



Predicting parental social influences: The role of physical activity variability

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ABSTRACT

Objectives: This study examined how variations in the activity of adolescents might relate to the social influences used by parents. Specifically, mean differences in activity across adolescents (individual differences) as well as variation in activity within adolescents (intra-individual variation) were used to predict the use of family social influence.

Design: A prospective design was used.

Methods: High school students ($N = 329$) completed measures of activity (six times) and social influences received from family (positive, negative, collaborative) (five times) over a one-year period. A multilevel analysis was used to predict each of the three types of social influence. The predictors included activity in two forms: The individual's mean level of activity (i.e., individual differences) and activity at the previous time point as a deviation from the individual's mean activity level (i.e., intra-individual variation).

Results: Controlling for age, gender and school, results revealed that both individual differences in mean activity level ($b = 0.04, p < .001$) and intra-individual variation in activity ($b = -0.02, p = .055$) predicted use of collaborative influence. For positive influence, only individual differences in mean activity level was a predictor ($b = 0.02, p < .001$). Neither form of activity predicted parental use of negative influence.

Conclusions: Results revealed support for the positive relationship between both positive and collaborative types of influence and individual differences in activity that is typically reported in the literature. However, a negative relationship between intra-individual variation in activity and collaborative social influences also was found. This negative relationship, where lower activity than normal by the adolescent was related to a greater use of collaborative influence by the parent, may be indicative of a regulatory form of social influence.

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Adolescents are thought to accrue many health benefits from participating in physical activities, including improved bone mineral accrual (Mackelvie, Khan, & McKay, 2002) and reduced risk of cardiovascular disease (Andersen et al., 2006). While numerous health benefits are associated with being active, it is important to maintain physical activity in order to reap these benefits (Marcus et al., 2000). However, activity during adolescence has been shown to be quite variable. For instance, studies have revealed substantial variation, with individuals increasing and decreasing activity seasonally (e.g., Vadiveloo, Zhu, & Quatromoni, 2009), and stability coefficients ranging from 0.31 to 0.64 during a 22-month period (Raudsepp, Neissaar, & Kull, 2008). This variability in activity patterns of adolescents suggests that maintenance of activity may be difficult in this population.

In the design of interventions to promote maintenance, the identification of salient correlates is important (Baranowski, Anderson, & Carmack, 1998). Social influence is one correlate that has been related to activity in adolescents (Pugliese & Tinsley, 2007). In terms of social influence sources, families (particularly parents) have been identified as important for the promotion of activity in youth (Katzmarzyk et al., 2008).

One of the most common forms of social influence is social support, which is described as the resources that a social network provides (Cohen, Gottlieb, & Underwood, 2000). With this form of social influence, a positive relationship with physical activity would be expected. For example, when looking at individual differences, those individuals who are more active may be drawing on more resources in their social network and reporting greater social influences than individuals who are less active. This supposition is certainly consistent with the positive relationship between parent influence and adolescent physical activity that is often reported when looking at differences across individuals (Pugliese & Tinsley, 2007).

However, inconsistencies in the relationship between physical activity and all sources of social influences also are evident (Van Der

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Horst, Paw, Twisk, & Van Mechelen, 2007). A similar picture of inconsistency emerges in the examination of family influences specifically, with some reporting positive relationships (e.g., Raudsepp & Viira, 2008) and others no relationship (e.g., Kahn et al., 2008).

While there are a number of plausible explanations for these inconsistencies including omission of possible moderators, sample or methodological differences, one possibility that has not been directly addressed concerns the fact that the examination of the family social influence–activity relationship often assumes that the activity being assessed is static. Assuming that activity is static is problematic, as attested to by the variability in the activity patterns of adolescents discussed previously. Recognizing that activity is variable suggests that we are dealing with a moving target that may need to be accounted for when examining relationships with social influences, and this formed the main purpose of the current study.

While it is often assumed that parental influences impact the activity behavior of their children, recognition of Bandura's (1997) contention of reciprocal causation would suggest that behavior could just as easily influence the social environment (i.e., what the parent does). For instance, would it be expected that parents sit by idly when they see the activity level of a child declining? Given Bandura's (1997) suggestion, the parent is likely to respond to the child's declining level of activity in some way. As such, the variability that is evident in physical activity behavior within an individual may affect the social environment of an individual (i.e., the social influences received). Therefore, there is a need to examine physical activity as an intra-individual variable.

This study sought to explore the other side of reciprocal causation by examining how behavior might influence social influences received. One form of social influence that may be influenced by changes in activity behavior is social control (Wilson & Spink, *in press*). Social control is a regulatory form of social influence that reflects a reaction to a deviation from a norm (Clark & Gibbs, 1965). Social control has been examined with a variety of health behaviors including smoking (Westmaas, Wild, & Ferrence, 2002), dieting (Markey, Gomel, & Markey, 2008) and cardiac rehabilitation (Franks et al., 2006).

While these studies focused on partner social control, social control also has been identified as an influence that parents may use when a child's activity level changes (Spink, Strachan, & Odnokon, 2008). In that study, it was found that active parents used more social control when their child was less active. It was suggested by the researchers that this action may represent an explicit attempt by these parents to regulate their child's declining physical activity behavior, which is a suggestion that is consistent with the deviance-prevention perspective of social control theory (Lewis & Butterfield, 2005). With health behaviors, the deviation from a norm is best exemplified by an individual moving from a healthy to a more unhealthy behavior (Lewis & Butterfield, 2005). This was captured recently in an activity study where it was found that parents intended to exert social control in response to a hypothetical lapse by their child (i.e., when the child had moved from a healthy (active) to a more unhealthy behavior (less active) (Wilson, Spink, & Priebe, 2010)).

It is plausible that the variability around a child's activity behavior (intra-individual variability) could impact the social influences that parents provide. Further, something other than the typical positive relationship might be expected if the child's activity was declining from typical levels. For instance, a negative relationship might be anticipated as decreases in activity may be associated with greater use of social influences by the parents. In this case, the influences would likely be more regulatory in nature in that parents might be attempting to move their child back to activity levels that are perceived as closer to the child's norm.

Given the possible emergence of both a positive and negative relationship with activity, the purpose of this study was to examine the physical activity–social influence relationship when physical activity is operationalized in two different ways. First, we were interested in individual differences in activity by examining the average level of physical activity of adolescents. It was hypothesized that individual differences in activity would be positively related to the receipt of family social influences, with those adolescents who are more active reporting greater receipt of social influences than those who are less active. Second, we also were interested in intra-individual variation in physical activity (i.e., when adolescents are less or more active than their average level, regardless of their absolute level of activity). Based on suggestions from the social control literature, it was hypothesized that intra-individual variations in physical activity would be negatively related to family social influences. Specifically, it was expected that a child's decrease in activity from his/her own average level would be related to greater family influences received whereas increases above his/her own average level would be related to use of less influences by the family. If these different relationships are identified, it will have implications for examining the relationship between social influences and physical activity in the future by highlighting the need to consider both the variation that we see between individuals as well as fluctuations in an individual's own activity level.

With different types of social influences identified in the activity literature, the present study examined social influences within three broad types: positive, collaborative and negative. Examples of positive influences can be seen in the literature in the form of social support (e.g., Beets, Vogel, Forlaw, Pitetti, & Cardinal, 2006), encouragement from parents (e.g., Fredricks & Eccles, 2005) and positive social control (e.g., Wilson et al., 2010). Collaborative influences, on the other hand, can be viewed in the literature as influences that occur when a parent is actively involved with the child including role modeling behaviors (e.g., Sabiston & Crocker, 2008) and collaborative social control (e.g., Wilson et al., 2010). Examples of negative or pressuring influences also are seen in the literature and include parental pressures for a child to perform well in the sport realm (e.g., Holt, Tamminen, Black, Sehn, & Wall, 2008; Kanters, Bocarro, & Casper, 2008) as well as those reflecting negative social control (e.g., ordering) (e.g., Spink et al., 2008; Wilson et al., 2010). As noted, these three influences also reflect types of social control and, as such, may be responsive to changes in physical activity within an individual (intra-individual variability) (Wilson & Spink, *in press*). No specific a priori hypotheses were made for each of these three broad types of social influences as they have yet to be examined with regard to activity variability. To control for possible confounders, we also examined the role of two possible covariates that have been related previously to the receipt of different amounts of social influence: age (Davison & Jago, 2009) and gender (Beets et al., 2006).

Methods

Participants and procedures

Adolescents ($N = 547$) in this study were recruited from high schools located in mid-sized cities and were part of a larger study examining physical activity. Participants ranged in age from 13 to 18 years of age (Mean age = 16.2 years, $SD = 1.2$) and were in grades 9 to 12 ($n_{gr.9} = 169, 31\%$; $n_{gr.10} = 150, 27\%$; $n_{gr.11} = 109, 20\%$; $n_{gr.12} = 117, 21\%$). Just over half of the participants were female ($n = 264, 52.5\%$). More than half of the participants ($n = 328, 60\%$) self-identified as Caucasian and 9.9% self-identified as Aboriginal ($n = 54$). Of the remaining participants, 17 (3.1%) identified another ethnicity and 161 (29.4%) did not report an ethnicity.

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