Predicting Parental Support and Parental Perceptions of Child and Youth Movement Behaviors

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Abstract

Objectives: In light of a shift to considering the integration of movement behaviors, the purpose of this study was to examine an extended multi-component theory of planned behavior (TPB) framework to predict parent support and parent perceived behavior of the Canadian 24-hour movement behaviors in children and youth including light physical activity (LPA), moderate to vigorous physical activity (MVPA), sleep, and screen-time. **Design:** Cross-sectional survey. **Method:** A representative sample of Canadian parents (N = 1,208) with children aged 5 to 17 years of age, completed measures of TPB, support behaviors, and the four child health behaviors via a panel survey**. Results:** Controlling for child age, structural equation models showed that child health behavior was predicted by parental support of that behavior (10-27% of variance explained) and intention and perceived capability to support explained support behaviors (42-53% variance explained). The TPB antecedents of intention, however, differed by each health behavior. **Conclusions**: Parental support behaviors are related to perceived child/youth behavior. Parental support is partly dependent on intention and perceptions of parental capability but the interventions to promote the underlying social cognitions behind parental support may be different for MVPA, LPA, sleep, and screen time restriction.

Key Words: Theory of Planned Behavior, perceived behavioral control, intention, attitude, parent-child relationship, parenting

Recently, Canadian 24-hour movement guidelines were developed to provide public health recommendations for integrating physical activity, sedentary behavior, and sleep for both children and youth (Tremblay et al., 2016) and the early years (Tremblay et al., 2017). The purpose of these guidelines is to acknowledge that combinations of movement behaviors interact, demonstrating that the composition of such behaviors across the whole day matter for health (Carson, Tremblay, Chaput, & Chastin, 2016; Saunders et al., 2016). Adhering to these new guidelines is associated with better body composition, cardiorespiratory and musculoskeletal fitness, academic achievement and cognition, emotional regulation, pro-social behaviors, cardiovascular and metabolic health, and overall quality of life (Carson, Hunter, et al., 2016; Carson, Tremblay, et al., 2016; Chaput et al., 2016; Poitras et al., 2016; Saunders et al., 2016). Furthermore, there is evidence that healthy movement behaviors in childhood track into adulthood (Biddle, Pearson, Ross, & Braithwaite, 2010; Telama, Yang, & Viikari, 2005) and foster health benefits across the life course (Malina, 2001).

Unfortunately, less than one in five Canadian children and youth aged 5-17 years adhere to all of the healthy movement behavior guidelines (Carson, Chaput, Janssen, & Tremblay, 2017; Roberts et al., 2017). Consequently, the promotion of healthy movement behaviors among young people are important for public health, now and in the future, and understanding the variables that can facilitate effective interventions is of paramount importance.

Many factors are associated with the spectrum of child and youth movement behaviors from individual differences to environmental and policy-level correlates (Bauman et al., 2012; Biddle, Atkin, Cavill, & Foster, 2011; Rhodes, Bredin, Janssen, Warburton, & Bauman, 2017; Temmel & Rhodes, 2013; Tremblay et al., 2011). An interesting aspect of child and youth behavior, however, is their co-dependency on parents. Specifically, children and youth spend

considerable time within the care of their parents, and indeed parents appear to be the 'gatekeepers' of physical activity during family time (Clark, Spence, & Holt, 2011; Gustafson & Rhodes, 2006). Parents are also critical agents in bedtime routines for sleep (Pyper, Harrington, & Manson, 2017) and screen-time access and duration (Xu, Wen, & Rissel, 2015). Unfortunately, interventions focused on PA and sedentary behavior in the family home are limited and have resulted in mixed to negligible changes (Brown et al., 2016; Kaushal & Rhodes, 2014; Maitland, Stratton, Foster, Braham, & Rosenberg, 2013; Rhodes & Quinlan, 2014).

Effective interventions are likely dependent on a sound theoretical understanding of the potential determinants of a behavior (Baranowski, Anderson, & Carmack, 1998; Cane, O'Connor, & Michie, 2012; Rhodes & Nigg, 2011). Thus, a better understanding of parental influence on child and youth movement behaviors may inform the design and success of family interventions in the future (Loprinzi & Trost, 2010). Parental influence generally includes two basic factors: parental role modeling (observational learning of the behavior) and parental support (facilitation of child behavior) (Rhodes & Quinlan, 2014). Of these factors, parental support has the most consistent and robust evidence as a correlate of movement behaviors (Biddle et al., 2011; Craggs, Corder, van Sluijs, & Griffin, 2011; Hutchens & Lee, 2018; Mitchell et al., 2012; Pyper, Harrington, & Manson, 2016; Trost & Loprinzi, 2011; Xu et al., 2015; Yao & Rhodes, 2015). Thus, attention to parental support as a means to changing child and youth movement behaviors appears important for successful family-based intervention.

Parental support is an umbrella term that represents the functional characteristics associated with the interactions between a parent and his/her children in promoting health behaviors (Beets, Cardinal, & Alderman, 2010; Pyper et al., 2016). The concept is complex with several different definitions and measures (Trost, McDonald, & Cohen, 2013). For the purpose

of the present paper, we used the core components of encouragement (e.g., providing information and pressure to be active), logistical support (e.g., facilitating physical activity, signing children up for activities, transportation to activities), and co-activity (i.e., parent-facilitated support via activity together and not mere modeling) proposed by Rhodes et al. (2015) for physical activity and the additional component of regulatory support (e.g., enforcing rules, setting limits) for sleep and screen time restriction (Pyper et al., 2016).

Given the evidence for the importance of these parental support behaviors for child movement behaviors, Rhodes and colleagues (2013; 2015) used the theory of planned behavior (TPB) framework (Ajzen, 1991) to understand parental support of physical activity as an outcome. TPB suggests that one's intention is the primary determinant of behavior. Intention is predicted by attitude (evaluation of the behavior), subjective norm (perceived social pressure), and perceived behavioral control (ability/autonomy of performing the behavior). Perceived behavioral control may also influence behavior directly to the extent that the behavior is not completely under one's full volition (Ajzen, 1991). In line with TPB, Rhodes and colleagues (2013; 2015) found intention to provide parental support was predicted by attitudes about support, particularly affective attitude (i.e., enjoyment of the support experience) rather than instrumental attitude (i.e., utility of the support experience), and perceived behavioral control over support in both studies (Rhodes et al., 2013; Rhodes et al., 2015). Overall, the largest predictor of parental support was perceived behavioral control over support, followed by intention. Since the publication of these studies, several small scale experimental designs have also shown promise through interventions targeting parental support attitudes and perceived control about physical activity that have resulted in changes in support behavior (Bassett-Gunter, Stone, Jarvis, & Latimer-Cheung, 2017; Laukkanen, Pesola, Finni, & Sääkslahti, 2017; Tanna,

Arbour-Nicitopoulos, Rhodes, & Bassett-Gunter, 2017). As such, the TPB also seems to be valuable in guiding interventions targeting parental support for physical activity.

Despite these interesting findings, some limitations warrant further exploration. First, the work to date has been focused on support of moderate to vigorous intensity physical activity (MVPA) and not light physical activity (LPA), sedentary behavior or sleep behavior. Given a shift in Canada to integrated, 24 hour movement guidelines and the collective importance of supporting these behaviors for child health, and the differences in parenting support across behaviors (i.e., physical activity requiring logistical support and co-activity, and screen time and sleep support requiring regulatory support), it stands to reason that studies should seek to explore whether the TPB parental support model is invariant across the movement behaviors.

Second, all of this work has been conducted on parents of children (e.g., under 12 years of age). It would be interesting to understand whether the same model still holds when applied to youth. Parents still often have to provide considerable support for physical activity among teenagers, but their growing autonomy suggests that it may not be as strong of a relationship as that of children (Beets et al., 2010; Biddle et al., 2011; Craggs et al., 2011; Edwardson & Gorely, 2010; Pugliese & Tinsley, 2007; Trost & Loprinzi, 2011).

Finally, Rhodes et al. (2015) noted that the composition of perceived control in these studies is poorly understood despite being such a robust predictor of parental support overall. Perceived control is likely to be comprised of at least two fundamental composites: perceived capability and perceived opportunity (Ajzen, 1991; Rhodes, Blanchard, & Matheson, 2006). Perceived capability represents perceptions of physical and mental ability, capacity, or competence to perform a specific circumscribed behavior (Williams & Rhodes, 2014). The construct is identical to Bandura's (1977) original conception of self-efficacy and interventions

for this construct would presumably follow performance mastery (e.g., instruction, demonstration, practice, feedback), and other techniques noted in self-efficacy theory. By contrast, perceived opportunity is the perceived time and available access that can allow one to perform the behavior (Rhodes et al., 2006). Interventions on this construct would likely need to apply time-management or problem solving approaches or even a socio-ecological policy lens to provide parents with more facilities and opportunities (e.g., free time from household and occupational demands; access to facilities) (Davison, Lawson, & Coatsworth, 2012). Both of these components of perceived control are conceivably linked to parental support. For example, in the physical activity domain, parents have noted that they perceive both their skills to enact physical activities (perceived capabilities) and their time (perceived opportunities) are barriers to supporting their children (Rhodes & Lim, 2018). The comparative predictive value of these two components of control, however, has not been examined.

Therefore, the purpose of this study was to advance prior research by exploring an extended multi-component TPB framework (see Figures 1 and 2) to predict both parental support and parent perceived behavior of the 24-hour movement behaviors in children and youth. We hypothesized that, similar to past research in MVPA (Rhodes et al., 2013; Rhodes et al., 2015), intention to support each health behavior would be predicted by components of attitude and perceived behavioral control. We further hypothesized that support behavior would, in turn, be predicted by both intention and perceived behavioral control and that support behavior would predict parent perceived child/youth behavior. We expected the affective component of attitude to be more predictive of intention than the instrumental component based on past research and theorizing that the hedonic aspects of action are prioritized over utility aspects (Williams, Dunsinger, Jennings, & Marcus, 2012). Finally, we expected that child age may moderate our

findings. We hypothesized that perceived behavioral control may have larger effects on intention and support behavior for parents of children compared to parents of youth. This hypothesis was based mainly on past physical activity research that has often demonstrated that parental support is less important for adolescents than children due to their increasing autonomy in behavioral actions (Edwardson & Gorely, 2010; Pugliese & Tinsley, 2007).

We also had two exploratory hypotheses. First, we considered the relative contribution of the two perceived behavioral control components (perceived capability, perceived opportunity) in the model as exploratory. Furthermore, we also considered the invariance of the TPB model structure across the four 24-hour movement behaviors as exploratory.

Method

Study Design and Participants

A cross-sectional study was undertaken by way of a national Canadian online panel survey via a hired vendor, Maru/Matchbox, in October 2017. The research team was not involved in the selection process of participants. Instead, Maru/Matchbox has a representative consumer online panel database of approximately 110,000 people who agree to answer surveys in return for small tokens of appreciation. Forum participants are typically recruited via word-of-mouth, referrals, campaigns, and partnering communities. For the present study, Maru/Matchbox randomly selected 1,208 parents with children between the ages of 5 and 17 years. Respondents were allowed two weeks to complete the online survey, and it was available in French and English. The sample was stratified by province and population density. Human research ethics for this study was approved by the board of the institution of a co-author (ALC).

Measures

To ensure that responding parents could understand what was meant by each behavior while answering the measures, all health behaviors were defined congruent with the Canadian 24-Hour Movement Guidelines for Children and Youth (Tremblay et al., 2016). Specifically, the definition of the health behavior was provided to respondents, followed by the definition of parental support for that behavior. Parents then completed the measures for that health behavior and subsequently were asked to move to the next section where the definition of the next health behavior was provided as well as our definition of support, and so on. When parents had more than one child within the 5- to 17-year range, they were asked to think of their child whose birthday was coming up next and to use them as the referent for all questions in the survey.

MVPA for children and youth was defined as engaging in at least 60 minutes a day of activities that take physical effort and require the child to breathe more than normal (e.g., hiking, skateboarding, cycling, running). Parental support of their child's MVPA was defined as encouraging their child's participation in sport and physical activity on a regular basis; driving or supporting transportation of their child to engage in sport and physical activity; and/or playing sport or engaging in physical activity with their child. We defined LPA as their child engaging in at least several hours of activities that do not result in sweat production or shortness of breath (e.g., mild stretching, playing with animals, walking) each day. Parental support for their child's LPA was defined as encouraging their child to move around more; encouraging games, chores and activities that require movement; and going for walks or doing activities with their child. Sleep was defined as their child engaging in uninterrupted 9 to 11 hours of sleep per night for those aged 5–13 years and 8 to 10 hours per night for those aged 14–17 years, with consistent bed and wake-up times. Parental support of their child's sleep was defined as encouraging their child's regular bed and wake-up times, and ensuring that their child has the right setting for sleep

(e.g., no TV, phone use at bed time). Finally, we defined healthy child screen time as their child engaging in no more than 2 hours a day of recreational screen time while sedentary based on current evidence (Carson et al., 2016; Tremblay et al., 2016). Parental restriction of their child's screen time was defined as encouraging their child to view screens no more than two hours a day while sedentary and ensuring that their child has other activities to pursue throughout the day that do not involve sitting (or lying down) and watching screens.

Background demographics. Respondents reported household income, parent sex, education and employment status, number of children in the home, and the age of the child who was considered for the questions in the survey.

Attitude about child support of physical activity. Based on the original semantic differential measurement of attitudes in the TPB (Ajzen, 1991, 2006a), two items for instrumental (e.g., harmful-beneficial, useless-useful) and affective (e.g., unenjoyable-enjoyable, unpleasant-pleasant) properties of an attitude for parental support of each child health behavior were included using seven-point semantic differential scaling (Ajzen, 2006b). The items were identical to those used by Rhodes et al. (2013; 2015) in prior research on parental support of child MVPA. Responses were on a seven-point scale.

Perceived behavioral control over child physical activity support. Our assessment of perceived behavioral control followed the recommendations of Rhodes and colleagues to assess specific components for perceived capability (2 items: I have the ability to support my child' s _____; I am capable of supporting my child's _____) and perceived opportunity (1 item: I will have an opportunity to support my child's ____) (Rhodes, 2017; Rhodes et al., 2006; Williams & Rhodes, 2014). All items were measured with a phrase that held motivation to support constant (i.e., "if I wanted to") in order to attempt to account for any confounds in perceived ability versus

perceived willingness (Williams & Rhodes, 2014) and featured five-point Likert scaling from (1) strongly disagree to (5) strongly agree.

Parental Support Intention. Intention to support their child's four health behaviors of the 24-Hour Movement Guidelines for Children and Youth was measured with a single open-scaled item based on Courneya (1994). The formatting of the item was "I intend to support my child's [MVPA, LPA, sleep schedule] ____ times per week" or "I intend to restrict my child's screen time to no more than 2 hours per day ____ times per week." This provides a measure of decisional intention (Rhodes & Rebar, 2017) and allows for scale correspondence with the measure of support behavior within the study (Courneya, 1994; Courneya & McAuley, 1994).

Parental Support Behavior. Commensurate with prior research on parental support measurement of MVPA (Rhodes et al., 2016), participants were asked about the frequency they: (1) encourage [their] child to participate in MVPA or sport, (2) play outside with [their] child or do MVPA with their child, and (3) drive or provide transportation to a place [their] child can do MVPA or play sports. Our measurement of LPA support and the other health behaviors followed similar item content. Specifically, LPA included the items "encourage your child to participate in LPA around the house or outdoors" and "engage in light physical activities with your child." Sleep support included the items "encourage your child to sleep between 9-11 hours per night" and "enforce your child's sleep schedule." Finally, screen time restriction support included the items "encourage your child to stop sitting and watching screens" and "enforce your child's screen time schedule." Responses were scored as 1 (never/rarely), 2 (1-2 times per week), 3 (3-4 times per week), 4 (most days) and 5 (daily). These measures are formative scales (i.e., index measure) of potentially different behaviors, but MVPA support ($\alpha = .75$), LPA support ($\alpha = .80$), sleep support ($\alpha = .83$) and screen time ($\alpha = .86$) restriction support all showed adequate

reliability.

Parent perceptions of MVPA, LPA, sleep, and screen time (of their child). The question for parent perception of MVPA used the item "In a typical week, on how many days does your child engage in moderate-to-vigorous physical activity for a total of at least 60 minutes per day?" The response format allowed parents to answer from 0-7 days. Similarly, the question for LPA asked "In a typical week, on how many days does your child engage in light physical activity for several hours per day?" with a 0-7 days response format. These items use a similar scoring format to the Behavioral Risk Factor Surveillance Survey Instrument (CDC, 2001), Health Behaviour of School-Aged Children Survey (Janssen et al., 2005), Godin Leisure-Time Exercise Questionnaire (Godin, Jobin, & Bouillon, 1986; Godin & Shephard, 1985), and the International Physical Activity Questionnaire (Craig et al., 2003); but they were framed to correspond with contemporary child physical activity guidelines (Tremblay et al., 2016). Child sleep used the item "How many hours does your child usually spend sleeping in a 24-hour period (including naps but excluding time spent resting)?" on a scale with response options from 0-24 hours. The item is similar to the single item used to assess sleep duration in the Pittsburgh Sleep Quality Index (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) and the same question drawn from the Canadian Health Measures Survey (Statistics Canada, 2015). Finally, screen time was assessed by the item "On average, how many total hours and minutes per day does your child watch TV, use the computer, and play video games, during their free time?" with a scale between 0-23 hours and 0-59 min, used in the Canadian Health Measures Survey (Statistics Canada, 2015). Parents reported their child's screen time for weekdays and weekend days separately, and a summary score was created for the week by multiplying weekday minutes by 5 and weekend day minutes by 2, summing the weekday and weekend day scores, and dividing by 7.

Analysis Plan

Data were analysed in Mplus version 7.31 (Muthen & Muthen, 1998-2012). Descriptive statistics for all variables were computed. First, a measurement model was tested for each of the 24-hour movement behaviors which included all latent and single-item variables (four full models in total). Second, a complete structural equational model was tested based on the TPB (Ajzen, 1991) for each of the 24-hour movement behaviors. Specifically, affective attitudes, instrumental attitudes, perceived capability, and perceived opportunity were modeled as antecedents of intention to support child physical activity. Intention, perceived control, and perceived opportunity were modeled with direct effects upon support behavior, and support behavior was subsequently modeled as an antecedent of child behavior. Demographic variable(s) were included as covariates if they were related to any of the criterion variables (intention, support behavior, child behavior) as deemed by a Pearson's correlation $r > .14$ and $p < .01$, which is based on recommendations of a lower-end meaningful effect (i.e., mid-point between Cohen's (1992) [r = .10] and Ferguson's (2009) [r = .21] recommendations). Covariate(s) were modeled as antecedents of all criterion variables and were set to covary with the cognitions (affective attitudes, instrumental attitudes, perceived capability, perceived opportunity). For factors with two or three items, the first item was fixed to 1.0 to set the metric of the latent variable and all item error terms were freed for estimation. For single item measures the error variance was fixed at 0.

To determine whether TPB model was invariant across the four 24-hour movement behaviors, the path coefficients from the four structural models were compared. To do this the unstandardized path coefficient from one model was fixed to be equivalent to another. For example, the coefficient between parental support and child behavior in the MVPA model was

set as equal to the corresponding coefficient in the LPA model. Significant differences between the constrained and freed models were compared.

To examine whether the TPB model held for parents with children (aged 5-11 years) and youth (aged 12-17 years), a multiple group analysis was completed for each behavior. One by one, each pathway from the model was set as equal between the two groups and the constrained and freed models were compared.

The χ_2 test was used to determine absolute model fit along with the Comparative Fit Index (CFI; acceptable fit: > 0.95) and the Root Mean Square Error of Approximation (RMSEA; acceptable fit: < 0.06) (Hu & Bentler, 1999). The Satorra-Bentler scaled $\chi_{2\ \text{difference}}$ test ($p < .01$) (Muthen & Muthen, 2005) was used to determine significant worsening of fit between nested models for invariance of the TPB model across behaviors and model comparisons between parents with children and youth. Indirect effects were calculated using the product of coefficient method along and its standard error computed via the delta method (Muthen & Muthen, 1998-2012). The MLR estimator was used for all structural equational models to account for some non-normality in the data. The significance level for path coefficients was set at $p < .01$ and meaningful effect sizes were considered > .14 (i.e., mid-point between Cohen's (1992) and Ferguson's (2009) recommendations).

Results

Participant Characteristics

Table 1 details the available baseline demographic and behavioral information of the parents in the sample. Congruent with the regional stratification in the sample, the data represents the diversity of Canadian demographics (Statistics Canada, 2014). The sample was nearly equally represented by males and females (52.3% female) and parents reported an average

of 1.81 (SD = 1.01) children; and education, income, and employment reflected national averages (Statistics Canada, 2007). The child of interest in the support-related questions had a mean age of 11.59 years old (*SD* = 3.81). In terms of health behaviors of the 24-hour movement guidelines (Tremblay et al., 2016), parents reported that 12.7% of their children were meeting national MVPA guidelines, 30.5% were meeting LPA guidelines, 25.8% were meeting screen time guidelines. Finally, 69.8% of children (aged 5 to 13 yrs.) and 72.2% of youth (aged 14 to 17 yrs.) were meeting sleep guidelines.

Insert Table 1 Here

Structural Equation Models of Parental Support Behaviors

Examination of support behavior intention, support behavior and parent perceived child behavior by family demographics showed that child age was the only significant ($p <. 01$; $r >$ .14) correlate across the four movement behavior models. Parental sex, parent education, family income, parent occupational status, parent marital status, and number of children in the family home were not related to the variables within these models. Thus, only child age was added to the main analyses as a covariate of the path models. The only variable with missing data was screen time (18%). Specifically, participants with missing data on screen time were significantly ($p < .01$) different than those without missing data on child age, LPA, sleep, and MVPA, parent education, household income, and number of kids in the home. Therefore, there was some evidence that missing data on screen-time was Missing-At-Random (MAR: i.e., the probability of missing data is not related to its particular value, but is dependent upon other measured variables) (Allison, 2002). To reduce bias, Full-Information-Maximum-Likelihood- estimation (FIML) was used to estimate missing values on screen time within the structural equation model and with variables related to missingness but not in the prediction model included as auxiliary

variables. Under MAR conditions, FIML provides unbiased parameter and standard error estimates and fit statistics and is known to be one of the best methods for handling missing data (Allison, 2012; Enders & Bandalos, 2001).

Insert Table 2 Here

The MVPA, LPA, and sleep measurement models had a modest yet acceptable fit to the data [MVPA: $\chi^2(36) = 62.03$, $p < .01$; RMSEA = 0.02; CFI = 1.00; LPA: $\chi^2(26) = 51.59$, $p < .01$; RMSEA = 0.03; CFI = 1.00; sleep: $\chi^2(26) = 71.51$, $p < .01$; RMSEA = 0.04; CFI = 0.99] and screen time restriction had an excellent fit to the data *[$\chi^2(26) = 26.21$, $p = .45$; RMSEA = 0.00; CFI = 1.00].* The full structural equation models also resulted in a modest yet acceptable fit of these data for MVPA [χ^2 (48) = 265.16; $p < .01$; CFI = .96; RMSEA = .06], LPA [χ^2 (37) = 166.97; $p < .01$; CFI = .98; RMSEA = .05], sleep [χ^2 (37) = 94.732; $p < .01$; CFI = .99; RMSEA = .04] and screen-time restriction [χ^2 (37) = 185.85; $p < .01$; CFI = .98; RMSEA = .06]. Descriptive statistics of the items and corresponding factor loadings are presented in Table 2. All items showed loadings on their proposed factor in the large effect size range. The structural models for MVPA and LPA are presented in Figure 1, and the models for sleep and screen time restriction are presented in Figure 2. Indirect effects within these analyses are presented in Table 3. For MVPA, affective attitude about support (standardized effect = 0.28) and perceived opportunity to support (standardized effect = 0.16) contributed to the prediction of intention and explained 16% of its variance (i.e., explained 16% of the variance independent of the effect of child age).

Parental support was subsequently predicted by intention (standardized effect = 0.45) and perceived capability (standardized effect = 0.25) explaining 41% of its variance (explained 41%

of variance when child age was removed). Further, affective attitude about support (standardized effect = 0.13) and perceived opportunity to support (standardized effect = 0.07) had significant indirect effects through intention when predicting parental support, although both effects were small. Finally, parent perceptions of child MVPA was predicted by parental support (standardized effect = 0.48), explaining 26% of its variance (explained 24% of variance when child age was removed). Indirect effects of this model were significant for affective attitude (standardized effect = 0.06), perceived capability (standardized effect = 0.15), and perceived opportunity (standardized effect = 0.08), although these effect sizes were small.

Insert Figure 1 Here

For LPA, only perceived opportunity (standardized effect = 0.18) was a significant predictor of intention and explained 15% of its variance (explained 14% of the variance when child age was removed). Parental support was subsequently predicted by intention (standardized effect = 0.44), perceived capability (standardized effect = 0.19) and perceived opportunity (standardized effect = 0.20), collectively explaining 51% of its variance (explained 48% of the variance when child age was removed). Only perceived opportunity to support (standardized effect = 0.08) had a significant indirect effect through intention when predicting parental support, although this effect was small. Finally, parent perceptions of child LPA were predicted by parental support (standardized effect = 0.48), explaining 27% of its variance (explained 25% of the variance when child age was removed). Indirect effects of this model were significant for perceived capability (standardized effect = 0.11), and perceived opportunity (standardized effect = 0.13), although these effect sizes were small.

Insert Figure 2 Here

In the model for sleep, instrumental attitude (standardized effect = 0.14) and perceived capability (standardized effect = 0.32) were significant predictors of intention and explained 23% of its variance (explained 22% of the variance when child age was removed). Parental support was subsequently predicted by intention (standardized effect = 0.29) and perceived capability (standardized effect = 0.35), explaining 53% of its variance (explained 44% of the variance when child age was removed). Only perceived capability to support (standardized effect = 0.10) had a significant, albeit small, indirect effect through intention when predicting parental support. Finally, parent perceptions of child sleep were predicted by parental support (standardized effect = 0.35), explaining 17% of its variance (explained 16% of the variance when child age was removed). Indirect effects of this model were only significant for perceived capability (standardized effect = 0.15).

Insert Table 3 Here

Finally, for screen time reduction, instrumental attitude (standardized effect = 0.22) and perceived capability (standardized effect = 0.28) were significant predictors of intention and explained 34% of its variance (explained 32% of variance when child age was removed). Parental support was subsequently predicted by intention (standardized effect = 0.50), with significant but small effects from perceived capability (standardized effect = 0.14) and perceived opportunity (standardized effect = 0.15) that collectively explained 53% of its variance (explained 53% of the variance when child age was removed). Further, both instrumental attitude (standardized effect = 0.11) and perceived capability to support (standardized effect = 0.14) had significant indirect effects through intention when predicting parental support, although these effects were small. Parent perceptions of child screen time was predicted by parent restriction support (standardized effect = -0.20), explaining 10% of its variance (explained 7% of the

variance when child age was removed). Very small indirect effects of this model were significant for instrumental attitude (standardized effect = -.02), and perceived capability (standardized effect = -0.06).

Comparison of Models by Child Age and the Four Movement Behaviors

The results of the comparisons for the two-group structural equation models by child age, across all four movement behaviors, are presented in Table 4. The multiple group structural equation models resulted in a modest yet acceptable fit of these data for MVPA [χ^2 (96) = 319.08; $p < .01$; CFI = .96; RMSEA = .06], LPA [χ^2 (74) = 222.35; $p < .01$; CFI = .97; RMSEA = .06], sleep [χ^2 (74) = 152.74; $p < .01$; CFI = .98; RMSEA = .04] and screen-time restriction [χ^2 (74) = 230.28; $p < .01$; CFI = .97; RMSEA = .06]. Only one path was significant [$\Delta \chi^2$ (1) 21.89; $p < .01$), across any of the models, and thus met the criteria for moderation. This path was for the effect of parental support on sleep. Specifically, parent support had a larger direct effect on child sleep (standardized effect = 0.49, $p < .01$) than youth sleep (standardized effect = 0.26, $p < .01$).

The results of our exploratory tests for model invariance across the four movement behaviors can be found in Table 5. Sixteen tests among the four models were significant ($p < .01$). There was only one significant difference between the MVPA and LPA models. Perceived opportunity had a larger direct effect on parental support for LPA (standardized effect = .20) compared to MVPA (standardized effect = .09). Affective attitude had a larger effect on intention for both MVPA (standardized effect = .28) and LPA (standardized effect = .15) compared to screen-time (standardized effect = .02) and sleep (standardized effect = -.07). By contrast, instrumental attitude had a larger effect on intention for screen-time (standardized effect = .22) and sleep (standardized effect = .14) compared to MVPA (standardized effect = -.12) and LPA (standardized effect = -.02). The effect of perceived capability on intention was also larger for

screen-time (standardized effect = .28) compared to MVPA (standardized effect = .12) and LPA (standardized effect = .10), while intention had a larger effect on parental support for MVPA (standardized effect = .45) than sleep (standardized effect = .29). Indeed, the effect of intention on parental support was also larger for screen-time (standardized effect = .50) and LPA (standardized effect = .44) compared to sleep. Finally, MVPA (standardized effect = .48) had a significantly different effect of parental support upon child behavior compared to screen-time (standardized effect = -.20). This is partly because screen-time had a negative relationship given that support is meant to restrict this time. A similar significant effect was found between screen-time and parental support-behavior paths for LPA (standardized effect = .48) and sleep (standardized effect = .35).

Insert Table 4 and 5 Here

Discussion

The prevalence of children and youth meeting 24-hour movement guidelines is low (Carson et al., 2017; Roberts et al., 2017) and parental support of these behaviors is a consistent correlate (Biddle et al., 2011; Craggs et al., 2011; Hutchens & Lee, 2018; Mitchell et al., 2012; Pyper et al., 2016; Trost & Loprinzi, 2011; Xu et al., 2015; Yao & Rhodes, 2015). While research into the antecedents of parental support for child and youth MVPA has been steadily accumulating, there is a relative paucity of research focused on LPA, sleep, and screen time restriction. This study attempted to advance prior research by exploring an extended multi-component TPB frame to predict both parental support and parent perceived behavior of the 24-hour movement behaviors in children and youth.

The first purpose of the study was to examine the overall fit and predictive capability of the extended TPB models across the four movement behaviors. We hypothesized that, similar to

past research on MVPA (Rhodes et al., 2013; Rhodes et al., 2015), intention to support each health behavior would be predicted by components of attitude and perceived behavioral control. We further hypothesized that support behavior would, in turn, be predicted by both intention and perceived behavioral control and that support behavior would predict parent perceived child/youth behavior. These hypotheses were supported and, in general, the models showed an acceptable model fit for complex models of this size (Iacobucci, 2010). Further, all models explained significant variance in intention (15-34%), parental support (42-53%), and parental support was a significant predictor of each parent perceived child and youth health behavior (10-27%). The findings are consistent with previous research showing the importance of parental support to child and youth health behavior (Biddle et al., 2011; Craggs et al., 2011; Hutchens & Lee, 2018; Mitchell et al., 2012; Pyper et al., 2016; Trost & Loprinzi, 2011; Xu et al., 2015; Yao & Rhodes, 2015), and the importance of understanding the antecedents of parental support. Furthermore, the TPB framework showed utility in understanding parental support with intention to support and perceived behavioral control as substantive contributors within the prediction equations that demonstrated medium-large and small-medium effect sizes, respectively (Cohen, 1992). Further, indirect effects of specific perceived behavioral control and attitude constructs tracked through the model to perceived child behavior with small effect sizes.

Despite the overall strength of prediction in these models, our exploration of whether the TPB frame was similar across the four movement behaviors showed several discrepancies. For attitude, we expected the affective component to be more predictive of intention than the instrumental component based on assumptions that the hedonic aspects of action are prioritized over utility aspects (Williams et al., 2012). This hypothesis did not have support outside of the MVPA domain. Similar to past work with MVPA support (Rhodes et al., 2015), affective

attitude about support was a predictor of MVPA support intention in the medium effect size range (Cohen, 1992), but not instrumental attitude. However, neither attitude construct predicted LPA support intention. The results further underscore how parental support for physical activity does not appear to be predicated on its benefits (Rhodes et al., 2013; Rhodes et al., 2016; Rhodes et al., 2015). The new information provided by this exploratory analysis, however, is that LPA support does not appear to have a strong link to an evaluation of the behavior at all, though further replication is warranted.

By contrast, both sleep and screen time limitation intentions were predicted by instrumental attitude in the small effect size range (Cohen, 1992) but not affective attitude. There may be a few different reasons for these findings. First, sleep and screen time limitations likely involve short bursts of parental enforcement that highlight the concept of regulatory support (restrictive and punitive practices) (Pyper et al., 2016). Sleep is also a habitual and necessary behavior. This contrasts providing logistical support for child and youth MVPA activities, such as driving one's child to sports or co-activity by participating in the higher intensity activity. It may be that for these differences that underlie the different attitudinal components; parental encouragement may be based on utility/benefit, while ongoing logistical and co-activity support may rely on affective properties of the expected action. Future research is needed to explore the possibility. Another reason for these differences may be simple familiarity of the outcomes of these child behaviors. Specifically, the benefits of physical activity for children and youth are well established, with almost every parent recognizing their importance (Rhodes et al., 2013). By contrast, the health impact of sedentary behavior and specific guidelines around best practice for sleep and screen-time are fairly new (Carson, Hunter, et al., 2016; Chaput et al., 2016). It may be that instrumental attitudes about supporting these behaviors have more variability and thus can

predict more variance in parental intention to support the behavior. The mean scores and variability of the instrumental attitude items do show this possibility with screen time reduction, but not sleep (see Table 2). In any case, the results of these exploratory findings support continued education about the benefits of parental support for sleep and screen time reduction but there is little value in doing the same for physical activity, through replication of the results is recommended.

Though we considered the relative contribution of the two perceived behavioral control components (perceived capability, perceived opportunity) in these models as exploratory, perceived capability emerged as the most consistent predictor of parental support independent of intention. This suggests that parents who feel they have the skills and capability to support their children and youth in enacting the four 24-hour movement behaviors are more likely to do so independent of intention. Parenting skills may be necessary for effective parental support, such as how to successfully encourage healthy behaviors and enforce family rules (Pyper et al., 2016). Parent-child skill training (e.g., Morgan et al., 2011) has shown complimentary findings to our results in this path model. Perceived opportunity showed less consistent findings as an independent predictor of parental support but it was a predictor of both screen time and LPA. The results here may indicate the importance of a parental presence that is needed to monitor screen time and push children and youth to engage in LPA during free time (Gillison et al., 2017). Though further replication of these results is necessary, occupational and other time demands are frequent barriers to spending time together as a family (Rhodes & Lim, 2018). Intervening to improve perceived opportunities to enact parental support may be difficult, given the occupational responsibilities of parents, but some family time management and rules/problem solving may be prudent in interventions (Davison et al., 2012).

The components of perceived control also had interesting effects on intention with noteworthy alignment by the types of behaviors. Specifically, in both the LPA and MVPA models, perceived opportunity to support was a better predictor of intention to support child/youth behavior than perceived capability to support, with effect sizes in the small range (Cohen, 1992). This replicates prior research in individual-level physical activity behavior (Rhodes et al., 2006), and suggests that parents are over-shadowed by the time and access aspects of physical activity in their intentions compared to beliefs about capability and skills to support physical activity. There is some evidence that increasing the self-regulatory abilities of parents for physical activity time with planning may hold utility (Brown et al., 2016), but many parents likely face real barriers for physical activity that may exceed an individual focus on self-regulation. In contrast to these results, parental intention to support sleep and screen time restriction was predicted by perceived capability and not perceived opportunity. Like the findings mentioned previously for attitude, it may be these differences in the form of regulatory support in sleep and screen-time reduction compared to ongoing logistical aspects of support that are imbedded in physical activity. The results require replication but currently suggest that parental skills training in how to set and enforce limits around bed time and screen time may be useful in increasing intentions to support these behaviors (Xu et al., 2015).

Our final purpose of this study was to explore whether this extended TPB framework was moderated by the age of the child receiving parental support. Child age clearly had a linear association with key outcomes of this model including intention, parental support, and perceived child behavior. This may be due to a natural shift in family behaviors to the importance of peers as children approach and move through adolescence (Edwardson & Gorely, 2010), or the growing autonomy that parents grant teenagers. Within the moderator analyses the only

significant differences were on the relationship between parent support and child sleep with parents of children (under 13 years) having a stronger relationship between parent support and child sleep than parents of youth (aged 13 years and older). A general lack of difference between parent support for children and youth was also noted in a recent study of coordinated family physical activity (Rhodes & Lim, 2018). This suggests that specific content targeting of interventions by child age may be unnecessary, and thus improve on the cost-effectiveness of programs.

Despite the original findings of this paper and several strengths (e.g., representative sampling, complex modeling), the results should be considered within the context of its limitations. First, the study features a passive correlational analysis with a cross-sectional design. Causal attributions in these types of designs are not possible. Second, the assessment of child behaviors via parent perception may have social desirability bias, and it is unlikely to reflect the full range of behaviors performed by the child because parents are not present to observe their children 24 hours a day. Further, though we used established scales, which were designed based on Azjen's (2006) recommendations for scale development, these included many two-item and some single item measures. Ideally, each construct should be measured with three indicators (Iacobucci, 2010). However, considering convergence was achieved and no Heywood cases were found in all of our analyses, this suggests that the inclusion of two-item and single item measures did not have large impacts on our analyses. Future models that employ more objective indicators of behavior and multi-item measures of cognitions are warranted. Our TPB model also omitted the subjective norm construct and an examination of how norms may relate to parental support seems useful in future research. Finally, the sample used for this research showed generally

strong representation of the Canadian population, but may not generalize to specific geographical locales or cultures. Future research is needed to test the generalizability of these findings.

In summary, parental support has been established as an important variable linked to child and youth health behaviors. As parental support is a behavior unto itself, it may be useful to understand its antecedents to inform future interventions. In this study we modelled an extended multi-component TPB framework to predict parent support and parent perceived behavior of the 24-hour movement behaviors in children and youth. As hypothesized, child health behavior was predicted by parental support of that behavior (10-27% of variance explained). Intention and perceived capability to support explained support behaviors (42-53% variance explained). Though age of the child had negligible effects on the TPB models, the TPB antecedents of intention differed by each health behavior. Affective attitude about support was a predictor of MVPA support intention but neither attitude construct predicted LPA support intention. Both sleep and screen time limitation intentions were predicted by instrumental attitude but not affective attitude. The results underscore that educational/informational interventions may benefit sleep and screen-time support intentions but not physical activity support. Perceived opportunity to support was a better predictor of intention to support child/youth behavior than perceived capability in both physical activity models. In contrast, parental intention to support sleep and screen time restriction was predicted by perceived capability and not perceived opportunity. The regulatory support enacted in sleep and screen-time reduction compared to ongoing logistical aspects of support that are imbedded in physical activity may explain these differences. Overall, the results suggest continued interventions on parental support with a focus on improving intention of the parent to enact support and more selective underlying social

cognitive antecedents of intention for MVPA, LPA, sleep, and screen time restriction are warranted.

Figure Caption

Figure 1. Path model predicting parental support of child physical activity and parent-perceived child physical activity. *$p < .05$. *Top coefficient* is moderate-to-vigorous physical activity and the *bottom coefficient* is light physical activity. Note: Child age is featured as a covariate in both models.

Figure 2. Path model predicting parental support of and parent-perceived child screen time and sleep. *$p < .05$. *Top coefficient* is screen time and the *bottom coefficient* is sleep. Note: All effects include child age as a covariate.

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Table 1
Demographic, Health, and Physical Activity Profile

Characteristic	N = 1208
Province	
% Alberta	10.3
% British Columbia	14.2
% Manitoba	3.0
% New Brunswick	2.2
% Newfoundland/Labrador	1.7
% Northwest Territories	0.2
% Nova Scotia	3.3
%Nunavut	0.1
% Ontario	36.8
% P.E.I.	0.5
% Quebec	24.2
% Saskatchewan	3.6
Demographic Profile	
Target Child Age Mean (SD)	11.59 (3.81)
# Children Mean (SD)	1.81 (1.01)
% of Female Parents	52.3
% Married/Common-law	83.2
% Completed High School	88.7
% Completed University	52.1
% > $75,000 Household Income	54.0
% Currently Employed	69.1
Parent Perceived Child Health Behaviors	
% Youth Meeting Canada's MVPA Guidelines	12.7
% Youth Meeting Canada's Light PA Guidelines	30.5
% Youth Meeting Canada's Sleep Guidelines Aged 5-13	69.8
% Youth Meeting Canada's Sleep Guidelines Aged 14-17	72.2
% Children Meeting Canada's Screen Time Guidelines	25.8

Table 2
Factor loadings of the parent support prediction model for child behaviour (*N*=1,208)

Observed variable (possible range of scores)	Mean	Variance	Factor Loading	Error Variance
MVPA				
Affective attitudes (1-7)				
Enjoyable	5.30	1.72	0.81	.35
Pleasant	5.47	1.38	0.91	.17
Instrumental attitudes (1-7)				
Beneficial	5.80	1.20	0.90	.20
Useful	5.72	1.34	0.90	.19
Perceived capacity (1-5)				
Ability	4.07	0.76	0.92	.16
Capability	4.11	0.72	0.92	.16
Perceived opportunity (1-5)	4.00	0.81	1.00	.00
Intention (0-14 times/2 weeks)	6.08	12.83	1.00	.00
Parent support (1-5)				
Encouragement	3.16	1.45	0.81	.35
Play outside	2.38	1.52	0.60	.64
Arrange transportation	2.59	1.58	0.68	.54
Child MVPA (0-7 days/week)	4.86	3.84	1.00	.00
Child age (5-17 years)	11.59	14.50	1.00	.00
LPA				
Affective attitudes (1-7)				
Enjoyable	5.55	1.32	.93	.14
Pleasant	5.60	1.28	.92	.16
Instrumental attitudes (1-7)				
Beneficial	5.77	1.17	.93	.14
Useful	5.74	1.23	.92	.16
Perceived capacity (1-5)				
Ability	4.16	0.62	.94	.13
Capability	4.18	0.59	.95	.11
Perceived opportunity (1-5)	4.07	0.69	1.00	.00
Intention (0-14 times/2 weeks)	6.77	16.55	1.00	.00
Parent support (1-5)				
Encouragement	3.38	1.45	.87	.24
Engage with	2.86	1.65	.74	.45
Child LPA (0-7 days/week)	5.47	4.87	1.00	.00
Child age (5-17 years)	11.59	14.50	1.00	.00
Screen time				
Affective attitudes (1-7)				
Enjoyable	4.35	2.86	.96	.09
Pleasant	4.40	2.78	.91	.18
Instrumental attitudes (1-7)				
Beneficial	5.50	1.82	.82	.32
Useful	5.31	2.20	.97	.06

Perceived Capacity (1-5)				
Ability	3.78	1.10	.94	.12
Capability	3.75	1.16	.93	.14
Perceived Opportunity (1-5)	3.75	1.10	1.00	.00
Intention (0-14 times/2 weeks)	6.86	23.29	1.00	.00
Parent support (1-5)				
Encouragement	3.27	1.92	.81	.34
Enforce	2.98	2.21	.93	.13
Child screen time (0-1439 min/day)	177.58	12507.96	1.00	.00
Child age (5-17 years)	11.59	14.50		
Sleep				
Affective attitudes (1-7)				
Enjoyable	5.32	1.83	.93	.14
Pleasant	5.39	1.81	.91	.17
Instrumental attitudes (1-7)				
Beneficial	6.03	1.13	.91	.17
Useful	5.93	1.37	.95	.11
Perceived capacity (1-5)				
Ability	4.24	0.68	.93	.14
Capability	4.25	0.65	.92	.15
Perceived opportunity (1-5)	4.25	0.67	1.00	.00
Intention (0-14 times/2 weeks)	10.08	21.91		
Parent support (1-5)				
Encouragement	3.91	1.51	.86	.27
Enforce	3.77	1.72	.82	.33
Child sleep (0-24 hours/day)	9.54	5.05	1.00	.00
Child age (5-17 years)	11.59	14.50	1.00	.00

MVPA: Moderate to vigorous physical activity; LPA: light physical activity

Table 3

Standardized indirect, total, and direct effects, and standard errors for the four parent support models

	MVPA	LPA	Screen Time	Sleep
AA to child behavior				
Indirect effect (INT, PS)	0.06 (0.02), p < .01	0.03 (0.02), p = .14	0.00 (0.00), p = .61	-0.01 (0.00), p = .08
IA to child behavior				
Indirect effect (INT, PS)	-0.03 (0.02), p = .12	-0.01 (0.02), p = .81	-0.02 (0.01), p < .01	0.01 (0.01), p = .02
PC to child behavior				
Total indirect effect	0.150 (0.03), P < .01	0.11 (0.02), p < .01	-0.06 (0.02), p < .01	0.15 (0.04), p < .01
Specific indirect effect (PS)	0.123 (0.03), p < .01	0.09 (0.02), p < .01	-0.03 (0.01), p = .04	0.12 (0.04), p < .01
Specific indirect effect (INT, PS)	0.027 (0.01), p = .02	0.02 (0.01), p = .07	-0.03 (0.01), p < .01	0.03 (0.01), p < .01
PO to child behavior				
Total indirect effect	0.08 (0.03), p < .01	0.13 (0.02), p < .01	-0.04 (0.02), p = .01	0.03 (0.04), p = .43
Specific indirect effect (PS)	0.04 (0.02), p = .07	0.09 (0.02), p < .01	-0.03 (0.01), p = .02	0.02 (0.04), p = .53
Specific indirect effect (INT, PS)	0.04 (0.01), p < .01	0.04 (0.01), p < .01	-0.01 (0.01), p = .24	0.01 (0.01), p = .39
AA to PS				
Total indirect effect (INT)	0.12 (0.04), p < .01	0.07 (0.05), p = .14	0.01 (0.02), p = .605	-0.02 (0.01), p = .07
IA to PS				
Indirect effect (INT)	-0.05 (0.03), p = .11	-0.01 (0.05), p < .05	0.11 (0.02), p < .001	0.04 (0.02), p = .01
PC to PS				
Total effect	0.30 (0.05), p < .01	0.23 (0.05), p < .01	0.28 (0.07), p < .001	0.44 (0.11), p < .01
Indirect effect (INT)	0.06 (0.02), p = .01	0.05 (0.02), p = .06	0.14 (0.03), p < .001	0.10 (0.03), p < .01
Direct effect	0.25 (0.05), p < .01	0.19 (0.04), p < .01	0.14 (0.06), p = .020	0.35 (0.11), p < .01
PO to PS				
Total effect	0.16 (0.05), p < .01	0.28 (0.04), p < .01	0.18 (0.06), p < .01	0.09 (0.11), p = .43
Total indirect effect (INT)	0.07 (0.02), p < .01	0.08 (0.02), p < .01	0.03 (0.03), p = .22	0.02 (0.03), p = .39
Direct effect	0.08 (0.05), p = .06	0.20 (0.04), p < .01	0.15 (0.06), p < .01	0.06 (0.10), p = .53

Note. Indirect effects were calculated using the product of coefficient method; MVPA = moderate-to-vigorous physical activity; LPA = light physical activity; AA = affective attitudes; IA = instrumental attitudes; PC = perceived capability; PO = perceived opportunity; PS = parent support; INT = intention.

Table 4

Path coefficient comparisons between parents of children and adolescents across all four movement behaviors

	MVPA	LPA	Screen Time	Sleep
Pathway	$\Delta \chi^2$	$\Delta \chi^2$	$\Delta \chi^2$	$\Delta \chi^2$
PS → child behavior	2.97	0.55	1.66	21.89*
INT → PS	3.96	0.04	1.46	0.09
PC → PS	0.24	0.81	0.70	2.37
PO → PS	0.00	0.23	0.00	1.08
AA → INT	0.08	0.00	0.00	1.04
IA → INT	0.01	0.10	0.07	0.56
PC → INT	0.01	0.74	0.41	0.27
PO → INT	0.06	1.35	0.36	0.07

Note. *$p < .01$; MVPA = moderate-to-vigorous physical activity; LPA = light physical activity; PS = parent support; INT = intention; PC = perceived capability; PO = perceived opportunity; AA = affective attitudes; IA = instrumental attitudes; significance was set at $p < .01$ for $\Delta \chi^2$; a significant $\Delta \chi^2$ indicates this path coefficient is significantly different between parents of children and parents of adolescents.

Table 5

Path coefficient comparisons across the parent support models for each movement behavior

	MVPA vs. LPA	MVPA vs. Screen Time	MVPA vs. Sleep	LPA vs. Screen Time	LPA vs. Sleep	Screen Time vs. Sleep
Pathway	$\Delta \chi^2$	$\Delta \chi^2$	$\Delta \chi^2$	$\Delta \chi^2$	$\Delta \chi^2$	$\Delta \chi^2$
AA → INT	0.81	79.58*	116.05*	27.56*	46.92*	5.07
IA → INT	0.64	100.25*	41.49*	51.57*	14.48*	1.46
PC → INT	0.00	8.68*	6.56	8.21*	6.36	1.19
PO → INT	1.91	1.75	0.21	5.65	0.94	0.06
IN → PS	1.80	0.50	49.69*	0.32	34.52*	40.28*
PC →PS	0.28	3.94	1.47	2.32	2.09	4.86
PO → PS	9.05*	1.19	0.01	2.05	1.64	0.35
PS → CB	0.28	13.71*	4.86	13.75*	6.61*	407.73*

Note. *p < .01; MVPA = moderate-to-vigorous physical activity; LPA = light physical activity; PS = parent support; INT = intention; PC = perceived capability; PO = perceived opportunity; AA = affective attitudes; IA = instrumental attitudes; CB = child behavior; significance was set at p < .01 for $\Delta \chi^2$; a significant $\Delta \chi^2$ indicates this path coefficient is significantly different between the two models.

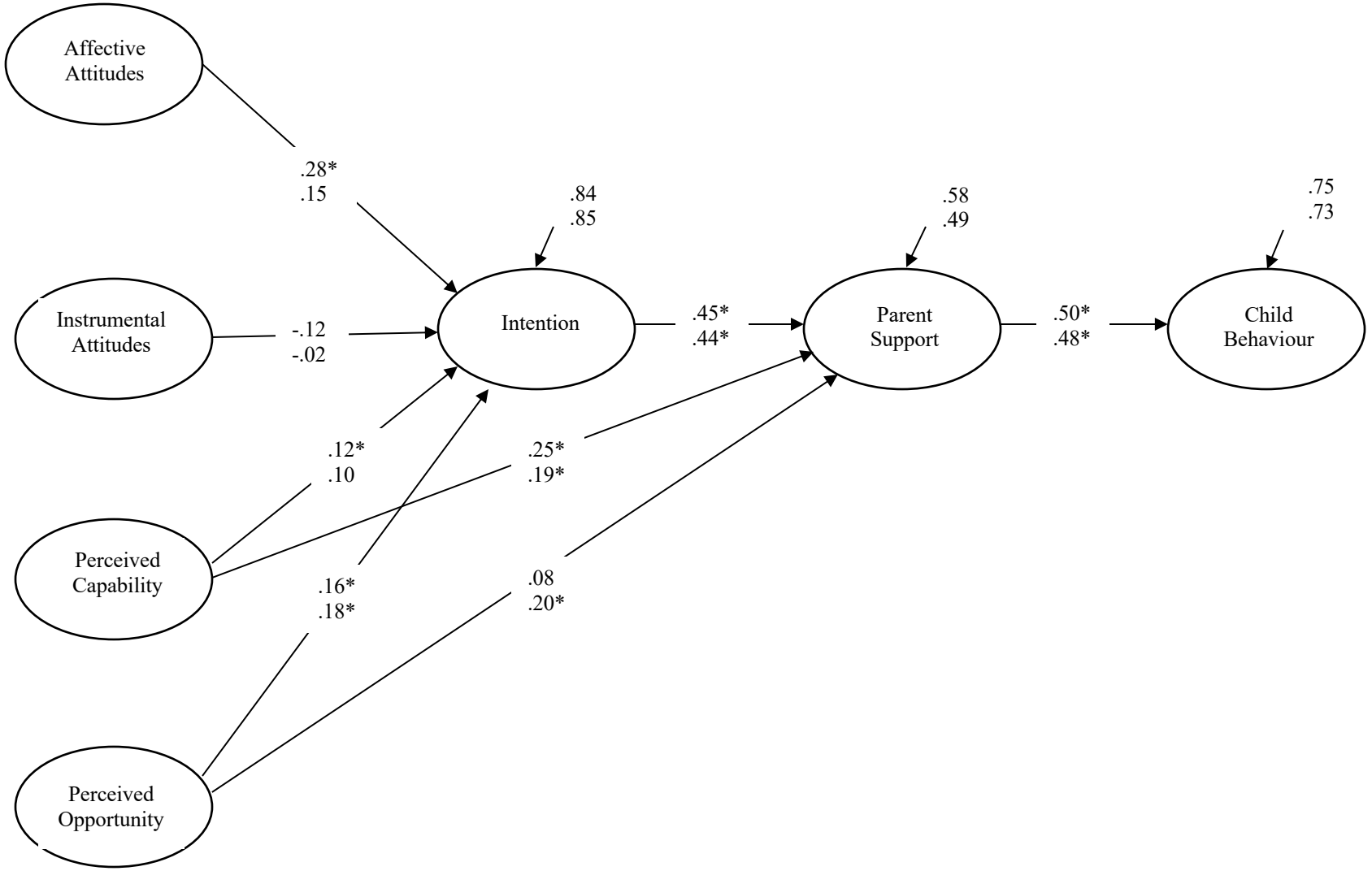

Figure 1. Path model predicting parent support of child physical activity and parent-perceived child physical activity. *$p < .05$. *Top coefficient* is moderate-to-vigorous physical activity and the *bottom coefficient* is light physical activity. Note: Child age is featured as a covariate in both models.

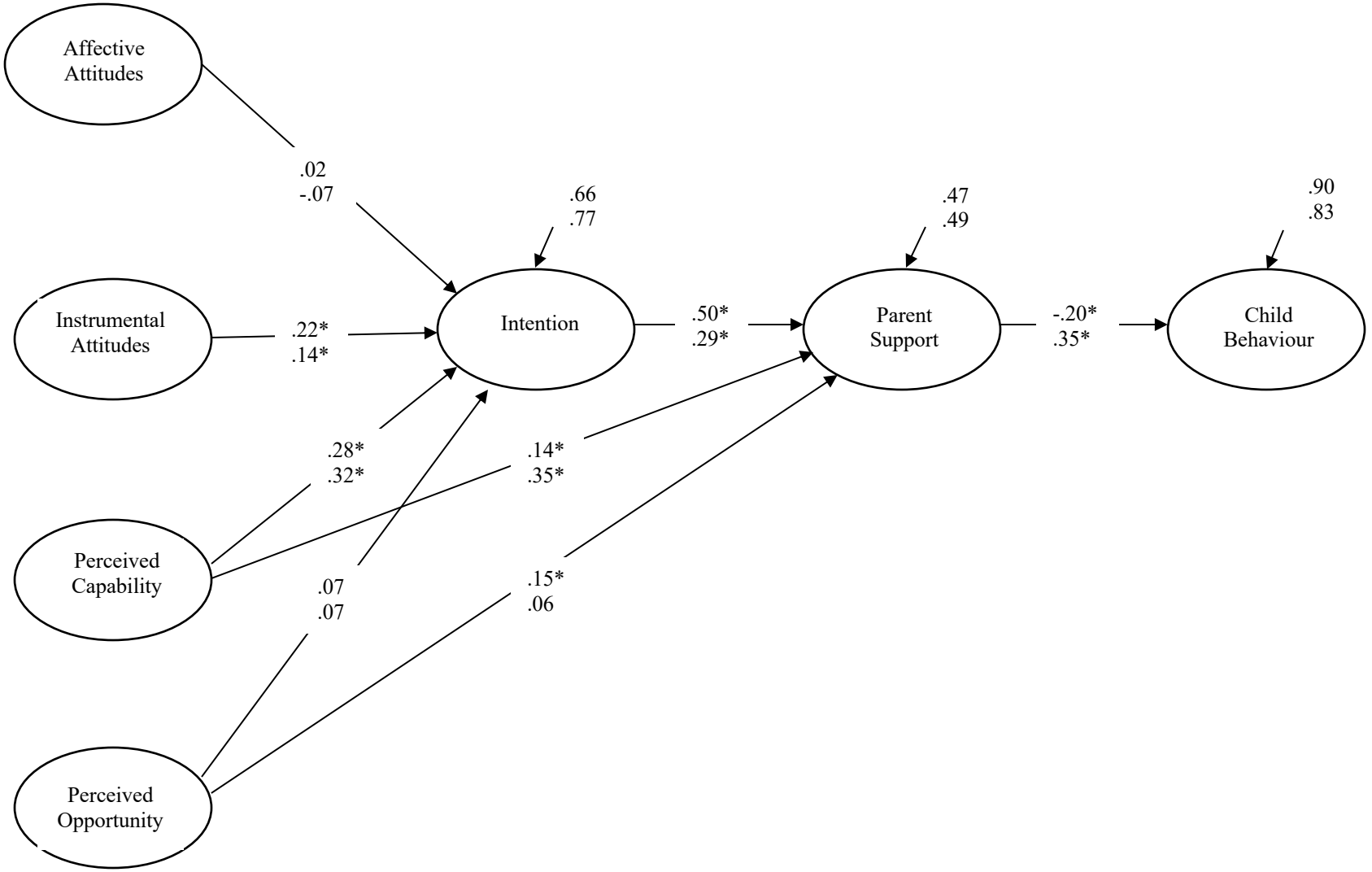

Figure 1. Path model predicting parent support of and parent-perceived child screen time and sleep. *$p < .05$. *Top coefficient* is screen time and the *bottom coefficient* is sleep. All effects include child age as a covariate.