Research Article

Preschool Power Play: Resource Control Strategies Associated with Health

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Background. This exploratory study uses a multimethod approach to examine the relationship between social strategy usage and overall health in preschool children. **Methods.** Children's temperament, social strategies, and health assessments were obtained via reported behavior from parents and teachers. In addition, children's use of prosocial and coercive strategies was observed and recorded via one-way windows in the preschool facility. **Results.** Results revealed that the temperament characteristic of effortful control was related to the observed use of coercive strategies and that coercive strategies were not observed by teachers, who viewed these children as primarily prosocial. The reported use of both coercive and prosocial strategies was also related to decrease in illness. **Conclusion.** These findings in relation to previous work suggest that using both prosocial and coercive strategies can elevate status as well as maintain health even in young children.

1. Introduction

Hierarchies are common in social species and are associated with control of important resources [1]. Living as part of a social group is somewhat paradoxical in that groups facilitate obtaining resources and establishing goals that are difficult to obtain alone [1–4]. They are also, however, a source of conflict and competition. This necessitates individuals to strike the right balance between self-interest and helping strategies [5]. While all levels of the social hierarchy are important for group functioning, some characteristics seem to lead to dominance in almost every group.

In the present study, we explored associations between individual differences in the temperament characteristics of preschool-aged children, their behavioral strategies, and overall health. More specifically, we investigated how their observed behavioral strategies (used to influence peers and control resources) were associated with temperament profiles and teacher ratings of their social strategies. We also examined the association between social influence strategies and health. We chose to focus on health because of the well-established associations between social relationships, frequency and duration of the stress response, and associated

health outcomes [6]. Our target group was preschool-aged children because, as previous research has noted, their hierarchies are relatively constrained, representative of an overall social order, and easily observable [7–9]. We employed a multimethod design, using behavioral observations, teacher reports, and parent reports, in order to gain the best possible understanding of the relationship between social strategies, temperament, and health.

The characteristics of hierarchical social structure (e.g., dominance) and the associated social strategies appear very early in human development, suggesting their importance as selective agents in human evolution [10–13]. Between eight and ten months of age, infants begin to recognize dominance based on size, expecting larger objects or people to be dominant over smaller objects or people [14]. As children develop, aggressive behaviors become perceived as the primary form of gaining and maintaining social dominance. Social dominance has been associated with aggression in children between 3 and 5 years of age, especially if the children could discriminate between physical and verbal aggression [15]. In addition, relational aggression, which aims to disrupt the social network of competitors [16], has been seen in children as young as two and a half [17].

The social centrality hypothesis states that aggression in the service of effective resource control can not only be effective but also appealing to the social group, such that peers gravitate towards the effective resource controller. It appears the benefits associated with aggression can outweigh the costs or at least counterbalance them, and an individual who uses aggression strategically can make an ally as well as an enemy [7]. In addition to aggression, strategic use of direct competitive behaviors, for example, coercive strategies (making others or forcing others to follow plans), begins early and is followed at four to five years of age with indirect competitive behaviors, such as prosocial strategies (helping, cooperation, and reciprocity). Socially dominant children (as well as adults) often use both strategies, but prosocial strategies are used more often than coercive strategies [7, 18].

Several studies have found that social skills are associated with characteristics of temperament [19, 20]. For example, adolescents' popularity is positively related to extroversion, agreeability, and emotional stability [19]. Introverted children are often ranked high in popularity as well if they are high in emotional stability [20]. Two studies were conducted examining temperament in relationship to children's cortisol response to the social stressor of starting a new school year. In both studies, surgency and sensation seeking were associated with the slope of cortisol on day five [21, 22]. In addition, shyness was associated with evening cortisol on day five [21] (1st grade). Effortful control has also been shown to directly predict socially appropriate behaviors and the relationship between socially appropriate behaviors and effortful control were moderated by negative emotionality [23]. Difficult temperament such negative emotionality has also been associated with increases in aggressive behaviors [24] and has been shown in preschoolers that emotional intensity and negative affectivity aspects of temperament are negatively associated with social skills [25].

Socially dominant children also tend to display an understanding of social and moral rules but show a decreased internalized conscience [8]. It seems that these dominant children understand societal rules but are selective about implementing them. In addition, socially competent preschool-aged children also show a combination of aggression and cooperation, aggression and affiliative behaviors, or aggression and reconciliation [17, 26]. Affiliation after conflict has been found to occur selectively between former opponents, and more likely among neutral associates than friends in preschool-aged children [18]. This may be due to increased theory of mind, which is shown to be significantly correlated with reconciliation and dominance [26]. It appears that dominant children's theory of mind facilitates their understanding of with whom and when to use aggression as well as reconciliation.

The seminal work of Hawley and colleagues has shown that overall social dominance is achieved by the use of both prosocial and coercive resource control strategies. Hawley [13] referred to individuals that used both these strategies as bistrategic controllers. Bistrategic controllers as well as four other types of strategy controllers are delineated based on responses to a questionnaire that operationally defines how individuals gain and maintain resources and position

within a hierarchy. The five types of controllers are noncontrollers, typicals, prosocial controllers, coercive controllers, and bistrategic controllers. Noncontrollers score in the lower 33rd percentile on prosocial and coercive strategies. Typical controllers score lower than 66th percentile on both but only in the lower 33rd percentile on one. Prosocial controllers score in the 66th percentile or above on prosocial strategies but average or low on coercive. Coercive controllers score in the 66th percentile or above on coercive strategies but average or low on prosocial strategies. Finally, bistrategic controllers score in the 66th percentile or above on both coercive and prosocial strategies [27].

Bistrategic controllers appear dominant within their social group and have the added benefit of appearing more prosocial to those outside their group. In a study of preschool children, bistrategic controllers were rated as more attractive by their teachers and a blind rater [9]. In a similar study involving children in grades five through ten, teachers did not report children that were bistrategic controllers as aggressive or engaging in coercive behavior, although the students themselves and their peers agreed they demonstrated aggressive acts [13]. Bistrategic children have been reported as having high quality relationships, in that they are rated high in intimacy and fun by their peers, although those relationships were also reported to contain the largest amount of conflict and coercion [27]. Dominance and overall resource control have been seen to remain stable overtime and within different situations [7, 28]. It seems this combination allows for social dominance and effective social resource control while being viewed positively by outsiders [13].

Although social dominance and the strategic balance of prosocial and coercive strategies are important for control of resources, it is also important to consider how the social challenges of resource obtainment might impact health. Stimuli that are interpreted as posing a physical or psychological threat may stimulate the hypothalamic pituitary adrenal (HPA) axis to release glucocorticoids [29], in primates primarily taking the form of cortisol [30]. Indeed, social challenges, in particular social hierarchies, have been demonstrated to reliably stimulate the release of cortisol (for review, see [1, 31, 32]), particularly those perceived as having the potential for gain or loss of social resources [29].

HPA activation (specifically cortisol) is an integral part of dealing with the challenges of everyday life by influencing the amount of energy released; the immune activity; and the level of mental alertness, memory, and learning [33, 34]. However, if the HPA system is activated repeatedly, without opportunity for recovery, it can lead to negative health outcomes, ranging from increased risk for a variety of infectious illnesses to autoimmune disorders [1, 30].

Animal literature has also shown that HPA activity and resulting health outcomes may be impacted by status. Some studies have shown that dominant individuals show stronger HPA reactivity to social situations [1, 22, 35, 36], while others show that subordinate individuals display a stronger response [37–39] and have resulting negative health outcomes [40]. Human studies have shown women with reported higher subjective social status had better

nutrition habits and women with lower subjective social status had higher anxiety, pessimism, stress, and blood pressure [41]. In addition, female adolescents that experience peer rejection reported higher amounts of physical health problems [6]. It is important to note that other factors have been shown to impact the relationship between social status and adverse impacts. In fact, low social economic status and being a female have been shown to increase the negative impacts of being socially subordinate [25].

In the current exploratory study, we used a multimethod design that included behavioral observations, teacher report, and parent report to examine preschool-aged children in observable but relatively constrained hierarchies. We explored temperament in relation to behavioral strategies [19, 20], and these were both observed and reported by the teacher. In addition, we compared these behavioral strategies to examine the association between social influence strategies and reported health. This study is the first known study to relate resource control strategies to health.

It was predicted that children's temperament (specifically effortful control and surgency) would be related to their use of prosocial and coercive strategies [8, 19, 20]. It was also predicted that children who used a mix of prosocial and coercive strategies, referred to as bistrategic children, would have a different pattern of HPA activation to social contexts than those that do not use both methods and therefore would have different reports of illness due to their enhanced effectiveness in exerting social control [40–42].

2. Methods

2.1. Participants. Participants were 18 preschool-aged students (age range 3–6, mean age = 4.5; 13 males, 5 females) that attend a child-centered preschool facility in the Central United States. Children were in two classrooms (ages 3–4 and ages 5–6) at the same facility. The children were often observed together when both classrooms were on the playground at the same time. Children's scores were not aggregated across the classroom due to the small sample size. Previous literature has examined resource control in ranges of children from 2 to 5 years of age [9]. All data were collected during the spring semester.

2.2. Instrumentation. In order to gather a multifaceted perspective on children's social functioning and strategies, information about the children's behaviors came from direct observations, teachers' reports, and parents' reports.

The observations were coded based on a modified version of the Manchester Inventory for Playground Observation (MIPO) [43]. The MIPO is a standardized measure that was developed to assess children's social behaviors and functioning through naturalistic observation on the playground. The MIPO has been shown to be high in reliability and validity (Cronbach's $\alpha = .924$). For subscales, Cronbach's α was as follows: prosocial $\alpha = .885$, conflict $\alpha = .834$, care/confiding $\alpha = .723$, and atypicality $\alpha = .751$ [43].

The original version of the MIPO (containing 28 observable traits) was modified to include only observations related to resource control strategies. Social reciprocity, enjoyment at play, concentration, anxiety, conflict intensity, confides with pleasure, responds with care, and verbal interactions were removed due to the difficulty in coding these behaviors under the constrained environment with such young children. The original MIPO was used to observe children 5–11 years of age. Peer rejection was added leaving the modified version with 21 observations (see Appendix). Scores were configured from the total observed behaviors for each category divided by the number of observers (4). Scores of prosocial observed behaviors were configured using the sum of joining, sustaining group interactions, friendship groups, peer acceptance, following group rules, compromise, friends with those who are older, response to good natured tease, and sticks up for self. These were all used previously in the original MIPO for prosocial behaviors and are grouped together, as prosocial behaviors are related to higher-level social skills which children need to facilitate successful interaction. Coercive behavior scores were configured using the following items from the MIPO: peer rejection, tells others to start conflict, and bullying. Additionally, bistrategic behavior scores were configured from the sum of coercive and prosocial scores.

One teacher from each classroom was asked to report on each child's behavior using the resource control strategy inventory (RCSI). The RCSI is a multi-item questionnaire in which teachers were asked to report about preschool students use of prosocial, coercive, and other resource control strategies on scale from strongly agrees to strongly disagrees [44]. Prosocial reported behaviors were assessed based on two questions (*He/She has good ideas or suggestions that others like to follow; He/She is chosen by others to lead the group*). Coercive reported behaviors were also assessed based on two questions (*He/She makes others do what he/she wants; He/She forces others to follow his/her plans*). The scores for bistrategic controllers were configured using the sum of prosocial questions and coercive questions. This method is a deviation from previous work by Hawley [13] in which percentiles were used. Due to the small sample size, summed scores from participants' use of both strategies were used for this study.

In order to gain the parent's perspective on their child's behaviors and health, parents were asked to fill out a temperament questionnaire and a child wellness questionnaire. Parents completed the Very Short Form of the Children's Behavior Questionnaire (CBQ) [45] which was designed to assess three broad dimensions of temperament (surgency, negative affect, and effortful control). Questions were reported using a 7-point Likert scale assessing the child's reaction to a number of situations in the last six months. The very short CBQ has been shown to be moderate to high in reliability and validity ($r = .22-.57$ depending on age of child) as well as adequate internal consistency ($\alpha = .74$) [46]. The child wellness questionnaire contained three short questions about the child's age, number of illnesses in the past six months, and the number school days missed due to an illness in the past six months.

2.3. Procedure. The study took place at a child-centered preschool facility in Central United States. All children were assigned arbitrary numbers and were not identified by name. Prior to coding children for the study, four research assistants were trained using the modified MIPO scale. Training involved video and real-world observation of children, as well as group discussion and recording. During training, research assistants discussed their ratings and agreed on operational definitions for each behavior in question. After training was completed interobserver reliability was obtained with all four observers watching children at the same time. After combining scores from three trials (each lasting 10 minutes) an interobserver reliability of $\alpha = .97$ was obtained. Participants were observed via one-way windows already present for observation purposes. Observations took place during “center time,” which involves children choosing activities among various centers in the classroom. Additionally, unobtrusive observations were recorded during outdoor play. Free playtime was used to detect and assess differences in social strategies among the children. Trained research assistants identified a focal child (using pictures and preassigned numbers) and recorded the behaviors observed using the revised version of the MIPO. Observation lasted 10 minutes for each child and all research assistants coded each child's behavior at least once throughout the duration of the study (approximately 40 minutes of recording for each child).

Teachers were also asked to fill out the RCSI questionnaire for each child that participated in the study and parents were asked to complete a short temperament questionnaire and a wellness questionnaire about their child.

3. Results

To determine if temperament and teacher reports were related to the observed behaviors, a series of linear regression analyses was conducted. Children's effortful control, a subscale of The Very Short Form of the Children's Behavior Questionnaire (CBQ), predicted observed coercive behaviors ($F(1, 16) = 7.19, P < .05, \beta = .56$), but surgency and negative affect did not ($F(1, 16) = .614, P = .45, \beta = .78$ and $F(1, 16) = .415, P = .53, \beta = .64$, resp.). Prosocial behaviors reported by teachers also predicted observed coercive behaviors ($F(1, 16) = 4.58, P < .05, \beta = .69$). There was a lack of significant findings between teacher reported coercive behaviors and observed coercive behaviors $r = .29, P = .913$.

Teacher reported bistrategic behaviors were assessed by combining scores on prosocial and coercive behaviors on the RCSI. Once again, the small sample size did not allow for the use of percentiles as seen in Hawley's previous work [13]. To determine whether there were reported behavioral differences in relation to illness over the past six months, two linear regressions were conducted. Reported bistrategic behaviors predicted lower rates of illness in the past six months ($F(1, 16) = 8.10, P < .05, \beta = -.59$). More specifically, when breaking down the characteristics of bistrategic behavior, reported coercive behaviors predicted a decrease in illness in the past six months ($F(1, 16) = 5.59, P < .05, \beta = -.603$).

4. Discussion

This is the first known study to demonstrate an association between the temperament characteristic of effortful control and the use of coercive strategies with peers, while surgency and negative affect did not predict social strategies. This is in contrast to previous findings showing that extraversion, or surgency, is related to dominance [19]. It is possible that the age of the children, as well as the limited number of participants, did not allow the dimension of extroversion or surgency to be observed fully. The findings regarding effortful control are particularly interesting in light of research suggesting that aggression is related to lack of control [47]. Our findings suggest that, rather than being under-controlled, bistrategic controllers may strategically exert coercion when it is useful for effective resource control rather than when provoked. In addition, observed bistrategic behaviors, and more specifically observed coercive behaviors, were determined to be related to teachers' reported prosocial behaviors, but not teachers' reported coercive behaviors. Taken together, these findings suggest that bistrategic strategies (often used by dominant children, see [13]) are related to effortful control, enabling the best contextual usage of prosocial or coercive strategies related to an ever-changing social context. Although coercive strategies are used, they may be strategically used when the teachers are not observing this behavior. This is consistent with previous work in older children, in which students in grades five through ten reported using aggressive acts and coercion that were not observed by their teachers [13]. The results also support previous literature that suggests socially dominant children (those that use aggression and reconciliation) may have more fully developed theory of mind [26]. Cumulatively, these findings suggest that, even in early childhood, effectively controlling resources are related to a suite of characteristics that include the ability to utilize the most optimal strategy dependent on social context and the perceptions of powerful others, in this case, teachers. To be clear, these results should be interpreted with extreme caution. The association between effortful control and the effective execution of social strategies does not rule out a third variable that may be responsible for this association. This is especially true based on a small sample size of relatively homogeneous children. More research is needed to affirm these findings.

In addition to these findings, we also examined how social strategies relate to health, as the use of these strategies can impact not only status but also the quality of an individual's health [6]. Previous research has shown that high status or dominant children use both prosocial and coercive strategies [13]. However, a link between these particular strategies and overall health has not, to our knowledge, previously been examined. Consistent with our hypothesis, the use of a mix of prosocial and coercive strategies was found to be associated with fewer illnesses, as reported by parents. In particular, the coercive behaviors were shown to be related to fewer illnesses. It appears that employment of bistrategic behaviors, coercive behaviors in particular, may have acute rather than chronic HPA activation, consistent with previous human and

nonhuman work in this area [1, 30]. It should be noted that, because HPA activation was not assessed in this study, this is only speculation based on previous findings. Though the measure of illnesses over the past six months is an admittedly rough measure of health, other research has shown similar results consistent with this. For example, in older adults, women of lower socioeconomic status (SES) are likely to have more daily and cumulative stressors, lower support, and higher basal cortisol levels compared with higher SES women [48–50]. Chronically, elevated cortisol levels resulting from repeated challenges and fewer psychosocial buffers have been implicated as a primary link between low SES and increased morbidity and mortality [51]. Overall, the findings can be explained by the Social Centrality Hypothesis, that *strategic* use of aggression or coercion in the service of effective resource control can be beneficial, at least to the individual employing them.

An alternative explanation is that those individuals with the best overall health are better able to utilize social strategies within their peer groups and construct interactions to their advantage [52–54]. This explanation is not entirely opposed to the explanation proposed above. These individuals may be better able to maintain good health despite insults from the environment [52, 55]. In this case “insults” would likely take the form of repeated stress system activation resulting from attempting to gain and maintain social status. There is a link between better overall health and social dominance in adult samples [56, 57]. To our knowledge, this association has not yet been shown in children.

4.1. Limitations. Numerous studies have suggested that prosocial and coercive strategies are important in establishing dominance. However, the relationship between the use of these strategies and health has not been assessed. This study provides preliminary evidence that status can impact health even in young children, but it has several limitations. Most notably, the study’s small sample size, as well as lack of biological evidence to support the findings regarding health, makes it difficult to generalize the findings to a broader population. It is possible that the relationship between the number of illnesses and social status may be circular with a weakened immune system impacting the use of specific social strategies. A larger, more representative sample and the use of physiological measures to assess health would help quantify the relationships found here. In addition, studies investigating in more detail the links between social strategy use, behaviorally delaying gratification, and the ability to understand what others perceive would contribute significantly to this body of knowledge and help solidify the association between effortful control and social strategy use. Prospective studies assessing physiological components, such as stress and immune system markers, associated with social strategies would also clarify these findings.

5. Conclusions

The relationship between social strategies, temperament characteristics, and health was investigated in this preschool

sample. Specifically, this exploratory study used Hawley’s resource control theory [13] as a framework to explore the nature of social strategies and health outcomes. Although due to the exploratory nature of this study, the results should be interpreted with extreme caution, these results provide the first known links between temperament characteristics, social strategies, and health in early childhood. The causal direction of these links remains undetermined and can only tentatively be explained; however, several aspects of these findings are novel and have the potential to advance research in this area.

The findings in the current study suggest that using both coercive and prosocial strategies allows individuals to be viewed positively by outsiders and may allow them to gain resources from those inside the group. This is consistent with similar findings with older children, in which bistrategic controllers are found to be rated as high in coercive behaviors as by their peers, and rated as prosocial by their teachers [13]. Our results show that bistrategic children display a suite of characteristics early in development that include an awareness of the utility of both prosocial and coercive strategies, and *when* they are most effective, perhaps demonstrating considerable effortful control and theory of mind, both in relation to peers and adults. Bistrategic children may have increased leadership potential. By identifying these children early in development, schools and parents may be able to increase the use of prosocial skills and therefore create better leaders. The results of this study also suggest that these strategies are associated with better overall health. In addition, peer-based learning, using those high on prosocial control strategies to instruct those lower on these strategies, may facilitate greater improvement in leader skills for bistrategic children as well as better understanding and health for children not effective in resource control.

Appendix

Coder _____
 Class _____
 Child# _____
 Date _____
 Time _____

Manchester Inventory for Playground Observation

Prosocial Skills

- (1) Joining
- (2) Sustaining group interaction
- (3) Friendship groups
- (4) Peer acceptance
- (5) Following group rules
- (6) Compromise
- (7) Friends with those older (caregivers)
- (8) Response to good natured tease
- (9) Sticks up for self

Unusual Behavior

- (10) Atypical
- (11) Aloofness

Conflict

- (12) Conflict resolution
- (13) Controls temper
- (14) Avoidance of conflict
- (15) Peer Rejection
- (16) Tells other to start Conflict
- (17) Bullying
- (18) Picked on/rejected

Care-Giving/Seeking

- (19) Responds/Copes with direction
- (20) Care-giving
- (21) Seeks care.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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