Abbreviations: PA = physical activity; PE = physical education; SDT = self-determination theory

Introduction

Abundant evidence shows that physical activity (PA) is associated with greater mental health and a reduced risk of mental ill-health (Biddle & Asare, 2011). However, the strength of the association between PA and mental wellbeing varies considerably between different studies. Early attempts to understand such inconsistency focused on determining the frequency, duration, and intensity required for optimal mental health benefits. However, researchers have been unable to confirm an optimal PA dose, with evidence supporting both higher and lower amounts of light, moderate, and vigorous PA (Biddle, 2000; Haarasilta, Marttunen, Kaprio, & Aro, 2004; Janssen & LeBlanc, 2010; Teychenne, Ball, & Salmon, 2008). These findings suggest that the amount of PA, and the intensity of PA, are not responsible for the large variation in the strength of association between PA and mental wellbeing, or at least, cannot be the only factors that influence the strength of association.

Given that PA is defined as any muscular movement that expends energy (Shephard, 2003), the term PA includes a broad range of bodily movements that are conducted in a variety of life domains (i.e., different areas of life including work or school, travel, and leisure-time). Recent meta-analytic evidence shows that the relationship between PA and mental health is not consistent across different life domains, and that PA during leisure-time has a stronger positive association with mental health than PA during work, transport, housework, and physical education (PE) (White et al., 2017). However, no study has explored factors that
may help to explain why leisure-time PA is more optimal than other domains. Additionally, no study has identified ways of making PA within less optimal domains more beneficial to mental health. However, the majority of people’s weekly PA does not occur during leisure-time (Active Healthy Kids Australia, 2014; Jurakić, Pedisić, & Andrijašević, 2009; Smith, Berdel, Nowak, Heinrich, & Schulz, 2016) and, therefore, it is of the upmost importance that we understand why leisure-time PA appears optimal, and what factors increase the strength of association in other domains. This understanding would enable the development of strategies to enhance other life domains, and to tailor interventions and physical activity guidelines, in order to ensure that mental health benefits are derived from as much of people’s daily PA as possible, regardless of the domain it occurs.

One factor that may partially explain why leisure-time PA is more strongly associated with mental health is motivation. It has been suggested that leisure-time PA may be a more self-determined behaviour than PA during other domains (e.g., active travel) (Asztalos et al., 2009; Kull, Ainsaar, Kiive, & Raudsepp, 2012), and this higher quality motivation may explain why leisure-time PA holds a stronger positive relationship with mental wellbeing (Asztalos et al., 2009; Kull et al., 2012). Self-determination theory (SDT; Deci & Ryan, 1985) supports this idea, as it theorises that more self-determined behaviours lead to more positive psychological outcomes because they are more likely to satisfy peoples’ need for autonomy, competence, and relatedness (Deci & Ryan, 2002a). However, no study has examined the role of motivation in the PA and mental health relationship, either in terms of total PA, or within specific PA domains.

Self-determination theory classifies motivation along a continuum from self-determined to
non-self-determined, and explains that autonomous motivation is the most self-determined form of motivation and is defined as acting “with a full sense of volition and choice because the activity is interesting or personally important” (Williams, 2002, p. 235). In the middle of the continuum lies controlled motivation – “engaging in an activity for internal (e.g., guilt) or external pressure (e.g., external rewards)” (Gillet, Vallerand, Lafrenière, & Bureau, 2012, p. 455). Amotivation lies on the opposing end to autonomous motivation, is the least self-determined, and is defined as “lacking intention to act” (Deci & Ryan, 2002b, p. 17).

Based on: (1) meta-analytic evidence demonstrating that life domain influences the strength of association, (2) strong theoretical support for motivation as an important contextual factor, and (3) the absence of studies investigating the role of motivation within different PA domains, this study aims to explore adolescents’ experiences of PA and affect within different PA domains, and among PA undertaken for different motivation reasons. The purpose of examining these relationships is to identify factors that may be important in explaining the varying strength in association between PA and mental health within different domains. This could then lead to tailored guidelines and interventions so that not only leisure-time PA is beneficial to mental health. Given that (1) a large portion of adolescents’ weekly PA occurs at school (Carlson et al., 2016) or when travelling to and from school (Cooper, Andersen, Wedderkopp, Page, & Froberg, 2005), and (2) few studies have examined mental health or wellbeing associated specifically with PA during school or travel, the current study focuses on PE, active travel, and leisure-time.

Methods
Methodological Approach and Epistemological Perspective

Qualitative methods are important in understanding the mechanisms that underlie the effect of PA on wellbeing (Mutrie, 1997) and are particularly useful in understanding a relationship in detail in different contexts (Faulkner & Biddle, 2004). Therefore, we conducted this study using a qualitative method to begin to explore the potential role of motivation in relation to PA and mental wellbeing in different life domains. We also employed a realist epistemological perspective as realism purports that investigating an event (i.e., PA) as well as the context and mechanisms associated with that event (i.e., life domain and motivation) lead to an enhanced understanding of the outcomes experienced (i.e., positive and negative affect; Pawson & Tilley, 1997). However, when exploring a new topic or relationship, combining quantitative and qualitative data can enhance the interpretation of findings (Onwuegbuzie & Leech, 2004). As such, we also included frequency counts and percentages to indicate the proportion of participants reporting certain affective experiences and motivational constructs when describing PA participation in different domains. Including this data adds meaning to the interpretation of the qualitative findings by demonstrating the strength of certain themes.

Participants

In order to describe the role of motivation in detail within a specific population (i.e., adolescents; Patton, 2002), we invited Year 9 students from two independent secondary schools in Western Sydney, Australia to participate. With regards to the socioeconomic status of the schools, one school was close to, and within one standard deviation of, the average Australian score on the SEIFA Index of Relative Socio-economic Advantage and Disadvantage (Pink, 2011), and the average score on the Australian Curriculum Assessment and Reporting Authority’s (2013) Index of Community Socio-Educational Advantage
The second school was slightly above average, being within two standard deviations of the mean on both the SEIFA and ICSEA indexes. All Year 9 students at both schools were invited to participate and 114 students provided parental consent and participant assent and agreed to participate ($M$ age = 14.42 years, $SD = .58$, 28% female). While common guidelines recommend between 20 and 50 participants for qualitative studies (Creswell & Clark, 2007; Patton, 2002), the participants in this study answered questions in the absence of a researcher. Although the questions included many probing questions, there was no researcher present one-on-one with the participant. Therefore, a larger sample size was advantageous as it ensured enough data was collected overall if some participants gave relatively short answers. The second reason for the large sample size was because of the need to recruit students from at least two different schools to increase triangulation, which is advantageous to the transferability of the results (Patton, 2002). Data saturation occurred after collecting data from the two schools, as new data failed to add new themes or extend the understanding of existing themes (Weed, 2009). Further, the main aim of this study was to present qualitative findings; quantification is merely included to supplement the qualitative results discussed. As such, 114 was deemed large enough for qualitative analysis, and a third school was not recruited. The Western Sydney University Human Research Ethics Committee provided ethics approval.

**Procedures**

Although interviews are perhaps the most common method of qualitative data collection and can lead to the creation of large amounts of data, they can often lead to high levels of social desirability bias, particularly when discussing topics such as affect (Bowling, 2005). Self-administered questionnaires can increase respondents’ willingness to disclose sensitive information, and reduce social desirability bias, due to the absence of an investigator.
Computer technology provides a platform for self-administering open-ended questions and collecting anonymous responses. Multiple studies have shown that interviews conducted using computer self-administration methods reduce social desirability distortion compared with face-to-face methods (Richman et al., 1999). Computerised methods also enable the collection of responses from a larger and more diverse sample of students than face-to-face methods. Additionally, adolescents have reported feeling comfortable reporting honestly about sensitive topics via computerised methods (Watson et al., 2001). As such, we employed a computerised self-administered interview procedure to ensure anonymity and encourage in-depth, honest responses on this topic.

Prior to data collection, the computer-assisted-self-interview was piloted among five adolescents aged 13-16 years of age. These adolescents completed the questions on the same type of device and were given the same instructions as the main sample. Additionally, the pilot sample was encouraged to make notes about questions they did not understand or found difficult to answer and these issues were discussed with the researcher after completion. Overall, the questions appeared well understood and no changes were made.

During a scheduled lesson at school we separated participants from each other as much as possible within the confines of the classroom provided, and distributed a computer tablet to each participant with the computer-assisted-self-interview loaded on the screen. Participants completed the interview questions at their own pace by typing on the on-screen keyboard. To increase privacy by reducing the amount of data displayed on any screen at any time, only one question was displayed at a time. However, participants were able to skip
forward and go back if they desired, as evidence suggests that social desirability bias is
reduced when skipping and backtracking is enabled (Richman et al., 1999). The lead author
was present to answer any questions or provide assistance to limit any impact of variations in
literacy ability.

The interview schedule commenced with general questions that were exploratory in nature.
We asked students to recall two PA experiences, one they felt “good” after, and one they felt
“unpleasant” after. We included affective states from the short version of the Positive and
Negative Affect Schedule for Children (Ebesutani et al., 2012) as examples to help elicit PA
experiences perceived to be associated with positive and negative affect (Clark & Watson,
1991). We then asked the students to describe: (1) the PA experience, (2) reasons for their
participation, (3) where the PA occurred, and (4) how they felt during and after participating
in the activity through a series of probe-like questions based on the participant’s initial PA
experience described. Questions slowly narrowed in focus as we specifically asked students
how they feel when participating in PA during their own time (i.e., leisure-time), when
walking or riding to or from school (i.e., active travel), and during PE. We also asked
students why they participated in each PA domain and why they perceive they feel the way
they do during and after participation. Please see the Supplementary Material for a full list of
interview questions.

Data Analysis

First, we conducted frequency counts in NVivo (version 10) for all closed-ended questions,
and open-ended questions where information on the most commonly reported answers was
useful (e.g., “Please list three words that sum up how physical activity makes you feel”).

Next, the lead author commenced thematic analysis by assigning an initial code to all data segments in response to all open-ended questions by linking a code (i.e., words or phrases) with sections of data that represented the participants’ perspectives (Patton, 2002). To triangulate coding, the second author (RO) also coded 10 pages of randomly selected data. We inductively coded sections of the data relating to physical activity and positive and negative affect in different life domains by using codes that were a direct manifestation of the data itself (Marks & Yardley, 2004). However, as exploring the role of motivation was driven by an existing theory, we subsequently abductively coded participants’ responses based on SDT tenets to explore new links between PA and affective wellbeing based on SDT (Marks & Yardley, 2004). For example, participants did not use the words “autonomous” or “controlled” in their responses; however, based on SDT tenets, we derived latent codes mirroring autonomous motivation from quotes relating to undertaking PA because it was fun (Marks & Yardley, 2004). Both authors conducted initial coding then compared codes for similarity and mutually agreed upon any differences to ensure consistency. The lead author then grouped codes together to develop broader categories which illustrated patterns in the data (i.e., themes) (Patton, 2002). Finally, we grouped participants based on the dominant motivation they described for each PA domain which enabled us to conduct frequency counts, descriptive statistics, and further thematic analysis within each motivational category. This grouping process enabled us to explore whether the themes arising in relation to autonomously motivated PA were different from, or similar to, the themes arising in the data describing PA experiences undertaken due to controlled motivation. Although the lead author led the analysis, in collaboration with the second author, all authors reviewed the broader categories before making final decisions about the overarching themes.
The computerised interview method resulted in 123 pages of text-based data. While some participants wrote more than others (ranging from a short sentence to an extended paragraph depending on the question), all participants responded to all questions and provided valuable depth. Despite a number of grammatical errors, there was no evidence of participants not understanding the questions or not being able to formulate a legible answer. Overall, frequency counts revealed that the most common words used to describe when PA leading to positive affect took place referred to the weekend, after school, and organised sport; all of which appear to relate to leisure-time PA (Table 1). Conversely, school was the most commonly used word to describe when PA led to negative affect. However, school was not solely associated with negative affect and leisure-time was not only associated with positive affect. When reporting affect in relation to specific PA domains, adolescents perceived to experience positive affect in relation to leisure-time PA and PE far more than active travel (as shown in Table 2). Thematic data analysis conducted to explain students’ perceptions of these relationships led to the development of nine sub-themes which were then categorised under four overarching themes: Social Interactions, Optimally Challenging Activities, Reasons for Participation, and Other Factors. The four overarching themes represent the main factors that were described in terms of influencing whether PA invoked positive or negative affect.

Social Interactions

Sense of belonging

Participants frequently mentioned their friends, peers, and teammates when explaining why they perceived to experience positive affective states when participating in PA. With regards
to PE, approximately one third of participants that perceived they experience positive affect during PE explained that one of the reasons they feel that way is because they are with their friends. For example, in response to why do you believe you feel happy and cheerful during PE, Participant 83 (female) stated: “because I am with my friends and my class is really great to be around and it is just fun.” Few participants described their friends or teammates as a main reason why they experience positive affect during leisure-time PA; however, those that did provided more in-depth responses explaining the importance of doing PA with their team or friends, as they perceived PA led to positive affect if they experienced a sense of belonging. “When you play soccer you are in a team and this makes you feel part of a group and welcomed” (Participant 61, male) and “because I feel like I belong, I feel happy” (Participant 10, male). Although few participants reported positive affect in relation to active travel (approximately one quarter), a number also explained it was because they get to walk with their friends. Participant 105 (female) explained “it gives me time to talk to my friends and be with them.”

Negative influence of others

Despite many students perceiving that social interactions led to a sense of belonging and therefore positive affect, a number of participants discussed negative impacts of the other people with whom they do PA. The negative influence of others theme captures the idea that negative affect was derived through PA if students experienced judgment from other people, felt self-conscious in front of others, or if negative peer comparisons were made. Of those describing PE as a PA that brings out negative moods and emotions, around half discussed feeling judged by others, or compared to their classmates that had a higher ability. Describing her experience in PE, Participant 97 (female) said, “I am not very good at sport, and so when
I have to do things in front of lots of people I don’t enjoy myself and can feel humiliated when I do something wrong.” Fewer participants discussed leisure-time PA in relation to other people making them feel humiliated or judged. However, with reference to organised sport, Participant 82 (female) explained that “swimming competitively is horrible, I felt sick to my stomach, I felt everyone’s eyes burning into me watching me fail and come last.”

Optimally Challenging Activities

Confidence, achievements, and progression

Participants explained that experiencing improvements and achievements in sport generally makes them feel good about themselves and boosts their self-confidence, which makes them feel happy. For example, Participant 96 (female) stated, “I always feel accomplished when I do physical activity and have a great sense of achievement, this makes me feel happy.” Similar to improvements and achievements, but more focused on an objective measurement of success rather than personal improvement, Participant 47 (male) explained that “after winning a game you feel happy about yourself and what you have done to contribute to that victory.” This theme was discussed particularly with reference to organised sport during leisure-time; Participant 51 (male) stated “I felt happy because whilst we were winning I felt a sense of pride and satisfaction that I was improving my game” and Participant 103 (female) stated “I have goals and when I achieve them it makes me feel happy.” A small number of participants also reported experiencing positive affect because they achieved health-related goals when exercising during leisure-time: “It makes me feel proud because I have finished going for a run; it also makes me happy because I’m proud” (Participant 69, male). With regards to PE, Participant 76 (male) explained: “I felt like I had learnt something new and that it was an achievement.”
Too difficult

A small number of participants explained that when PA tasks were perceived as too difficult, such that the participants did not feel competent, then the PA behaviour was perceived as resulting in the experience of negative affect for one of two reasons. Firstly, because of the difficulty they felt unable to participate, as demonstrated by Participant 80 (female) who explained that during PE:

The game [rugby league] is confusing and I don’t know how to get involved. I try and participate as much as I can, but it’s extremely difficult. After the game I don’t feel like I have accomplished anything, because I can’t put everything into it.

Further, Participant 90 (female) stated “sometimes [I] have low self-esteem during PE as I feel I am not able to participate as well as others.” Secondly, difficult activities were perceived to result in negative affect due to poor performance. Participant 95 (male) explained that: “[in a game of cricket] I was annoyed at myself because I got out so many times.”

Reasons for Participation

Autonomous participation in physical activity

With regards to PA experiences described as leading to positive affect, all participants described autonomous reasons for participation. The vast majority of students reflected being intrinsically motivated to undertake the activity, with students commonly reporting that they did the activity because they enjoy it, they love the sport, they are passionate about the sport,
or because it is fun, as highlighted in the following quotes: “I participate in basketball because it is fun and enjoyable to do” (Participant 2, male) and “I do Oz-tag [i.e., touch rugby] because I wanted to play with my friends and have fun” (Participant 53, male). Fewer participants described participating in order “to keep fit and feel good” (Participant 11, Soccer, male), “to gain strength” (Participant 27, gym, male), and to “to relieve stress and feel better about myself” (Participant 85, running, female); all of which are valued benefits of PA, and therefore autonomous reasons for participation.

The data in Table 3 supports this theme as those who perceived their participation in PA was autonomous, reported more positive affective outcomes than those who perceived their participation to be underpinned by controlled motivation. This difference in affective experiences between autonomously motivated PA and controlled participation was apparent across all three PA domains (i.e., leisure-time, active travel, and PE).

With regards to leisure-time, all students discussed autonomous reasons for participation; 52% explained they participate due to enjoyment and 48% because of perceived benefits. Although participating for enjoyment is more self-determined than participating for valued benefits (Deci & Ryan, 2002a), both are autonomous in nature and students participating for both reasons reported that they experienced positive affect during leisure-time PA far more than negative affect (see Table 3). Additionally, participants explained that they experience positive affect, such as happiness, because they are choosing to do something that they enjoy, “I have the choice to participate, I do it because I enjoy it and because I have passion for the sport it brings me joy when I play” (Participant 21, male).
Far fewer participants described enjoyment (11%) or health benefits (22%) as the reason for their participation in active travel to school. Nevertheless, all of those who did, also perceived to feel happy when they walk or ride to school (Table 3). They also described experiencing other positive moods and emotions such as cheerful and lively. Participant 108 (male) stated: “I like to ride to school because riding my bike is fun. I believe I feel happy, cheerful, joyful, and lively because I love riding.” Alternatively, Participant 94 (female) highlighted the perceived benefit of walking to school for health benefits:

I walk home from school sometimes for exercise. My parents come to pick my brother up so I could get a ride with them, but I choose to walk because I just like to. It makes me feel healthy and fit and good about myself because I’m choosing to do something healthy.

Connecting the theme of autonomous participation to the earlier theme ‘Social Interactions,’ Participant 21 (male) explained he chooses to walk to school because he enjoys it, because he walks with his friends:

I sometimes catch the bus to the shopping centre and meet up with friends to walk to school. I have the choice to catch the bus straight to school if I want but I rather walk because I’m happy and relaxed when I walk to school because I’m with my friends and they keep my mind off things I could be stressed about.

Participants described their participation PE as leading to positive affect slightly less than leisure-time, but far more than active travel (Table 2). Further, students’ perceived reasons
for participation in PE were more mixed across the sample than they were for leisure-time or
active travel. Nearly half of all students explained that they participate in PE because they
enjoy it or because it’s a way of doing exercise which is good for them (33% enjoyment and
9% valued benefits) and the majority of these students reported experiencing positive affect
during PE. For example, Participant 14 (male) reported feeling happy, proud, cheerful, and
joyful during PE. In terms of why he participates in PE, he stated “because I enjoy being
active and spending time with mates.” Similarly, Participant 81 (female) reported
experiencing happiness, joyfulness, and cheerfulness during PE. When asked why she
participates in PE she stated “I participate in school PE because I always have fun and it is
really enjoyable to play against or with my friends in games we may not usually play outside
of school.” In addition to the 42% of participants reporting autonomous participation in PE, a
further 37% reported both autonomous and controlled participation. These students were
slightly less likely to describe their participation in PE as leading to positive affect than those
who purely stated only autonomous reasons for participation, but still believed PE lead to
positive affect far more than negative affect (Table 3).

**Forced participation**

When students felt forced or obliged to participate in PA they reported experiencing negative
affective states. For example, Participant 105 (female) stated “I feel angry and frustrated
because you have to do a sport that you don’t have a choice in.” In fact, PA experiences that
participants perceived as leading to negative affect were mostly undertaken due to controlled
motivation. With regards to these negative PA experiences described, students reported
participating because their friends did – “cause my mates play Rugby Union” (Participant 6,
male), because their parents encouraged them to – “because I was encouraged by my parents
and I was good at swimming” (Participant 91, female), and because their teacher instructed them to – “I swam in the school swimming carnival because my homeroom teacher made me” (Participant 82, female). In addition to participating because of other people, participants also took part because they felt they had no choice or felt forced. Some students reported that their parents told them to – “my parents said I needed to try a summer sport [cricket]” (Participant 74, male), while many students reported that their school or teacher forced them – “school makes me, they force you to do PE” (Participant 67, male). Similarly, Participant 9 (male) said “I did it because that’s what the teacher chose.”

While controlled reasons for participating were rarely discussed in reference to leisure-time activities, most students (67%) reported walking or riding a bicycle to school because it was their only means of getting to and from school. This controlled reason for participation was demonstrated by Participant 112 (female) who stated:

I have to walk home from school because it is my only means of getting home. I don’t have much choice if my mum is busy and she can’t pick me up I have to walk. I feel miserable when I have to walk because it is a long way and my bag is heavy.

She also reported feeling miserable while walking. Further, few participants like Participant 112 who walked because they were forced, reported experiencing positive affect. In fact, only 32% of students who walk because it’s their only method of travel (i.e., controlled motivation) reported feeling happy while walking, compared to 100% of students who walk because it’s fun or beneficial to their health. The following quote further illustrates that being forced to walk was not described in relation to positive affect in the same way that walking to school for enjoyment (autonomous participation) was. Participant 84 (female) stated that:
I have to walk to my house from the bus stop in the afternoon because my parents are at work and can't pick me up from school. I feel as if I'm just wasting my time. I'm tired, hungry, hot, stressed, and not in the mood for walking with a heavy school bag.

With regards to PE, a small portion indicated that they participated because they were forced (21%).

I only participate in PE because I am made to, I have no choice. We don’t get provided with input. I feel miserable and mad because I am being forced to do it and I don’t like the sports that we do. (Participant 79, female)

As shown in Table 3, those students who participated in PE because they felt forced (i.e., controlled motivation) more frequently reported feeling sad, mad, afraid, miserable, and scared during PE, than those who reported doing PE because it’s fun or because it’s good for them (i.e., autonomous motivation). Those who felt forced were also less likely to report feeling happy, cheerful, joyful, proud, or lively during PE than those who participate due to autonomous motivation. Although the majority of participants that reported feeling sad and miserable in PE only took part because they “have to do it; it’s compulsory” (Participant 82, female), the majority of the reasons discussed as to why they experience negative affect were related to other themes such as ‘negative influence of others’ or ‘no interest.’ As such, forced participation appears to be linked to these themes.

Other Factors

Fun and enjoyment
When discussing PA in general, the majority of students perceived participation in PA as fun and enjoyable, as demonstrated by the following quotes: “physical activity makes me feel happy because I enjoy it” (Participant 26, male) and “physical activity makes me feel happy because it’s fun” (Participant 42, male). However, when discussing specific domains, this theme was discussed extensively by nearly all participants with regards to leisure-time and was quite often discussed in combination with the theme ‘autonomous participation in PA.’ However, the majority of participants discussed PE as being fun and enjoyable, even though some reported participating in PE because it’s compulsory. For example, Participant 87 (female) participated in PE because “it’s compulsory” and stated “I have no choice in what we do in PE.” However, she also stated “I feel happy in PE because we do fun activities.” Therefore, the fun and enjoyment associated with physical activities is often tied to autonomous motivation, yet students also discuss fun activities as being directly related to why they are happy when active even if motivation is partially controlled.

No interest

While undertaking physical activities which participants found enjoyable was described as evoking positive affect, participation in activities which were of no interest was described in relation to negative affect. Of those describing PE as an activity that brings out negative moods and emotions, around half discussed having no interest in the activities they do in PE as the reason they experience negative moods and emotions, or explained they only experience negative moods and emotions during classes where the activity is not perceived as interesting or enjoyable. Representing this view, Participant 79 (female) reported feeling miserable and mad during PE because “I do not like the sports that we do in PE.” Similarly, in terms of active travel, approximately half of the students who reported experiencing
negative affect in response to active travel, also discussed feeling bored, not wanting to walk, and not liking it, as reasons for their negative affect. This theme was discussed almost solely in terms of PE and active travel as fewer participants explained taking part in leisure-time activities they weren’t interested in. While often discussed in relation to having no choice, this represents a distinct theme in which only a portion of those discussing controlled motivation discussed having little interest. Nevertheless, the lack of interest in an activity was part of the explanation as to why forced participation in PE and active travel was perceived as related to negative affect.

**Distraction and opportunity for mindfulness**

Physical activity was perceived by participants to also be: (1) a method of releasing anger which results in experiencing positive affect – “you get to release any anger and negative energy and thoughts [in martial arts] leaving only room for good ones (Participant 91, female); (2) a distraction from life stress - “it distracts you from what’s going on in your life” (Participant 32, male) and “it takes away life’s problems and releases stress” (Participant 48, male); and (3) an activity that promotes mindfulness – “I feel happy because I focus on the sport I’m participating in at the current time” (Participant 23, male). Except for a small number of participants who reported feeling happy while walking to school because they listened to music to zone out or take their mind off other things, the distraction theme was mostly discussed by participants in terms of organised sport during leisure-time.

**Discussion**

This study showed that adolescents perceived PA to be associated with both positive and
negative affect. More adolescents perceived positive affect to be associated with PA during leisure-time than PA as a means of transportation or PA at school. Further, PA behaviours that adolescents associated with positive affect were largely undertaken for autonomous reasons, including enjoyment (i.e., intrinsic motivation) and valued benefits (i.e., identified regulation), while PA experiences associated with negative affect were predominantly undertaken for more controlled reasons. Controlled reasons for participation included feeling pressured to do a sport due to cultural background, family history, or because their friends played (i.e., introjected regulation) and being forced to participate, either by their parents in terms of active travel or by their teachers in terms of PE (i.e., external regulation). While these findings are in line with SDT which suggests autonomously motivated behaviours are more likely to be associated with greater psychological wellbeing compared to activities which are carried out due to controlled motivation (Deci & Ryan, 2008; Ryan & Deci, 2000), this is the first study to specifically examine the role of motivation in the relationship between PA and mental wellbeing.

According to SDT, the reason autonomous behaviours are likely to be associated with greater mental health benefits is because individuals are likely to autonomously choose to participate in activities that satisfy their psychological needs of autonomy, competence, and relatedness (Weinstein & Ryan, 2010) which are essential for optimal wellbeing (Deci & Ryan, 2002a). Conversely, the extent to which psychological needs are not satisfied influences the likelihood of a behaviour being associated with negative psychological outcomes (Ryan & Deci, 2002). Results from the current study supported the theory that competence plays an important role in the relationship between autonomously motivated PA and affective wellbeing, as PA perceived by adolescents to lead to positive affect was associated with feelings of achievement and progress. Alternatively, negative affect was described in relation
to PA where participants felt incompetent or as though they performed poorly. Similarly, these findings provide some support for the mastery hypothesis which posits that participating in PA enhances feelings of success and confidence, which benefits mental health when the feeling of mastery is carried into other areas of life (Paluska & Schwenk, 2000). However, given that not all PA experiences are necessarily associated with feelings of competence and mastery, other mechanisms must also play a role.

Teychenne, Ball, and Salmon (2010) found that participants who completed some of their leisure-time PA with another person were less likely to experience depression compared to individuals who completed all their leisure-time PA alone. However, the relationship was not linear and it was suggested that mental health benefits may be derived from participating in leisure-time PA with others; but, not all PA with others is necessarily beneficial (Teychenne et al., 2010). The results from the current study augment this idea, showing that adolescents perceived PA with others to be beneficial if a sense of belonging was experienced, but damaging if judgment occurs or peer comparisons are made. Therefore, it is apparent that relatedness (i.e., the fundamental need to maintain close personal connections with other people and feel like a valuable and cared for member of a group) is beneficial to positive affect experienced during and after PA (Baumeister & Leary, 1995). Many adolescents perceived that one of the reasons they chose to participate in PA during leisure-time was because they felt a sense of belonging with their friends and teammates. However, few participants reported walking to school with a friend. This difference in social interaction may partially explain why, compared with active travel, leisure-time PA was more often associated with positive affect. Regarding PE, students who described experiencing a sense of belonging also perceived to experience positive affect during PE, while those who felt judged and embarrassed in front of their peers experienced negative affect when participating in PE.
Hence, this study suggests that merely participating in PA with others is not necessarily beneficial; instead, the satisfaction of the basic psychological need for relatedness appears to influence whether PA is associated with positive affect or negative affect, and is therefore an important mechanism.

Results from this study also support quantitative evidence showing that leisure-time PA is more positively associated with mental wellbeing than PA during other domains (White et al., 2017). However, adolescents accumulate a large portion of their weekly PA during school (42%; Carlson et al., 2016). Therefore, greater understanding of the relationship between school-based PA and mental health is necessary. Although many students perceived PE to be enjoyable and associated with positive affect, those who were extrinsically motivated by teachers’ control were less likely to believe PE led to positive affect. As such, controlling teacher behaviours not only contribute to reduced autonomous motivation and reduced PA (Hagger et al., 2009; Standage, Duda, & Ntoumanis, 2006), but may also undermine the benefits of PE for affective wellbeing. Hence, autonomy supportive behaviours should be promoted further in the future; not only to increase PA, but to enhance the effect of school-based PA on students’ wellbeing (Cheon, Reeve, & Moon, 2012).

Strengths and Limitations.

The key strength of this study was that it was the first to explore adolescent perceived affective wellbeing in relation to a range of different PA domains, and develop an initial understanding of the role of motivation. The method of data collection (i.e., computer-assisted-self-interview) was also a strength of the study, as it allowed for a larger sample size
for qualitative investigation than is typical, and ensured anonymity of responses, thereby encouraging participants to discuss their views honestly. While the anonymity of the computer-assisted-self-interview was a strength, the absence of an interviewer could be a limitation as only probes that were pre-defined by the research team could be used. The using both descriptive statistics and frequency counts to supplement thematic analysis was also a strength in fostering the exploration of a phenomenon that was previously unstudied.

There are a number of additional limitations to note. Recalling positive and negative affect, as opposed to measuring affect during or after PA, may have introduced recall bias (Hufford, 2007). Quantitatively testing the relationships between PA and affect immediately after PA would allow for more rigorous measurement of post-exercise affect, and enable results to be generalised to a broader sample. However, it is possible that PA behaviours that have an immediate impact on affect, either positive or negative, may not influence longer term mental health and wellbeing. As such, using validated psychological measures to determine the relationships between domain-specific PA, motivation, and more stable affective states would also be useful. Finally, mental wellbeing is comprised of both affective (i.e., emotions and moods) and cognitive (i.e., evaluations of life satisfaction) components (Luhmann, Hawkley, Eid, & Cacioppo, 2012), and measuring cognitive wellbeing in addition to affective wellbeing could provide a more detailed understanding of mental wellbeing.

**Conclusions**

This study suggests that PA experiences in varying life domains may have differential influences on adolescents’ affective wellbeing. As such, promoting PA may not always be beneficial to mental wellbeing. It appears that promoting autonomously motivated PA which
satisfies adolescents’ psychological needs is likely to be the most effective method of enhancing their mental wellbeing through PA.


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Figure 1. Adolescent perceived relationships between physical activity and positive and negative affect.
Table 1

*Frequency Counts of the Most Common Words Used to Explain When Physical Activity Leads to Positive Affect as Opposed to Negative Affect*

<table>
<thead>
<tr>
<th>Word</th>
<th>Positive Affect Frequency Count</th>
<th>Negative Affect Word</th>
<th>Frequency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekend</td>
<td>57</td>
<td>School</td>
<td>45</td>
</tr>
<tr>
<td>After school</td>
<td>33</td>
<td>Weekend</td>
<td>38</td>
</tr>
<tr>
<td>Organised sport</td>
<td>31</td>
<td>Organised sport</td>
<td>22</td>
</tr>
<tr>
<td>School</td>
<td>15</td>
<td>Physical education</td>
<td>18</td>
</tr>
<tr>
<td>Morning</td>
<td>8</td>
<td>After school</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 2

*Participants’ reported positive and negative affect within three different Physical Activity Domains*

<table>
<thead>
<tr>
<th></th>
<th>Leisure Time Frequency</th>
<th>%</th>
<th>Active Travel Frequency</th>
<th>%</th>
<th>Physical Education Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive Affect</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happy</td>
<td>101</td>
<td>89%</td>
<td>33</td>
<td>37%</td>
<td>96</td>
<td>86%</td>
</tr>
<tr>
<td>Cheerful</td>
<td>73</td>
<td>64%</td>
<td>19</td>
<td>21%</td>
<td>77</td>
<td>69%</td>
</tr>
<tr>
<td>Joyful</td>
<td>72</td>
<td>63%</td>
<td>18</td>
<td>20%</td>
<td>65</td>
<td>58%</td>
</tr>
<tr>
<td>Proud</td>
<td>80</td>
<td>70%</td>
<td>16</td>
<td>18%</td>
<td>43</td>
<td>38%</td>
</tr>
<tr>
<td>Lively</td>
<td>88</td>
<td>77%</td>
<td>29</td>
<td>32%</td>
<td>75</td>
<td>67%</td>
</tr>
<tr>
<td><strong>Negative Affect</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sad</td>
<td>3</td>
<td>3%</td>
<td>6</td>
<td>7%</td>
<td>8</td>
<td>7%</td>
</tr>
<tr>
<td>Mad</td>
<td>8</td>
<td>7%</td>
<td>8</td>
<td>9%</td>
<td>8</td>
<td>7%</td>
</tr>
<tr>
<td>Afraid</td>
<td>4</td>
<td>4%</td>
<td>3</td>
<td>3%</td>
<td>8</td>
<td>7%</td>
</tr>
<tr>
<td>Miserable</td>
<td>2</td>
<td>2%</td>
<td>11</td>
<td>12%</td>
<td>16</td>
<td>14%</td>
</tr>
<tr>
<td>Scared</td>
<td>4</td>
<td>4%</td>
<td>8</td>
<td>9%</td>
<td>4</td>
<td>4%</td>
</tr>
</tbody>
</table>

*Note.* Frequency and % refer to the number of, and proportion of, students who indicated they experience that emotion during each particular physical activity domain.
Table 3

Participants’ Perceived Affective Experiences in Different Physical Activity Domains according to Participants’ Main Motivational Reason for Participation

<table>
<thead>
<tr>
<th></th>
<th>Leisure Time</th>
<th>Active Travel</th>
<th>Physical Education</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Enjoyment</td>
<td>Health benefits</td>
<td>Fun</td>
</tr>
<tr>
<td>n</td>
<td>59</td>
<td>55</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
</tr>
<tr>
<td>Positive Affect</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happy</td>
<td>49</td>
<td>83%</td>
<td>47</td>
</tr>
<tr>
<td>Cheerful</td>
<td>37</td>
<td>63%</td>
<td>36</td>
</tr>
<tr>
<td>Joyful</td>
<td>44</td>
<td>75%</td>
<td>39</td>
</tr>
<tr>
<td>Proud</td>
<td>40</td>
<td>67%</td>
<td>33</td>
</tr>
<tr>
<td>Lively</td>
<td>57</td>
<td>96%</td>
<td>47</td>
</tr>
<tr>
<td>Negative Affect</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sad</td>
<td>2</td>
<td>4%</td>
<td>0</td>
</tr>
<tr>
<td>Mad</td>
<td>8</td>
<td>13%</td>
<td>6</td>
</tr>
<tr>
<td>Afraid</td>
<td>5</td>
<td>8%</td>
<td>3</td>
</tr>
<tr>
<td>Miserable</td>
<td>5</td>
<td>8%</td>
<td>0</td>
</tr>
<tr>
<td>Scared</td>
<td>2</td>
<td>4%</td>
<td>0</td>
</tr>
</tbody>
</table>

Note. % refers to the proportion of students who indicated they experience each emotion during each particular physical activity domain, according to their reason for participating in that physical activity domain.