstrated that when children image themselves having fun in active play, they are also often imaging themselves being physically competent in their activities, often imaging themselves better than they actually are physically (Tobin et al., 2013).

In contrast to our hypothesis, fun imagery was not found to be associated with perceived autonomy. Autonomy is being the perceived origin or source of one's behaviour and having control of the outcome (Deci & Ryan, 2002). In a practical sense, children who image themselves participating in active play will likely be focusing on enjoyable experiences rather than on their decision of which activity to perform. Play behaviours are commonly characterised as freely chosen, personally directed, fun, and intrinsically motivated (Brockman, Jago, & Fox, 2011). Given that active play is autonomous in nature, it is plausible that children's participation in active play activities (either actual or imaginative) is what helps satisfy the need for autonomy, not the choice of activity. Furthermore, the basic needs questionnaire used in the current study only measures one component of autonomy (i.e. perceived choice). Research has demonstrated that autonomy includes three concepts: volition, perceived locus of causality, and perceived

choice (Reeve, Nix, & Hamm, 2003). Volition is "a sense of unpressured willingness to engage in the activity" (Deci, Ryan, & Williams, 1996, p. 165). Perceived locus of causality is the belief that a behaviour is started and controlled by a personal or an environmental force (deCharms, 1968). It would be important to measure all three as they overlap and are mutually supportive (Deci & Ryan, 1985). Given that the questionnaire used in the present study only included perceived choice, it could further help to explain why no link was found between fun imagery and the need for autonomy. The present study is not without its limitations. Children's imagery ability was not measured. Despite this potential limitation, previous research has established that children as young as five years old have the ability to image (Kosselyn, Margolis, Barrett, Goldknopf, & Daly, 1990). We also did not measure the children's level of active play. This was intentional as we did not want burden the participants with questionnaires. Because of the participants' age, we wanted to ensure that they were able to remain focused while responding to the questions. Too many questionnaires may lead to participant fatigue thereby affecting the results (Belson, 1981).

This study provides an insight into the relations that exist between active play imagery and the basic psychological needs in children. Support for the promotion of a need supportive environment aimed at increasing unstructured leisure-time physical activity motivation for children is evident (Standage et al., 2003). It is essential to identify factors that may be associated with the satisfaction of the basic psychological needs, which could then lead to increased participation in physical activity. Understanding the associations between the different types of active play imagery and the basic psychological needs will facilitate the development of effective imagery interventions aimed at increasing children's motivation to be physically active. Imagery interventions can target satisfying the need for relatedness and competence by incorporating capability, fun, and social imagery. For instance, the imagery scripts would prompt children to image themselves being successful and competent in their active play, having fun while participating in active play, and enjoying the company of others (e.g. friends and siblings). Using imagery scripts to aid in the facilitation of children's basic psychological needs may positively influence children's motivation, which in turn may also positively impact their overall levels of physical activity. Incorporating imagery scripts into children's daily lives, perhaps during school hours, could also be beneficial. For instance, a two-minute imagery script incorporating capability, fun, and social imagery, could be played over the speaker system during morning announcements at school. Given our earlier work (Tobin et al., 2013) and the present findings, an imagery intervention may be one way to help motivate children to participate in active play.

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