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Parental Differential Treatment of Siblings and Adolescents' Health-Related Behaviors: The Moderating Role of Personality

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Abstract

Youth who receive comparatively poorer parental treatment than a sibling are at risk for maladaptive behaviors in a variety of domains, but research has yet to examine links with adolescents' health-related behaviors nor consider how those links may vary based on adolescents' personality traits, namely conscientiousness and agreeableness. Two siblings ($n = 590$ adolescents; 53% female; $M_{\text{age}} = 15.86$, $SD = 1.73$) from 295 families reported on their differential conflict and closeness with their fathers and mothers as well as on their personality, sleep habits, exercise habits, and general health habits. Multilevel modeling revealed that, generally, the less conscientious adolescents had better health habits when they had comparatively warmer

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Authors' Contributions

AJ contributed to this study by working on data collection, conceptualization, analysis, and writing of the manuscript; HA helped with conceptualization, analysis, and manuscript preparation; ER helped with conceptualization and manuscript preparation; JC helped with conceptualization and manuscript preparation; SW helped with data collection, conceptualization, and manuscript preparation. All authors read and approved the final manuscript.

Data Sharing Declaration

This manuscript's data will not be deposited.

Conflicts of Interest

The authors report no conflict of interests.

Ethical Approval

All procedures performed in the current were in accordance with the ethical standards of the institutional research committee (Purdue University Institutional Review Board; protocol number: 0802006460) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

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relationships with their mothers. Less conscientiousness adolescents may be less distressed by inequality in the family, and thus may experience positive effects of relatively better treatment.

Keywords

siblings; sleep habits; health habits; exercise habits; differential treatment; favoritism; conscientiousness; parents; family

Introduction

Siblings influence one another's development from childhood to adolescence by modeling behaviors for one another (Whiteman et al. 2014), through daily interactions (Harper et al. 2016), and indirectly through parental differential treatment (Loeser et al. 2016). Many studies suggest that parents' differential treatment of offspring plays a unique role in adolescent development by fostering opportunities for social comparison between siblings. For example, extant work highlights that differential treatment is negatively linked to adolescents' academic achievement (Barrett Singer and Weinstein, 2000; Jensen and McHale 2015) as well as mental health (Shanahan et al. 2008), and positively associated with problem behaviors (Scholte et al. 2007). To date, however, differential treatment has not been examined in connection with adolescents' health-related behaviors despite the fact that these behaviors have important implications for physical (Fatima et al. 2015) and mental health (Cairns et al. 2014). Addressing this gap, the current study examined the links between PDT and adolescents' health habits. Importantly, research on differential treatment suggests that there are numerous individual and dyadic characteristics (e.g., youth gender, gender composition of the sibling dyad, age, birth order) that may protect (or potentially exacerbate) youth from the deleterious effects of differential treatment (e.g., Shanahan et al. 2008). Furthering research in this domain, the current study explored whether youth's personality traits, specifically conscientiousness and agreeableness, moderated the associations between PDT and youth's health habits.

Differential Treatment and Adolescents' Health

Although parental differential treatment may denote parents favoring one sibling over another, in many instances differences in parenting may simply reflect parents meeting the varying developmental, emotional, and physical needs of their children (Kowal and Kramerv 1997). The published literature on parental differential treatment regularly uses vernacular such as favored and less favored when comparing how siblings are treated (or perceived to be treated) by their parents. However, measurement of differential treatment less often focuses on favoritism per se, but rather on differences in parenting (i.e., who experienced more conflict or a closer relationship) that may arise from numerous factors (e.g., sensitivity to offspring's different developmental or emotional needs, gender differences, and even favoritism). These differences are typically assessed in one of two ways. Either through youth's individual perceptions of the differences, or through difference scores that are based on each sibling's perceptions of the parenting they individually receive. Very few studies have examined both approaches simultaneously. The nuances of the studies that have examined the approaches together are beyond the scope of this paper, but it appears as if

both perception and difference scored based approaches have unique links with youth adjustment (e.g., Jensen and Whiteman 2014; Meunier et al. 2012).

Regardless of how differential treatment is measured and whether it reflects parental favoritism or sensitive parenting in response to offspring's qualities or needs, scholars have argued that differential treatment provides opportunities for siblings to compare themselves with one another based on the parenting they individually receive (e.g., Shanahan et al. 2008). This argument is founded in Social Comparison Theory and the tenet that social comparison is a central process by which self-evaluations are formed (Festinger 1954; Suls et al. 2002). Downward social comparisons, such as those in which youth who perceive they receive better treatment than their sibling are linked to enhanced self-concepts and foster healthier development. In contrast, upward social comparisons, such as perceiving poorer parental treatment relative to a sibling, may hinder youth's self-concepts and foster maladaptive development (e.g., Jensen et al 2015). Evidence supporting this theoretical approach to differential treatment has been found in relation to a variety of adolescent outcomes including academic achievement (Barrett Singer and Weinstein 2000), prosocial behavior (Jensen et al. 2015; Oliver and Pike 2018), and problem behavior (Scholte et al. 2007; Tamrouti-Makkink et al. 2004), among others. Importantly, these associations also emerge longitudinally. For example, studies have found evidence that relatively poorer parental treatment is linked to longitudinal increases in both internalizing (Shanahan et al. 2008) and externalizing problems (Richmond et al. 2005).

Despite a robust literature linking parental differential treatment to adolescents' adjustment, to date, no studies have examined differential treatment in the context of adolescents' health-related behaviors. Health behaviors in adolescence are critical to examine given that they have long-term implications for both physical and mental health. For example, recent meta-analytic data suggests that youth who have poorer sleep habits and have shorter duration of sleep are more than twice as likely to become overweight/obese over time (Fatima et al. 2015) and youth who regularly engage in exercise are less likely to be obese (Kelley and Kelley 2013). Other meta-analytic data suggest that youth who have poorer sleep and general health habits, but not poorer exercise habits, are at greater risk for depression (Cairns et al. 2014). The literature on adolescents' health behaviors typically focuses on sleep, general health, and exercise habits separately because each of these factors likely play a role in future health through unique mechanisms (Chaput and Dutil 2016). In connection with past research on parental differential treatment, the current study hypothesizes that adolescents who receive comparatively better parental treatment will report better sleep, health, and exercise habits. In contrast, adolescents who receive relatively worse parental treatment will report poorer sleep, health, and exercise habits.

Parental Differential Treatment and Personality Traits

The research on parental differential treatment is replete with contexts that moderate the link between differences in parenting and adolescents' adjustment. Indeed, the literature reveals that significant interactions between differential treatment and a variety of other variables (e.g., youth gender, gender composition of the sibling dyad, age, birth order) is the rule, rather than the exception (e.g., Shanahan et al. 2008). In fact, Social Comparison Theory

provides a foundation for the exploration of moderating contexts. A major tenet of Social Comparison Theory is that comparisons are enhanced by similarity (Festinger 1954; Suls et al. 2002). Several studies suggest that when siblings are the same sex (e.g., Feinberg and Hetherington 2001; McHale et al. 2000) or are closer in age (e.g., Jensen et al. 2015), the effects of parental differential treatment are exacerbated. It is important to note, however, that these patterns are not completely consistent across studies (e.g., Rolan and Marceau 2018; Shanahan et al. 2008). Recent work also has explicitly measured the propensity to form comparisons with siblings and found that in some cases a greater sibling social comparison orientation enhanced the link between parental differential treatment and adolescent adjustment (Jensen et al. 2015).

Other research highlights moderating factors that may mitigate the implications of differential treatment. Specifically, work by Kowal and colleagues (Kowal and Kramer 1997; Kowal et al. 2002; Kowal et al. 2004) suggests that when youth understand the reasons for differences in parenting (i.e., differences in age, one sibling has a disability), and see those differences as fair, that the differential treatment is unrelated to their family relationships and externalizing behavior. Although social comparisons in treatment still occur in these instances, it appears that the comparisons are not efficacious. This notion is in line with the studies that show weaker links between differential treatment and various adolescent adjustment indices when siblings are of a different sex or farther in age (e.g., Feinberg and Hetherington 2001; Jensen et al. 2015; McHale et al. 2000), perhaps because in those instances youth may be more understanding of the discrepant parenting because of their objective differences.

The current study extends work on moderating contexts between differential treatment and youth adjustment by proposing that youth's personality traits might serve as an additional context that may either enhance or mitigate the hypothesized link between differential treatment and adolescents' sleep, health, and exercise habits. Based on the Big 5 approach to personality, three traits, in particular, may moderate the role of differential parenting: conscientiousness, agreeableness, and neuroticism.

Conscientious youth prefer order and rules, and have an awareness of when physical and social order is violated (Roberts et al. 2014). Extant research highlights that conscientious individuals are more aware of others and more apt to social comparison (Eggen et al. 2011; Rekers-Mombarg and van der Werf 2011). As such, conscientious adolescents may be more inclined to upward and downward comparisons based on differences in parenting (even if legitimate reasons for those differences exist) and thus the differences in treatment may be more strongly associated with their health-related habits. In contrast, less conscientious youth may be less apt to compare their treatment to a sibling and perhaps more willing to accept reasons for differences in parenting. As such, the implications of parental differential treatment may be weaker for less conscientious youth.

Agreeable adolescents typically have the desire to meet the expectations of others due to feelings of guilt (Dunlop et al. 2015; Howell et al. 2011). Although extant research has not explicitly linked youth's propensities for social comparisons, agreeableness may shape how adolescents' perceive differential treatment from parents. For example, based on Expectancy

Value Theory (Wigfield and Eccles 2000), recent work suggests that adolescents may improve or decline in academic performance based on their parents' expectations relative to a sibling (Jensen and McHale 2015). Differences in treatment may signal a similar type of expectation for general positive or negative behaviors (including health-related behaviors), especially for agreeable youth. Youth who receive comparatively better parental treatment may interpret such parenting as an expectation and may work to live up to those positive expectations. In contrast, adolescents who receive comparatively poorer treatment may interpret the parenting as relatively lower expectations and not put as much effort towards achieving their goals. As such, they may struggle in various domains, including demonstrating poorer health-related habits.

Lastly, youth's degree of neuroticism also may shape the links between parental differential treatment and their health-related habits. Contentious youth are more emotionally reactive, struggle with self-regulation, and as such, tend to react negatively to challenging situations (Danielsson et al. 2010). As such neurotic adolescents may be more apt react emotionally to comparatively poorer parenting, even in the face of legitimate reasons for the treatment, exacerbating the links between parental differential treatment and adjustment. In contrast, less neurotic youth may demonstrate greater restraint, and perhaps understanding, when confronted with discrepant treatment, mitigating the implications of the differential treatment for adjustment. Despite the reasons for why neuroticism may serve as a moderating context, the current study was unable to include it as a moderator because of poor psychometric qualities in the sample.

Current Study and Hypotheses

Extant literature suggests that parental differential treatment has implications for adolescents' development in a variety of domains and that youth who receive relatively poorer treatment tend to exhibit maladaptive outcomes (Oliver and Pike 2018; Scholte et al. 2007). The aim of the current study is to extend this literature by examining its' links with adolescents' health-related behaviors (sleep, health, and exercise habits), which have important physical (Fatima et al. 2015) and mental health (Cairns et al. 2014) implications. Further, rooted in Social Comparison Theory and research on personality (Eggers et al. 2011; Rekers-Mombarg and van der Werf 2011) (Dunlop et al. 2015; Howell et al. 2011) the current study assessed whether links between parental differential treatment and adolescents' health-related behaviors varied as a function of their conscientiousness and agreeableness and tests the following hypotheses:

Because differences in treatment may facilitate opportunities for social comparison, there would be a positive association between preferential parental treatment and adolescents' health-related behaviors (i.e., adolescents with comparatively worse relationships with parents would engage in less positive health behaviors).

Because conscientious adolescents may be more apt to form social comparisons, the link between differential treatment and health-related behaviors would be stronger for adolescents high in conscientiousness.

Because agreeable adolescents may be more apt to meet the expectations of their parents, the link between differential treatment and health-related behaviors would be stronger for adolescents high in agreeableness.

Differential treatment from both parents is included because maternal and paternal differential treatment may matter in different ways (Jensen and Whiteman 2014). Consistent with past literature, two broad domains of treatment were assessed: differential closeness and differential conflict (Shanahan et al. 2008). Additionally, the analyses control for a number of factors that may account for adolescent differences in health-related behaviors.

Methods

Participants

Data came from a cross-sectional study of 326 families from a midwestern state. In each family, one parent and two adolescent children were interviewed. Although only one parent was interviewed, in cases in which adolescents lived with both parents or had contact with a nonresidential parent, participating youth reported on treatment from both parents. The analytic sample was limited to those who reported on differential treatment from both parents ($n = 295$ families, 590 adolescents). Sample demographic characteristics of adolescents and their parents are presented in Table 1.

Procedures

Using a marketing mailing list, families with at least two adolescent offspring were recruited from seven counties in a midwestern U.S. state. Recruitment materials were mailed to 6,854 eligible families (contact information for 3,002 families was incorrect), and interested families responded through the mail. There were 1,296 families who responded, and they were then contacted by the research team to establish eligibility. (The eligibility criteria was that the family must have two siblings between the ages of 12 and 18 residing in the home.) In total, 785 families were identified as eligible, and 326 families ultimately participated (a 42% response rate). Informed consent was obtained in writing through the mail from each family member. Telephone interviews were conducted individually and privately with each participating member of the family. Research assistants trained in standardized interviewing procedures conducted the interviews, which lasted approximately 40 minutes, with each family member. Upon completion of the interviews, each participant received an honorarium of \$35 (\$105 per family). All procedures were approved by the institutional review board of Blinded University.

Measures

Demographic information.—Parents reported on ethnicity, household composition, parental marital status, age, gender, and the education level of each member of the household. This information was reported on the family generally, the parents themselves, and each sibling, respectively.

Family relationships.

Closeness with mother.: Using an 8-item scale from Blyth and Foster-Clark (1987), adolescents reported on the level of emotional closeness with their mother. Participants rated how often various behaviors were evident in their relationship in the last year using a scale of 1 (*not at all*) to 5 (*very much*). Example items include “How much do you go to your mother for advice/support?”, “How important is your mother to you?”, and “How much does your mother accept you no matter what you do?” Scores were averaged across the 8 items, with higher score denoting greater closeness with their mother ($M = 3.61$, $SD = .68$). The measure showed adequate reliability ($\alpha = .85$).

Closeness with father.: Adolescents reported on their closeness with their father using the same 8-item scale used to assess closeness with mother, but adapted to refer to fathers (Blyth and Foster-Clark 1987). Scores were averaged across the 8 items, with higher score denoting greater closeness with their father ($M = 3.29$, $SD = .79$). The measure showed adequate reliability ($\alpha = .88$).

Closeness with sibling.: Adolescents reported on their closeness with their sibling using the same 8-item scale used to assess closeness with mother, but adapted to refer to siblings (Blyth and Foster-Clark 1987). Scores were averaged across the 8 items, with higher score denoting greater closeness with their sibling ($M = 3.26$, $SD = .67$). The measure showed adequate reliability ($\alpha = .81$).

Conflict with mother.: Adolescents reported on the level of conflict with their mother based on a 12-item scale from Smetana (1988) that assessed frequency of conflict in the last year on a scale of 1 (*not at all*), 2 (*a couple of times*), 3 (*a few times each month*), 4 (*several times a week*), 5 (*about once a day*), and 6 (*several times a day*). The scale assessed conflict in a variety of domains, such as chores, curfew, grades, romantic relationships, friendships, dress and grooming, and health-related behaviors. Scores were averaged across the 12 items, with higher score denoting more conflict ($M = 2.23$, $SD = .70$). The scale showed adequate reliability ($\alpha = .84$).

Conflict with father.: Adolescents reported on the level of conflict with their father using the same 12 items used to assess conflict with their mother, but adapted for fathers (Smetana 1988). Scores were averaged across the 12 items, with higher score denoting more conflict ($M = 2.06$, $SD = .74$). The scale showed adequate reliability ($\alpha = .88$).

Conflict with sibling.: Conflict with the sibling was reported using 5 items from Furman and Buhrmester (1985). Items were rated on a scale from 1 (*not at all*) to 5 (*very much*). Example items include “How much do you and your sibling get upset or mad at each other?”, “How much do you and your sibling get on each other’s nerves?”, and “How much do you and your sibling get annoyed with each other?” Scores were averaged across the items, with higher scores denoting greater conflict with a sibling ($M = 3.13$, $SD = .86$). The measure showed adequate reliability ($\alpha = .91$).

Parental differential treatment.

Differential closeness with mother.: Differential closeness with the mother was calculated via difference score using each sibling's report of their own closeness with their mother. The report from each adolescent was calculated by subtracting the score of their sibling from their own. Thus, higher values reflected comparatively better treatment (i.e., more closeness with the mother than the sibling), a value of zero reflected equal treatment, and negative values reflected relatively poorer treatment ($M = .00$, $SD = .78$).

Differential closeness with father.: Differential closeness with the father was calculated via difference score in the same manner as differential closeness with mother. Higher values reflected comparatively better treatment (i.e., more closeness with the father than the sibling), a value of zero reflected equal treatment, and negative values reflected relatively poorer treatment ($M = .00$, $SD = .93$).

Differential conflict with mother.: Differential conflict with the mother was calculated via difference score using each sibling's report of their own conflict with their mother. The report from each adolescent was calculated by subtracting their own score from that of their sibling. Thus, higher values reflected comparatively better treatment (i.e., less conflict with the mother than the sibling), a value of zero reflected equal treatment, and negative values reflected relatively poorer treatment ($M = .00$, $SD = .96$).

Differential conflict with father.: Differential conflict with the father was calculated via difference score in the same manner as differential conflict with mother. Higher values reflected comparatively better treatment (i.e., less conflict with the father than the sibling), a value of zero reflected equal treatment, and negative values reflected relatively poorer treatment ($M = .00$, $SD = .91$).

Health related behaviors.

Sleep habits.: Parents and adolescents reported on their own sleep habits via the two-item subscale of the health related behaviors measure from Senguttuvan and colleagues (2014). The items were rated on a scale of 1 (*really not true*) to 5 (*really true*). The items were, "I get enough sleep most nights", and "It is important to me to get enough sleep so that I am well rested during the day". Items for were averaged together with higher values reflecting better sleep habits (adolescent sleep habits: $M = 3.46$, $SD = .91$; parent sleep habits: $M = 3.66$, $SD = .95$). The measure showed adequate reliability for both adolescents ($\alpha = .72$) and parents ($\alpha = .73$).

Health habits.: Parents and adolescents reported on their own sleep habits via the seven-item subscale of the health related behaviors measure from Senguttuvan and colleagues (2014). The items were rated on a scale of 1 (*really not true*) to 5 (*really true*). Example items include, "For me, being healthy and taking care of my body is important", "I make sure I eat nutritiously", and "My diet is essentially healthy and nutritious". Items for were averaged together with higher values reflecting better health habits (adolescent health habits: $M = 3.56$, $SD = .68$; parent health habits: $M = 3.66$, $SD = .95$). The measure showed adequate reliability for both adolescents ($\alpha = .86$) and parents ($\alpha = .90$).

Exercise habits.: Parents and adolescents reported on their own sleep habits via the two-item subscale of the health related behaviors measure from Senguttuvan and colleagues (2014). The items were rated on a scale of 1 (*really not true*) to 5 (*really true*). The items were, “I engage in physical activity regularly”, and “I am sure to get regular exercise”. Items for were averaged together with higher values reflecting better exercise habits (adolescent exercise habits: $M = 3.83$, $SD = 1.02$; parent exercise habits: $M = 3.37$, $SD = 1.08$). The measure showed adequate reliability for both adolescents ($\alpha = .81$) and parents ($\alpha = .88$).

Adolescent personality.

Conscientiousness.: Adolescents reported on their conscientiousness using the four-item subscale from the Mini-IPIP (Donnellan et al. 2006). Example items include, “I get chores done right away”, “I like order”, and “I often forget to put things back in their proper places” (reverse scored). All four items were averaged together, with higher scores reflecting more conscientiousness ($M = 3.26$, $SD = .75$). The measure showed lightly low reliability ($\alpha = .63$).

Agreeableness.: Adolescents reported on their agreeableness using the four-item subscale from the Mini-IPIP (Donnellan et al. 2006). Example items include, “I sympathize with others’ feelings”, “I feel others’ emotions”, and “I am not really interested in others” (reverse scored). All four items were averaged together, with higher scores reflecting more agreeableness ($M = 3.86$, $SD = .69$). The measure showed lightly low reliability ($\alpha = .69$).

Neuroticism.: Adolescents reported on their agreeableness using the four-item emotional stability subscale from the Mini-IPIP (Donnellan et al. 2006). Example items include, “I have frequent mood swings”, “I get up easily”, and, “I am relaxed most of the time” (reverse scored). All four items were averaged together, with higher scores reflecting more neuroticism ($M = 2.78$, $SD = .61$). The measure inadequate reliability ($\alpha = .13$).

Results

Descriptive Statistics

Bivariate correlations are presented in Table 2. Correlations revealed that adolescents’ sleep, exercise, and general health behaviors were significantly related to one another. Additionally, comparatively better treatment and conscientiousness were generally related to better health behaviors.

Analytic Strategy

Patterns of missing data were first analyzed. Only two of the variables used in the models had any missing data: parents’ education level (0.3% of cases) and adolescents’ body mass index (1.7% of cases). Little’s MCAR Test supported the assumption that data were missing completely at random ($\chi^2 = 32.689$, $df = 38$, $p = .71$). The variables from the model that contained no missing data as auxiliary variables were used to impute 50 data sets using PROC MI in SAS 9.4. PROC MIANALYZE was used to compile effect sizes for each analysis.

To account for the nested nature of siblings within families, models for sleep, health, and exercise habits were tested in a series of multilevel models. Because there were only two participating siblings per family, analyses were limited to the testing of fixed effects. Separate, but identical, models were tested for each dependent variable. Models were tested hierarchically. Model 1 included gender of the participating parent (0 = mother; 1 = father), the parents' education level, the parents' marital status (0 = parents not married; 1 = parents are married), sibship size, the parent's corresponding health-related behavior (sleep, health, or exercise habits), gender composition of the sibling dyad (0 = same gender; 1 = mixed gender), age difference between the siblings, gender of the adolescent (0 = female; 1 = male), adolescent age, ethnicity (0 = Caucasian; 1 = minority), body mass index of the adolescent, birth order (0 = older than sibling; 1 = younger than sibling), conflict with mother, closeness with mother, conflict with father, closeness with father, conflict with sibling, closeness with sibling, differential mother closeness, differential mother conflict, differential father closeness, differential father conflict, agreeableness, and conscientiousness. Model 2 added 8 two-way interactions that were each type of differential treatment interacted with both agreeableness and conscientiousness.

All continuous variables were centered at their mean, except for the parental differential treatment variables where zero reflected equal treatment. All significant interactions probed following the procedures outlined by Aiken and West (1991). Specifically, interactions were plotted and the simple slopes were tested at one standard deviation above and below the mean for the given moderator.

Sleep Habits

Results for sleep habits are provided in Table 3. Model 1 revealed that participants with more siblings, those who were closer to their mother, or who were more conscientious reported better sleep habits. Those who were older or had more conflict with their mother reported poorer sleep habits. In Model 2, the interaction between maternal differential closeness and adolescent conscientiousness was significant. Testing of the simple slopes revealed that adolescents who reported high conscientiousness (+1 *SD*) had less healthy sleep habits when they had comparatively closer relationships with their mothers ($\gamma = -.15$, $SE = .08$, $p < .05$). The association was not significant for those below average in conscientiousness. Additionally, no links with differential treatment were moderated by agreeableness.

Health Habits

Results for general health habits are provided in Table 4. Model 1 revealed that adolescents whose participating parent engaged in better health habits, who were closer to their father, and who were more conscientious reported better health habits. Adolescents with a higher BMI, and those who were older reported poorer health habits. Model 2 revealed a significant interaction between maternal differential closeness and adolescents' conscientiousness. Testing of the simple slopes revealed that adolescents who reported low conscientiousness (−1 *SD*) had healthier habits when they had comparatively closer relationships with their mothers ($\gamma = .12$, $SE = .06$, $p < .05$). The association was not significant for those who

higher than the average conscientiousness. Additionally, no links with differential treatment were moderated by agreeableness.

Exercise Habits

Results for exercise habits are provided in Table 5. Model 1 revealed that those who were male, those who were closer to their father, those who were closer to their sibling, and those who were more conscientious exercised more regularly. In Model 2, the interaction between maternal differential closeness and conscientiousness was significant. Testing of simple slopes revealed that adolescents who reported low conscientiousness ($-1\ SD$) reported exercising more when they had comparatively closer relationships with their mothers ($\gamma = .22, SE = .09, p < .05$). The association was not significant for those who were above average conscientiousness. Additionally, no links with differential treatment were moderated by agreeableness.

Alternate Models

In addition to the reported analyses, other models also examined if the tested two-way interactions were further qualified by interactions with gender composition, age difference, and birth order. None of the three-way interactions were significant.

Discussion

Past research highlights that youth who receive poorer parental treatment relative to a sibling are at risk for maladaptive development in a variety of areas including mental health (Shanahan et al. 2008) and problem behaviors (Jensen and Whiteman 2014; Scholte et al. 2007). The current study builds on the current literature by connecting parental differential treatment to adolescents' health-related behaviors like sleep, general health, and exercise habits. These health-related behaviors are important to examine because they have unique implications for the broader physical (Fatima et al. 2015) and mental health (Cairns et al. 2014) of adolescents. Additionally, the current study extends past work on the moderating of contexts associated with differential treatment by examining whether patterns varied by adolescents' personality traits of conscientiousness and agreeableness.

It was hypothesized that adolescents who received less preferential treatment would engage in poorer health habits, given that less favored treatment may promote a negative sense of self through greater upward social comparison with the better-treated sibling. This hypothesis was not supported, at the main effect level, as neither differential closeness nor conflict with mothers or fathers predicted adolescents' health habits. Although, parenting likely still plays a role in adolescents' health related behaviors; closeness from mothers was linked to sleep habits, and closeness from fathers was linked to health and exercise habits. Differences in parenting, however, may be dependent on moderating contexts, which is consistent with the findings of this study.

Building on theory and research exploring factors that shape the implications of social comparisons and differential treatment, the current study also examined whether the personality traits of conscientiousness and agreeableness moderated the associations between differential treatment and adolescents' health related behaviors. It was hypothesized

that both conscientiousness and agreeableness would strengthen the implications of differential treatment for youth's adjustment, but neither hypothesis was supported. Several findings did emerge, however, that may have important implications for understanding links between differential treatment and adolescent health related behaviors. These findings hint at more nuances to the moderating role of personality.

For both health and exercise habits there was a positive link with differential maternal closeness for adolescents who were less conscientious. In other words, less conscientious youth who had a more distant (or less close) relationship with their mother compared to their sibling reported having worse health and exercise habits. As previously noted, in many instances, differences in parenting may be due to the varying needs of the siblings (Kowal and Kramer 1997). Although less conscientious youth may engage in fewer social comparisons than those higher in conscientiousness (Eggens et al. 2011; Rekers-Mombarg and van der Werf 2011), they may be less aware of why they are being treated differently, and thus the differences may play a role in their health and exercise habits. In contrast, rather than being more affected by differences due to heightened social comparison, adolescents that are more conscientious are better at taking the perspectives of others (Chopik et al. 2007; Song and Shi 2017), and thus may be more aware of the reasons for why they are treated differently by their parents. Future studies will need to examine personality further in the context of adolescents' interpretations of differential treatment.

Findings regarding adolescents' sleep habits were different from those for health and exercise habits. Analysis revealed a negative link between differential maternal closeness and sleep habits for youth who were more conscientious. Meaning, conscientious adolescents who had relatively closer relationships with their mother reported poorer sleep habits. Past work highlights that conscientiousness is linked to a greater ability to take the perspective of others (Chopik et al. 2007; Song and Shi 2017). Although it is possible that conscientious youth may be more aware of why they are treated differently than their sibling, they also may be more aware of how their sibling may feel about those differences too. Perhaps in these instances, conscientious youth feel some level of empathic distress on behalf of their sibling who has a relatively less close relationship with their mother. Why did the effect only emerge for sleep habits? Recent work highlights that sleep patterns and habits are particularly sensitive psychological distress (Sampasa-Kanyinga et al. 2018) and in particular, stress due to social interactions (Donoghue and Meltzer 2018; Tavernier et al. 2016) such as parent and sibling dynamics within families.

Contrary to hypotheses, agreeableness was not a significant moderator of differential treatment and adolescents' health related behaviors associations. Agreeable adolescents may be more likely to want to meet parents' expectations (Dunlop et al. 2015; Howell et al. 2011), but health related behaviors may not be an area where differential treatment readily conveys a parental expectation of behavior. Future studies will need to assess whether agreeableness moderates links between differential treatment and domains that might have more obvious parental expectations, for example problem behavior and academic performance.

Hypotheses about parent gender were not included; however, the models speak somewhat to the potentially differing roles of differential treatment from mothers and fathers. Contrary to some studies on differential treatment in childhood and adolescence (e.g., Tamrouti-Makkink et al. 2004), but consistent with work in adulthood (e.g., Davey et al. 2009) the findings suggest that differential treatment from mothers is more salient than that from fathers. In some cases, fathers may be less engaged with their children (McBride and Mills 1993) or their parenting may matter in other ways (e.g., Lloyd et al. 2014). Future work will need to explore further the differing roles of differential treatment from mothers and fathers.

Although this study makes important contributions to the study of parental differential treatment, it is not without limitations. First, the sample was moderately small and included largely two-parent families from the same state. These processes may look different in single-parent or blended family homes. Future studies will need to collect sufficient samples of varying family compositions so that interactions with parents' marital status can be included. Second, the data were cross-sectional and the analysis was unable to determine the direction of effects. Third, neuroticism may also serve as a moderator between differential treatment and adolescent adjustment. The current study, however, was unable to test this hypothesis because the measure demonstrated poor internal consistency. Lastly, the study did not include assessments of parents' motivations or adolescents' understandings of the reasons for differences in treatment. Future studies will need to incorporate these constructs to understand better the links between differential treatment and adolescent development.

Conclusion

Extant literature highlights that youth who receive relatively poorer treatment from parents are at risk for maladaptive outcomes (e.g., Oliver and Pike 2018; Shanahan et al. 2008). Research to date, however, had not examined links between differential treatment and adolescents' health related behaviors. The current study contributes to this literature by suggesting that relatively poorer relationships with mothers may be linked to worse health and exercise habits for youth who are less conscientious. Additionally, conscientious youth who have comparatively better relationships with their mother may exhibit poorer sleep habits. These findings are important in that they extend the differential treatment literature to health-related behaviors, which have important implications for the broader physical (Fatima et al. 2015) and mental health (Cairns et al. 2014) of adolescents and suggest that personality may be another key moderating context that future studies should examine. The findings contribute to the understanding that the processes surrounding differential treatment are complex and often vary by factors like the personality of adolescents. Parents, clinicians, and those working with youth to promote overall well-being should consider how differential treatment and personality might play a role in the health habits of the adolescents they work with.

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Abbreviations:

PDT	parental differential treatment
SCT	social comparison theory

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Table 1.

Demographic characteristics of adolescents and their parents.

Variables	Parents (N = 295)	Adolescents (N = 590)
	<i>M (SD) or Proportion</i>	<i>M (SD) or Proportion</i>
Age	45.40 (5.31)	15.86 (1.73)
Female	.86	.54
Ethnicity		
White	.74	.75
Black	.19	.19
Hispanic	.04	.04
Other	.03	.02
Education Level ^a	14.60 (2.11)	-
Sibship Size	-	2.83 (1.16)
Married	.84	.00
Sibling Gender Composition		
Same Gender	-	.52
Sibling Age Difference	-	2.66 (1.06)

^aEducation Level: 11 = less than high school, 12 = high school, 13 = some college, 14 = associates, 16 = bachelors, 18 = advanced, 20 = Ph.D, J.D., M.D.

Table 2.

Bivariate correlations among dependent and key study variables (N = 590 adolescents)

Variables	1	2	3	4	5	6	7	8
1. Sleep Habits								
2. Health Habits	.33***							
3. Exercise Habits	.25***	.59***						
4. Differential Mother Closeness	.18***	.14***	.07					
5. Differential Mother Conflict	.19***	.16***	.10**	.31***				
6. Differential Father Closeness	.21***	.16***	.15***	.41***	.26***			
7. Differential Father Conflict	.15***	.09*	.01	.16***	.69***	.17***		
8. Agreeableness	.02	.07	-.01	.12**	-.02	.01	-.02	
9. Conscientiousness	.24***	.24***	.18***	.16***	.27***	.08	.27***	.06

*
 $p < .05$

**

 $p < .01$

 $p < .001$

Table 3.

Results of multi-level model for variables predicting sleep habits (N = 590 participants nested in 295 families).

Variables	Model 1		Model 2	
	γ	SE	γ	SE
Intercept	3.54 ***	.15	3.51 ***	.15
Parents' Gender	.08	.11	.07	.11
Parents' Education Level	.00	.02	.00	.02
Parents' Marital Status	.08	.11	.11	.11
Sibship Size	.07 *	.03	.07 *	.03
Parents' Sleep Habits	.06	.04	.06	.04
Gender Composition	-.11	.07	-.09	.07
Sibling Age Difference	-.05	.04	-.04	.04
Adolescent Gender	-.06	.08	-.04	.08
Adolescent Age	-.10 **	.03	-.10 **	.03
Ethnicity	-.04	.05	-.04	.05
Adolescent BMI	.00	.01	.00	.01
Birth Order	.01	.11	.00	.11
Conflict with Mother	-.23 *	.11	-.25 *	.11
Closeness to Mother	.18 *	.08	.18 *	.08
Conflict with Father	-.05	.10	-.04	.10
Closeness to Father	.08	.07	.07	.07
Conflict with Sibling	-.04	.05	-.03	.05
Closeness to Sibling	-.02	.06	-.01	.06
Differential Conflict with Mother (MDCon)	-.02	.06	.00	.06
Differential Closeness with Mother (MDClo)	-.03	.07	-.05	.07
Differential Conflict with Father (FDCon)	.09	.05	.08	.05
Differential Closeness with Father (FDClo)	-.01	.07	.00	.07
Agreeableness (Agree)	.01	.05	.01	.05
Conscientiousness (Conscien)	.20 ***	.05	.19 ***	.05
MDClo X Agree			.03	.07
MDClo X Conscien			-.20 **	.06
MDCon X Agree			.02	.07
MDCon X Conscien			-.02	.07
FDClo X Agree			.05	.06
FDClo X Conscien			.06	.05
FDCon X Agree			-.03	.08
FDCon X Conscien			.06	.07

*
 $p < .05$ **
 $p < .01$ ***
 $p < .001$

Table 4.

Results of multi-level model for variables predicting health habits (N = 590 participants nested in 295 families).

Variables	Model 1		Model 2	
	γ	SE	γ	SE
Intercept	3.71 ^{***}	.12	3.70 ^{***}	.12
Parents' Gender	.04	.09	.04	.09
Parents' Education Level	.01	.01	.01	.01
Parents' Marital Status	-.13	.09	-.12	.09
Sibship Size	.05	.03	.05	.03
Parents' Sleep Habits	.09 [*]	.04	.10 [*]	.04
Gender Composition	.03	.06	.03	.06
Sibling Age Difference	-.01	.03	-.01	.03
Adolescent Gender	.06	.06	.06	.06
Adolescent Age	-.05 [*]	.03	-.05 [*]	.03
Ethnicity	-.05	.04	-.05	.04
Adolescent BMI	-.01 [*]	.01	-.02 [*]	.01
Birth Order	-.04	.08	-.04	.08
Conflict with Mother	-.06	.09	-.06	.09
Closeness to Mother	-.01	.06	-.02	.06
Conflict with Father	-.01	.08	.00	.08
Closeness to Father	.15 ^{**}	.05	.14 ^{**}	.06
Conflict with Sibling	-.01	.04	-.01	.04
Closeness to Sibling	.08	.05	.09	.05
Differential Conflict with Mother (MDCon)	.04	.05	.04	.05
Differential Closeness with Mother (MDClo)	.07	.06	.06	.06
Differential Conflict with Father (FDCon)	-.01	.04	-.01	.04
Differential Closeness with Father (FDClo)	-.06	.05	-.05	.05
Agreeableness (Agree)	.08	.04	.07	.04
Conscientiousness (Conscien)	.15 ^{***}	.04	.15 ^{***}	.04
MDClo X Agree			.04	.05
MDClo X Conscien			-.11 [*]	.05
MDCon X Agree			.01	.06
MDCon X Conscien			.02	.05
FDClo X Agree			-.06	.04
FDClo X Conscien			.03	.04
FDCon X Agree			-.02	.06
FDCon X Conscien			.01	.05

*
p < .05

**
p < .01

 $p < .001$

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Table 5.

Results of multi-level model for variables predicting exercise habits (N = 590 participants nested in 295 families)

Variables	Model 1		Model 2	
	γ	SE	γ	SE
Intercept	3.76***	.18	3.72***	.18
Parents' Gender	.20	.12	.19	.12
Parents' Education Level	.01	.02	.01	.02
Parents' Marital Status	-.05	.13	-.02	.13
Sibship Size	.04	.04	.04	.04
Parents' Sleep Habits	.00	.04	-.01	.04
Gender Composition	.08	.08	.09	.09
Sibling Age Difference	-.04	.04	-.03	.04
Adolescent Gender	.37***	.09	.39***	.09
Adolescent Age	-.05	.04	-.05	.04
Ethnicity	-.09	.06	-.08	.06
Adolescent BMI	-.02	.01	-.02	.01
Birth Order	-.02	.13	-.03	.13
Conflict with Mother	-.03	.13	-.07	.13
Closeness to Mother	-.12	.09	-.13	.09
Conflict with Father	.21	.11	.21	.11
Closeness to Father	.31***	.08	.31***	.08
Conflict with Sibling	-.04	.05	-.03	.05
Closeness to Sibling	.18*	.07	.19**	.07
Differential Conflict with Mother (MDCon)	.05	.07	.06	.07
Differential Closeness with Mother (MDClo)	.10	.08	.07	.09
Differential Conflict with Father (FDCon)	-.06	.06	-.08	.06
Differential Closeness with Father (FDClo)	-.03	.08	-.01	.08
Agreeableness (Agree)	.05	.06	.05	.06
Conscientiousness (Conscien)	.23***	.06	.23***	.06
MDClo X Agree			.02	.08
MDClo X Conscien			-.21**	.07
MDCon X Agree			-.02	.09
MDCon X Conscien			-.02	.08
FDClo X Agree			.04	.07
FDClo X Conscien			.09	.06
FDCon X Agree			.03	.10
FDCon X Conscien			.10	.08

*
p < .05

**
p < .01

 $p < .001$

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