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RESEARCH ARTICLE

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Adolescent responses to paternal verbal aggression: Assessing spillover and compensatory processes using random intercept cross-lagged panel models

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Abstract

Introduction: Prior research suggests several pathways through which verbal aggression manifests across adolescent relationship contexts, including spillover (continuity of aggression across different relationships) and compensation (offsetting an aggressive relationship with *less* aggression in other relationships). These pathways vary across timescales in ways that between-person analytic approaches are unlikely to adequately capture. The current study used random intercept cross-lagged panel modeling (RI-CLPM) to examine adolescents' spillover and compensatory responses to paternal verbal aggression.
Methods: Participants were 184 adolescents (53.2% female) from a United States community sample participating in a longitudinal study. Annually from ages 13–17, participants reported on their experiences of verbal aggression in their paternal and maternal relationships and participated in observed interactions with a close peer that were coded for aggressive behavior.
Results: Spillover was observed from father-adolescent to mother-adolescent and adolescent-peer contexts in analyses at the between-person level, likely capturing long-term, cumulative effects of paternal aggression. Conversely, compensation was observed in analyses at the *within-person* level, likely capturing medium-term (i.e., year-to-year) adaptations to paternal aggression: Adolescents who experienced more aggression from their father than expected at a specific time point were *less* likely to both perpetrate and experience aggression in maternal and peer relationships the following year. Several findings differed across teen gender, with compensation more likely to occur in males than females.
Conclusions: These findings highlight the multiple pathways by which father-adolescent aggression may be linked to behavior in other relationships in the medium- and long-term. They also support the value of RI-CLPM in decomposing these effects.

KEYWORDS
adolescence, fathers, peer relationships, random intercept cross-lagged panel modeling, verbal aggression

1 | INTRODUCTION

Verbal aggression (e.g., arguments, threats, and spiteful behavior) from parents can contribute to a host of difficulties for teens, including internalizing symptoms (Brouillard et al., 2018), externalizing problems (Little et al., 2019), criminal behavior (Mowen & Boman, 2018), academic failure (Patterson et al., 1989), and challenges establishing autonomy in interactions with parents (Allen et al., 1996). Similarly, hostile conflict with peers is related to depression (Hussong, 2000)

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and risk-taking behaviors (Telzer et al., 2014), as well as occurs more often in adolescents with attachment insecurity (Allen et al., 2007). Importantly, high levels of verbal aggression and hostility in close relationships can also be emotionally dysregulating for adolescents (Adrian et al., 2011; Crowell et al., 2014), which may prompt teens to seek other supportive relationships as a way to offset some of this emotional distress.

Adolescents may be particularly likely to seek out other supportive relationships to cope with the intensity of verbal aggression that can be displayed by fathers. Fathers are more likely than mothers to engage in verbally aggressive behaviors (Shulman & Seiffge-Krenke, 1997; Yaffe, 2023). This type of aggression not only has a lasting impact on the father-adolescent relationship, but also on adolescents' relationships with other social partners. Indeed, studies have found that verbally aggressive behavior from fathers is a stronger predictor of poor mental health in adolescents than is maternal verbal aggression (Polcari et al., 2014; Sheeber et al., 2007). Conversely, supportive paternal behavior predicts adolescent psychological well-being above and beyond the effects of supportive maternal behavior (Barrera & Garrison-Jones, 1992). Some evidence suggests that the incidence and effects of paternal verbal aggression may vary by gender, with boys more likely than girls to receive paternal verbal aggression (McKee et al., 2007; Wang et al., 2016), and boys who experience high levels of paternal verbal aggression are also more likely than girls to model aggression in their own adult romantic relationships (Palazzolo et al., 2010).

Numerous studies support the theory that aggressive fathers produce aggressive adolescents (Browne & Hamilton, 1998; Margolin & Baucom, 2014; Widom, 1989). These studies are consistent with the *spillover* model, which suggests that negative emotions caused by a hostile interpersonal event will spillover to affect later interactions in other settings (Almeida et al., 1999; Chung et al., 2009; Repetti, 1987). This model explains how cumulative exposure to a certain type of behavior (e.g., paternal verbal aggression toward an adolescent) often leads to enacting similar behaviors in other contexts in the long-term (e.g., adolescent verbal aggression towards their mother or a peer). Indeed, studies have found that adolescents who experienced violence during childhood will aggress against the non-offending parent as they age (Cottrell & Monk, 2004), and that family conflict and hostile parenting predict longer-term problems in peer relationships (Allen et al., 2002; Chung et al., 2011; Cummings et al., 2015). Additionally, though links between father-adolescent verbal aggression can be bidirectional, the current study focused on verbal aggression perpetrated by fathers towards adolescents, given that parent-to-child aggression has been shown to precede child-to-parent aggression (Gallego et al., 2019).

Although most research to date has examined the ways in which behaviors across relationship contexts echo and reinforce each other, evidence also suggests that adolescents' behavior in one context can act in opposition to their behavior in the other context at least in the medium-term (i.e., year-to-year). This process, known as *compensation* theory, has been applied as an explanation for the process by which adolescents become *more* dependent on peers as they become progressively *less* dependent on parents (Steinberg & Silverberg, 1986). Adolescent autonomy struggles, though developmentally normative, can engender hostile parent-adolescent interactions (Allen et al., 1996, 2002). As a result, we would expect adolescents to gravitate towards peer relationships for support in navigating these hostile parental interactions, particularly if the adolescent is experiencing a higher level of verbal aggression from parents at a given point in time than they are used to receiving.

In line with this developmental trend, compensation theory has been used to explain how supportive peer behavior can compensate for the effects of unsupportive parental behavior (Schacter & Margolin, 2019; Sentse et al., 2010; Stocker, 1994). For example, when adolescents feel over-controlled by parents, they are more likely to cope by engaging in support-seeking behaviors with their peers (Levpuščček, 2006). Compensation theory has also been used to explain the benefits of maternal support in mitigating the negative mental health effects of low father support (Sandler et al., 2008, 2013; van Aken & Asendorpf, 1997). Similarly, in the domain of parenting styles, authoritative mothers compensate for uninvolved fathers in terms of reducing child internalizing and externalizing problems (Simons & Conger, 2007).

Compensatory processes could also occur across paternal, maternal, and peer contexts because adolescents may have difficulty tolerating co-occurring unsupportive or aggressive behavior across multiple contexts (Stocker, 1994). Indeed, experiencing intrafamilial conflict in multiple relationships compounds the risk for adjustment problems in children and adolescents (Ehrlich et al., 2012; Ingoldsby et al., 2001; Osborne & Fincham, 1996). Accordingly, adolescents may feel the need to invest in stability and safety in at least one close relationship so as to offset the emotional distress and sense of relational threat caused by hostility in other relationships. This adaptive strategy may be particularly likely to occur if adolescents begin to experience a greater-than-normal level of verbal aggression from a parent and need a way to cope with this unexpected change. Although it is possible that compensatory strategies occur in the very short-term as a result of a given instance of paternal verbal aggression, such as when an adolescent asks for support or avoids starting an argument with mothers or peers, it is likely that stronger patterns of compensatory responses slowly develop in the medium-term (i.e., over the course of a given year). These responses may result from the cumulative emotional distress that is likely to occur when fathers are highly verbally aggressive.

Studies have examined the compensation hypothesis as it applies to positive interactions in one relationship domain (e.g., peers) offsetting mental health or behavior problems associated with problematic interactions in another domain (Hazel et al., 2014; Lyell et al., 2020; Zhang et al., 2018). Compensation has thus far not been examined with regard to the ways in

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which adolescents handle verbal aggression across paternal, maternal, and peer relationships. Further, studies have not examined the various types of compensatory processes that may occur in response to verbal aggression. Teens may directly behave in a manner (e.g., conciliatory, warm, submissive) that reduces the likelihood of verbally aggressive interactions with other social partners. Additionally, these behaviors may evoke less verbally aggressive behavior on the part of others (e.g., mothers and peers) in close relationships with the teen.

Compensatory processes have largely only been examined in cross-sectional studies, but it is likely that the interplay between adolescents' multiple relationships displays dynamic, transactional patterns across time. These processes are likely to vary at both between-family and within-family levels, and identifying patterns of changing behavior *within* families is what individual parents are most likely to find salient and useful for understanding adolescent behavior. However, if offspring of verbally aggressive fathers tend to be more aggressive than the average teen in the long-term, this can make it harder to identify teens' compensatory responses to specific instances of paternal verbal aggression in the medium-term, *unless* one uses statistical approaches that explicitly distinguish these between-person differences (greater verbal aggression overall) from the within-person effects (a teen's reaction to higher-than-typical levels of verbal aggression from their father). Fortunately, statistical approaches that allow for precisely these distinctions have recently become available (Hamaker et al., 2015; Mund & Nestler, 2019).

The current study utilized random intercept cross-lagged panel modeling (RI-CLPM) to examine how fathers' verbal aggression shapes adolescents' behavior in relationships with their mothers and peers in a sample of adolescents assessed repeatedly from ages 13 to 17. RI-CLPM allows for the separation of between-person and within-person variance and accounts not only for the temporal stability of constructs, but also time-invariant, trait-like stability through the inclusion of random intercepts (Hamaker et al., 2015). RI-CLPM allows us to examine the extent to which deviations from expected levels of a construct in one context (i.e., paternal verbal aggression) forecast change 1 year later in another context (i.e., verbal aggression in maternal or peer relationships). It is important to note that these deviations are captured at the within-person level, which provides a measure of the degree to which behavior at a given time is more or less than would be expected based on the individual's overall pattern of interaction. For example, through observation of cross-lagged effects, RI-CLPM facilitates examination of the ways in which an adolescent whose father generally displays low levels of verbal aggression reacts to a period of relatively heightened paternal verbal aggression. RI-CLPM also allows us to capture between-person effects through the correlation between the random intercepts, such as the average association between paternal aggression and teen aggression with mothers or peers across the adolescent period. Thus, RI-CLPM provides the opportunity to investigate two distinct questions: First, how do adolescents behave on average *relative to other adolescents* in response to paternal verbal aggression? This between-families effect is most likely to capture patterns that have evolved over longer periods of time, or as a result of heritable differences that distinguish dyads. Second, how do adolescents respond to their own father being more verbally aggressive than they are used to in the medium-term? This second, within-families effect captures responses to *deviations* in levels of verbal aggression from typical family norms.

Adequately capturing adolescent reactions to deviations in parental verbal aggression levels is of great importance when considering that parents are most likely to notice and respond to their own and their teen's changes in behavior as a guide to future parenting. Indeed, one of the most widely recognized and problematic examples of this is the observation that harshly punitive parents often see a short-term submissive reaction from their children in response to their behavior, even though in the long-term such harsh punishment has been linked to child and adolescent aggression (Margolin & Baucom, 2014). This process has primarily been observed anecdotally to date. Therefore, this study is one of the first to examine a version of this compensatory/offsetting process using rigorous statistical techniques and multi-method data.

The current study focused on the relation of verbal aggression in the father-adolescent relationship to verbal aggression in two of adolescents' other close relationships; those with mothers and those with close peers. Specifically, we were interested in assessing for the presence of spillover and/or compensatory processes across relationships, as well as examining how adolescents' experience of paternal verbal aggression contributes to adolescents' own behavior and the behavior they evoke from their mothers and peers. Thus, we tested the following hypotheses:

1. Consistent with past research, at the between-person level, adolescents who experience greater paternal verbal aggression will be *more* likely to both experience and perpetrate greater verbal aggression in their relationships with their mother and peer over time.
2. At the within-person level, adolescents who experience more paternal verbal aggression than expected at a given time point (i.e., relative to typical levels as assessed via the random intercept) will be relatively *less* likely to perpetrate verbal aggression toward their peer the following year.
3. At the within-person level, adolescents who experience more paternal verbal aggression than expected at a given time point will be relatively *less* likely to perpetrate verbal aggression toward their mother the following year.
4. At the within-person level, adolescents who experience more paternal verbal aggression than expected at a given time point will be relatively *less* likely to experience verbal aggression from their peer the following year.

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5. At the within-person level, adolescents who experience more paternal verbal aggression than expected at a given time point will be relatively *less* likely to experience verbal aggression from their mother the following year.

The potential role of adolescent gender differences will be examined in relation to each of these hypotheses.

2 | METHOD

2.1 | Participants

This report is drawn from a larger longitudinal investigation of adolescent social development in familial and peer contexts. Participants included 184 adolescents (85 males and 99 females) followed over a 5-year period from ages 13 to 17, along with collateral data collected from close friends and parents of these adolescents. The sample was racially/ethnically and socioeconomically diverse: 107 (58%) identified as White, 53 (29%) as African American, 15 (8%) as of mixed race/ethnicity, and 9 (5%) as being from other minority groups. Adolescents' parents reported a median family income in the $40,000–$59,999 range at the initial assessment.

Adolescents were initially recruited from the seventh and eighth grades of a public middle school drawing from suburban and urban populations in the Southeastern United States. Students and their peers were recruited via an initial mailing to all parents of students in the school along with follow-up contact efforts at school lunches. Families of adolescents who indicated they were interested in the study were contacted by telephone. If a student was identified as a close peer of a participant and agreed to participate in that capacity, they were no longer eligible to participate as primary participants, to reduce redundancies in the data. Of all students eligible for participation, 63% agreed to participate as either target participants or as peers providing extensive collateral information in a 3-hour session. All adolescents provided assent before each interview session, and parents provided informed consent for adolescents. Initial interviews took place in private offices within a university academic building. Follow-up assessments were conducted in the same setting, or for participants' living at a distance, were conducted either in local settings (e.g., hotel conference rooms), or via mail.

Adolescents were assessed annually from ages 13 to 17 (Time 1: $M = 13.35$, $SD = 0.64$; Time 2: $M = 14.27$, $SD = 0.77$; Time 3: $M = 15.21$, $SD = 0.81$; Time 4: $M = 16.35$, $SD = 0.87$; Time 5: $M = 17.32$, $SD = 0.88$). At each time point, adolescents nominated their closest same-gender friend to participate with them, as well as two additional peers from their circle of extended close friends and acquaintances. In the event that this close friend was not able to participate, the next closest friend from the adolescent's circle of closest friends was selected. Adolescents were asked to select a peer of their same gender to reduce the likelihood of confounding close platonic friendships with heterosexual romantic relationships. On average, close friends' ages differed by less than a month from target adolescents' ages. The same friend did not need to be specified across different assessment time points. Close friends reported knowing the target adolescent on average from 4.01 years ($SD = 2.90$) at the age 13 assessment to 5.85 years ($SD = 3.83$) at the age 17 assessment.

2.2 | Attrition analyses

Rates of attrition were low across the five time points ($n = 171$ at Time 5, i.e., 7% attrition over 5 years). *t*-Tests comparing participants with and without follow-up data revealed no significant differences on any of the variables of interest (adolescent reports of verbal aggression with fathers and mothers and observed verbal aggression with close peers). Chi-square difference tests and *t*-tests did not reveal any gender or income differences in dropout rates.

Full information maximum likelihood methods were used with all analyses to reduce any potential biases due to attrition. These procedures have been shown to yield the least-biased estimates for longitudinal analyses when all available data are used (vs. listwise deletion of missing data; Arbuckle, 1996); thus, the full sample of 184 was utilized for these analyses. This analytic technique accounts for the distributional characteristics of the full sample data to minimize bias in estimates of parameters obtained with missing data.

2.3 | Procedure

Confidentiality was assured to all study participants in the initial introduction and throughout all study sessions, and adolescents were told that none of their responses would be revealed to their parents or friends. Participants' data were protected by a Confidentiality Certificate issued by the U.S. Department of Health and Human Services, which protected information from subpoena by federal, state, and local courts. If necessary, participants were provided with transportation and childcare. Adolescent participants, their parents, and their peers were all paid for participation.

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2.4 | Measures

Verbal aggression: At each time point, adolescents reported on how often they experienced paternal verbal aggression, how often they experienced maternal verbal aggression, and how often they perpetrated verbal aggression toward their mother using the Conflict Tactics Scale (CTS; Straus, 1979). The CTS contains 80 items assessing severity and frequency of conflict between two partners, as well as conflict management techniques. The 6-item Psychological Aggression subscale was used in the current study. Items included "Your father figure insulted or swore at you," "Your father figure did or said something to spite you," and "Your father figure threatened to hit or throw something at you." Items were identical for adolescents' experience and perpetration of verbal aggression in their relationship with their mother. Adolescents responded on a 7-point Likert scale (*never, once, twice, 3–5 times, 6–10 times, 11–20 times, or more than 20 times*). Final scores were obtained by summing responses on the frequency scale across behaviors and could range from 0 to 36. Cronbach's alphas ranged from 0.70 to 0.78 for the paternal Psychological Aggression subscale, from 0.66 to 0.83 for the mother-to-adolescent Psychological Aggression subscale, and from 0.71 to 0.83 for the adolescent-to-mother Psychological Aggression subscale across the five time points.

Observed verbal aggression with peer: At the first time point, adolescents and their close peer participated in an 8-min videotaped interaction in which they were presented with a hypothetical dilemma involving 12 people being stranded on Mars. They were told that only seven people would fit on the return ship and were asked to decide which seven people should be selected. In accordance with a revealed differences paradigm (Strodtbeck, 1951), the adolescent and their close peer made their selections individually, then came together to discuss any disagreements and make a final decision. Adolescent and close peer dyads were presented with a similar task at each time point (e.g., deciding which patients should receive a cure for a fatal disease, deciding which characters should be kicked off an island in a survivor scenario, ranking who would be most interesting to watch on a TV show). Behavior during the interaction was coded according to the Autonomy-Relatedness Coding System for Peer Interactions (Allen et al., 2001). This system captures behaviors related to behaving in a verbally aggressive manner towards a social partner, specifically, interrupting or distracting their partner when the partner is speaking, as well as displaying hostility toward their partner. In this coding system, hostile behavior included making statements which are rude, hostile, mean, disdainful, or devaluing toward the other person, and which would be reasonably expected to leave the other person feeling annoyed, hurt, or worse about themselves. Verbal aggression towards peers was rated globally over the course of the full interaction on a scale of 1–9. The three types of verbally aggressive behavior—interrupting, distracting, and hostility—were all captured in one code. Each interaction was coded independently by two raters for both adolescent verbal aggression towards their peer and peer verbal aggression towards the adolescent, and the average of the two scores was used (mean intraclass r for adolescent verbal aggression to peer = 0.61, mean intraclass r for peer verbal aggression to adolescent = 0.61).

2.5 | Analytic plan

Analyses were conducted in R using the RStudio software version 2022.07.2 and the Lavaan package (Rosseel, 2012). To model the longitudinal associations between paternal verbal aggression and verbal aggression in adolescents' maternal and peer relationships, random intercept cross-lagged panel models were constructed in accordance with procedures outlined by Hamaker et al. (2015). The variance of each observed score for adolescent experience of paternal verbal aggression, adolescent perpetration of verbal aggression towards their mother, adolescent experience of maternal verbal aggression, adolescent perpetration of verbal aggression towards their peer, and adolescent experience of peer verbal aggression was decomposed into between-person and within-person components via the inclusion of random intercepts. Thus, the lagged coefficients of the RI-CLPM capture within-person variation over time, while the correlations between the random intercepts represent the between-person effects. The main effects of interest in the current study were the cross-lagged effects from adolescent experience of paternal verbal aggression to each outcome variable and the between-person correlations between the random intercepts of paternal verbal aggression and the outcome variables. Other effects captured by RI-CLPM are autoregressive effects, which describe the extent to which scoring above or below an individual's specific mean level of a variable at one time point predicts scoring above or below this level on the same variable at the next time point, and within-timepoint covariances, which describe the extent to which deviations from the person-specific mean of one variable are associated with deviations from the person-specific mean of the other variable at the same time point.

The first model tested associations between paternal verbal aggression and adolescent verbal aggression towards their peer. The second examined paternal verbal aggression and adolescent verbal aggression towards their mother. The third examined paternal verbal aggression and peer verbal aggression towards adolescents, and the fourth tested associations between paternal verbal aggression and maternal verbal aggression towards adolescents.

Model testing proceeded via a set of nested model comparisons using Chi-Square Difference tests. We examined whether associations between paternal verbal aggression and our four outcome variables of interest varied based on adolescent age. We tested models with the autoregressive and cross-paths constrained to be equal across the five time points and compared

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them with corresponding models where all autoregressive and cross-paths were allowed to vary across time points. We found that the unconstrained models did not significantly improve model fit, suggesting that the associations between paternal verbal aggression and adolescent verbal aggression with mothers and peers did not significantly differ across adolescent age (Table S2). Thus, we proceeded with the constrained models. Adolescent gender and family income were not significantly correlated with any variables in the current study, so these variables were excluded from the models. Model fit was deemed acceptable if comparative fit index (CFI) values were above 0.90 and root mean square error of approximation (RMSEA) values were less than 0.08 (Hu & Bentler, 1999). For model comparisons, we also examined two comparative fit indices—the Akaike information criterion (AIC) and the Bayesian information criterion (BIC)—with lower values indicating better fit. Finally, we tested whether associations between constructs differed by gender using multi-group analyses. Specifically, we created multi-group models unconstraining the two sets of autoregressive paths, the two sets of cross-lagged paths, and the covariance between the random intercepts and compared these models to nested multi-group models in which those pathways were constrained across genders. Results for males and females are presented separately for the model that indicated significant gender differences. Model comparisons for the multi-group models can be found in Table S3. An example RI-CLPM as applied in this study can be found in Figure 1.

3 | RESULTS

3.1 | Preliminary analyses

Table 1 presents means and standard deviations of measures used in the current study, as well as gender differences in means. We ran bivariate correlations among primary variables and found significant, positive associations between paternal verbal aggression, maternal verbal aggression, and adolescent verbal aggression with mothers and peers at several assessment time points (Table S1).

3.2 | Primary analyses

Hypothesis 1. Consistent with past research, at the between-person level, adolescents who experience greater paternal verbal aggression will be more likely to both experience and perpetrate greater verbal aggression in their relationships with their mother and peer over time.

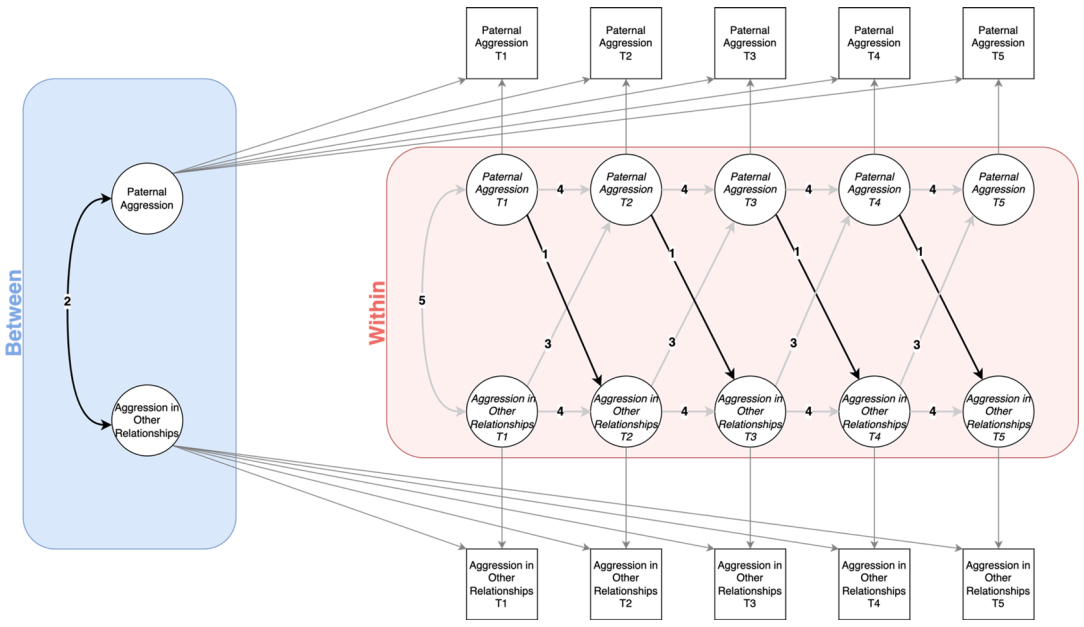

FIGURE 1 An example random intercept cross-lagged panel model as applied in this study. Aggression = Verbal Aggression. Paths labeled "1" indicate the main cross-lagged effect of interest, path labeled "2" indicates covariance of between-person effects, paths labeled "3" indicate second cross-lagged effect, paths labeled "4" indicate autoregressive effects, path labeled "5" indicates covariance of within-person effects. Within-time point covariances among concurrent variables are calculated in the model, but not displayed, for visual clarity.

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TABLE 1 Descriptive statistics for primary measures.

	Males		Females		Overall			
	Mean	*SD*	Mean	*SD*	Mean	*SD*	*t*	*p*
Paternal Verbal Aggression (13)	4.07	4.71	3.45	4.60	3.74	4.64	0.83	.407
Paternal Verbal Aggression (14)	2.00	3.05	3.10	5.08	2.60	4.30	−1.64	.102
Paternal Verbal Aggression (15)	2.99	4.35	3.27	4.64	3.14	4.49	−0.39	.699
Paternal Verbal Aggression (16)	3.13	4.25	2.86	4.11	2.99	4.17	0.40	.692
Paternal Verbal Aggression (17)	3.14	4.70	2.15	3.24	2.61	4.01	1.49	.139
Adolescent Verbal Aggression to Mother (13)	5.76	5.53	5.93	4.55	5.85	5.02	−0.23	.818
Adolescent Verbal Aggression to Mother (14)	3.69	4.35	5.43	5.20	4.61	4.89	**−2.38**	**.018**
Adolescent Verbal Aggression to Mother (15)	4.54	5.04	5.97	6.00	5.29	5.59	−1.68	.094
Adolescent Verbal Aggression to Mother (16)	5.01	6.64	5.30	5.49	5.17	6.05	−0.31	.758
Adolescent Verbal Aggression to Mother (17)	3.33	4.85	4.13	5.14	3.75	5.00	−1.05	.297
Maternal Verbal Aggression (13)	3.21	4.36	3.46	4.20	3.34	4.26	−0.40	.687
Maternal Verbal Aggression (14)	2.38	3.66	3.06	4.64	2.74	4.21	−1.07	.288
Maternal Verbal Aggression (15)	3.57	4.70	3.79	5.10	3.68	4.90	−0.29	.772
Maternal Verbal Aggression (16)	4.56	6.01	3.64	4.49	4.08	5.27	1.12	.265
Maternal Verbal Aggression (17)	3.11	5.10	2.70	4.44	2.89	4.75	0.56	.577
Adolescent Verbal Aggression to Peer (13)	1.95	1.43	1.74	1.16	1.84	1.29	1.05	.297
Adolescent Verbal Aggression to Peer (14)	1.60	0.65	1.66	0.82	1.64	0.75	−0.52	.605
Adolescent Verbal Aggression to Peer (15)	1.70	1.03	1.47	0.73	1.58	0.89	1.51	.133
Adolescent Verbal Aggression to Peer (16)	1.75	1.09	1.88	1.07	1.82	1.08	−0.70	.483
Adolescent Verbal Aggression to Peer (17)	1.76	0.82	1.77	0.89	1.77	0.85	−0.08	.933
Peer Verbal Aggression to Adolescent (13)	1.96	1.38	1.77	1.06	1.86	1.22	1.00	.317
Peer Verbal Aggression to Adolescent (14)	1.60	0.78	1.68	0.84	1.65	0.81	−0.61	.546
Peer Verbal Aggression to Adolescent (15)	1.93	1.10	1.67	0.89	1.79	1.00	1.49	.140
Peer Verbal Aggression to Adolescent (16)	1.95	1.19	1.69	1.05	1.81	1.12	1.37	.173
Peer Verbal Aggression to Adolescent (17)	1.73	0.89	1.78	0.91	1.76	0.90	−0.28	.776

Note: Numbers in parentheses denote adolescent age at assessment. Bold values indicate a statistically significant *t*-test result.

We constructed four random intercept cross-lagged panel models examining associations between adolescents' experience of paternal verbal aggression and the following four constructs: adolescent verbal aggression to peers, adolescent verbal aggression to mothers, peer verbal aggression to adolescents, and maternal verbal aggression to adolescents. Model fit for all models was adequate (see Table 2 for fit indices). There was a significant, positive correlation between the random intercepts for all four models (βs: .11–.34, *p*s: <.000–.007; Tables 3–6), with a significant, positive correlation between the random intercepts for the second model present in males only, given gender interactions described below. Thus, at the between-person level, higher levels of paternal verbal aggression across ages 13–17 were associated with greater adolescent verbal aggression to peers, male (but not female) adolescent verbal aggression to mothers, maternal verbal aggression to adolescents, and peer verbal aggression to adolescents.

Hypothesis 2. At the within-person level, adolescents who experience more paternal verbal aggression than expected at a given time point (i.e., relative to typical levels as assessed via the random intercept) will be relatively less likely to perpetrate verbal aggression toward their peer the following year.

Next, we examined associations between paternal verbal aggression and adolescent verbal aggression towards their close peer across ages 13–17. Results from the multi-group analysis did not indicate gender differences in this model, so findings

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TABLE 2 Model fit indices.

	χ^2	*df*	AIC	aBIC	CFI	TLI	RMSEA [90% CI]
Paternal Verbal Aggression → Adolescent Verbal Aggression to Peer	61.12	44	4050.21	4051.21	0.940	0.938	0.046 [0.008 0.072]
Paternal Verbal Aggression → Adolescent Verbal Aggression to Mother	140.83	90	3828.92	3830.83	0.935	0.935	0.078 [0.052 0.103]
Paternal Verbal Aggression → Peer Verbal Aggression to Adolescent	51.35	44	4079.66	4080.66	0.970	0.969	0.030 [0.000 0.060]
Paternal Verbal Aggression → Maternal Verbal Aggression	53.16	44	3827.08	3828.08	0.988	0.988	0.034 [0.000 0.063]

Note: The degrees of freedom for the paternal verbal aggression→adolescent verbal aggression to mother model are higher due to paths being estimated separately for boys and girls in this model.

Abbreviations: AIC, Akaike Information Criterion; aBIC, sample-size adjusted Bayesian information criterion; CFI, comparative fit index; CI, confidence interval; RMSEA, root mean square error of approximation; TLI, Tucker-Lewis index.

TABLE 3 RI-CLPM effects for paternal verbal aggression and adolescent verbal aggression to peers across ages 13–17.

	β	*SE*	*p*
Main effects of interest			
Cross-Lagged Effect 1 (Path 1)			
Paternal Verbal Aggression → Adolescent Verbal Aggression to Peer	−.20	0.08	.008
Between-Person Effects Covariance (Path 2)			
Paternal Verbal Aggression—Adolescent Verbal Aggression to Peer	.14	0.04	.001
Other effects			
Cross-Lagged Effect 2 (Path 3)			
Adolescent Verbal Aggression to Peer → Paternal Verbal Aggression	−.11	0.05	.012
Autoregressive Effects (Path 4)			
Paternal Verbal Aggression	.16	0.07	.018
Adolescent Verbal Aggression to Peer	.01	0.07	.809
Within-Person Effects Covariance (Path 5)			
Paternal Verbal Aggression—Adolescent Verbal Aggression to Peer	.03	0.07	.663
Within-Time Point Covariance			
Paternal Verbal Aggression—Adolescent Verbal Aggression to Peer	.06	0.04	.170

Note: Paths 1–5 are labeled in Figure 1.

Abbreviation: RI-CLPM, random intercept cross-lagged panel modeling.

are reported for the sample as a whole. The cross-lagged path between paternal verbal aggression and adolescent verbal aggression to their peer was significant ($\beta = -.20$, $p = .008$; Table 3). This means that when adolescents perceived their fathers to be more verbally aggressive than expected based on their longer-term pattern of behavior, these adolescents were subsequently less verbally aggressive with their peers than would otherwise be expected based on the general pattern of variances/covariances in the data. The cross-lagged path between adolescent verbal aggression to their peer and paternal verbal aggression was also significant ($\beta = -.11$, $p = .012$; Table 3), suggesting that adolescents who displayed more verbal aggression toward their peer than expected based on their overall pattern of verbal aggression at a particular assessment were less likely to report experiencing paternal verbal aggression the following year.

Hypothesis 3. At the within-person level, adolescents who experience more paternal verbal aggression than expected at a given time point will be relatively less likely to perpetrate verbal aggression toward their mother the following year.

We next examined associations between paternal verbal aggression and adolescent verbal aggression towards their mother across ages 13–17. Multi-group analyses indicated that effects in the paternal verbal aggression and adolescent verbal aggression to mother model varied by gender ($\Delta\chi^2$ (5) = 16.97, $p = .005$). Thus, we proceeded with examining the paternal verbal aggression cross-lagged pathways for males and females separately. Results revealed that males who experienced more paternal verbal aggression than expected at a particular assessment were less likely to display verbal aggression toward their

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TABLE 4 RI-CLPM effects for paternal verbal aggression and adolescent verbal aggression to mothers across ages 13–17 in males and females.

	Males			Females		
	β	*SE*	*p*	*β*	*SE*	*p*
Main effects of interest						
Cross-Lagged Effect 1 (Path 1)						
Paternal Verbal Aggression → Adolescent Verbal Aggression to Mother	−.19	0.08	.026	.04	0.08	.587
Between-Person Effects Covariance (Path 2)						
Paternal Verbal Aggression—Adolescent Verbal Aggression to Mother	.34	0.08	.000	.09	0.09	.325
Other effects						
Cross-Lagged Effect 2 (Path 3)						
Adolescent Verbal Aggression to Mother → Paternal Verbal Aggression	−.06	0.09	.525	.31	0.08	.000
Autoregressive Effects (Path 4)						
Paternal Verbal Aggression	.09	0.12	.436	.19	0.09	.028
Adolescent Verbal Aggression to Mother	.29	0.08	.000	.60	0.08	.000
Within-Person Effects Covariance (Path 5)						
Paternal Verbal Aggression—Adolescent Verbal Aggression to Mother	.26	0.08	.001	.26	0.08	.001
Within-Time Point Covariance						
Paternal Verbal Aggression—Adolescent Verbal Aggression to Mother	.19	0.03	.000	.19	0.03	.000

Note: Paths 1–5 are labeled in Figure 1.
Abbreviation: RI-CLPM, random intercept cross-lagged panel modeling.

TABLE 5 RI-CLPM effects for paternal verbal aggression and peer verbal aggression to adolescents across ages 13–17.

	β	*SE*	*p*
Main effects of interest			
Cross-Lagged Effect 1 (Path 1)			
Paternal Verbal Aggression → Peer Verbal Aggression to Adolescent	−.16	0.08	.037
Between-Person Effects Covariance (Path 2)			
Paternal Verbal Aggression—Peer Verbal Aggression to Adolescent	.11	0.04	.007
Other effects			
Cross-Lagged Effect 2 (Path 3)			
Peer Verbal Aggression to Adolescent → Paternal Verbal Aggression	−.02	0.04	.705
Autoregressive Effects (Path 4)			
Paternal Verbal Aggression	.14	0.07	.053
Peer Verbal Aggression to Adolescent	.07	0.06	.253
Within-Person Effects Covariance (Path 5)			
Paternal Verbal Aggression—Peer Verbal Aggression to Adolescent	.01	0.07	.898
Within-Time Point Covariance			
Paternal Verbal Aggression—Peer Verbal Aggression to Adolescent	−.07	0.04	.101

Note: Paths 1–5 are labeled in Figure 1.
Abbreviation: RI-CLPM, random intercept cross-lagged panel modeling.

mother the following year ($\beta = -.23$, $p = .004$; Table 4). In contrast, the cross-lagged pathway from paternal verbal aggression and adolescent verbal aggression to mother was not significant for females. However, female adolescents who were more verbally aggressive towards their mother were likely to experience greater verbal aggression from their father the following year ($\beta = .24$, $p = .013$; Table 4).

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TABLE 6 RI-CLPM effects for paternal verbal aggression and maternal verbal aggression to adolescents across ages 13-17.

	β	*SE*	*p*
Main Effects of Interest			
Cross-Lagged Effect 1 (Path 1)			
Paternal Verbal Aggression → Maternal Verbal Aggression	−.11	0.06	.051
Between-Person Effects Covariance (Path 2)			
Paternal Verbal Aggression—Maternal Verbal Aggression	.25	0.06	.000
Other Effects			
Cross-Lagged Effect 2 (Path 3)			
Maternal Verbal Aggression → Paternal Verbal Aggression	.17	0.07	.017
Autoregressive Effects (Path 4)			
Paternal Verbal Aggression	.01	0.07	.923
Maternal Verbal Aggression	.33	0.06	.000
Within-Person Effects Covariance (Path 5)			
Paternal Verbal Aggression—Maternal Verbal Aggression	.19	0.07	.004
Within-Time Point Covariance			
Paternal Verbal Aggression—Maternal Verbal Aggression	.25	0.03	.000

Note: Paths 1–5 are labeled in Figure 1.

Abbreviation: RI-CLPM, random intercept cross-lagged panel modeling.

Hypothesis 4. At the within-person level, adolescents who experience more paternal verbal aggression than expected at a given time point will be relatively less likely to experience verbal aggression from their peer the following year.

Next, we examined the cross-lagged paths between paternal verbal aggression and peer verbal aggression towards adolescents across ages 13–17. Significant gender differences emerged for this model ($\Delta\chi^2$ (5) = 12.72, p = .026). However, the model fit of the multi-group gender model was poor, likely because of restricted sample size due to missing data when splitting by gender. Thus, we present the findings from the model that did not account for gender (results from the model with gender unconstrained can be found in Table S4). Adolescents who experienced more paternal verbal aggression than expected at a particular assessment were less likely to experience verbal aggression from their peer the following year (β = −.16, p = .037; Table 5).

Hypothesis 5. At the within-person level, adolescents who experience more paternal verbal aggression than expected at a given time point will be relatively less likely to experience verbal aggression from their mother the following year.

Finally, we examined within-person associations between paternal verbal aggression and maternal verbal aggression towards adolescents across ages 13–17. Findings from the multi-group analysis did not reveal significant gender differences in this model. Adolescents who experienced more paternal verbal aggression at a particular assessment were less likely to report experiencing maternal verbal aggression the following year (β = −.11, p = .051; Table 6). Conversely, adolescents who experienced more maternal verbal aggression during a particular year were more likely to experience paternal verbal aggression the following year (β = .17, p = .017; Table 6).

4 | DISCUSSION

The transactional and reinforcing behavioral dynamics of adolescents' close relationships underscore the importance of taking a systems perspective when examining the effects of parental verbal aggression on adolescent development and future aggressive behavior. Using RI-CLPM, we identified both spillover and compensatory patterns of behavior that adolescents display when they have experienced high levels of paternal verbal aggression (e.g., threats, hostility, verbal insults). At the between-person level, more paternal verbal aggression was associated with more adolescent verbal aggression in relationships with mothers and close peers across the adolescent period. However, at the within-person level, when adolescents perceived

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their father to be more verbally aggressive in a given year than expected based on their father's usual pattern of aggression (i.e., based on the father's random intercept), these adolescents subsequently behaved with *less* verbal aggression in their maternal and peer relationships than would otherwise be expected. Similarly, adolescents experiencing greater-than-expected paternal verbal aggression in a given year also subsequently *evoked* less verbal aggression *from* mothers and peers. This pattern of results differed by gender in one case, with evidence of compensation present only in males with respect to adolescent verbal aggression to mothers.

The findings from the current study provide a unique and nuanced examination of the sequelae of aggressive father-adolescent relationships in adolescence. Relationships with fathers that are unsupportive or characterized by verbally aggressive interactions may be particularly harmful to adolescents as they attempt to organize and develop their viewpoints and sense of identity. There is evidence that adolescents turn to fathers to discuss issues such as professional preferences and adult development (Shulman & Seiffge-Krenke, 1997). Thus, fathers may serve as representative figures from whom adolescents model their broader views of the world, which aligns with socially constructed gendered scripts giving fathers greater societal power relative to mothers (Dufur et al., 2010; Yaffe, 2023). When fathers are verbally aggressive, adolescents may feel the need to rely on mothers or peers for support as they navigate the negative effects of these interactions (Mayseless et al., 1998) and may be motivated to maintain a sense of harmony and psychological safety in their maternal and peer relationships. Although in some ways this is adaptive, one concern is that fathers may observe these compensatory behaviors as evidence that their verbally aggressive tactics "work," in that intimidated adolescents react to their aggression by behaving less aggressively in other contexts, albeit only in the near-term. This is consistent with evidence from abusive parents that in the medium-term, their abusive behavior does appear to beget a compensating, obedient response (Breyer & MacPhee, 2015; O'Brian & Lau, 1995), even if in the longer term, the result is the opposite (Widom, 1989). Therefore, compensation may be one process through which aggression is reinforced.

The distinct medium- and long-term patterns of behavior observed in the current study only became visible because of the use of RI-CLPM. This method allowed us to investigate whether, on average, adolescents with verbally aggressive fathers are more verbally aggressive themselves in the long run, as well as to explore how adolescents respond on a shorter timescale to higher-than-expected levels of verbal aggression from their father. Our between-subjects findings are consistent with the spillover hypothesis and prior research on intergenerational transmission of individual differences in aggression (Allen et al., 2002; Chung et al., 2011; Cummings et al., 2015). Conversely, research has sought to identify ways in which peer relationships could compensate for problematic parent-adolescent relationships (Hazel et al., 2014; Levpušček, 2006; Rubin et al., 2004), but these studies have all utilized between-subjects analytic approaches. Thus, this study is the first to examine adolescents' compensatory behaviors as a medium-term response to higher-than-normal levels of verbal aggression from fathers.

Our findings also support the theory that compensatory behaviors are both active and evocative. We found that greater paternal verbal aggression was associated with less adolescent verbal aggression to mothers from sons, as well as less adolescent verbal aggression to peers, maternal verbal aggression to adolescents, and peer verbal aggression to adolescents in both males and females. Thus, not only may teens themselves directly behave in a compensatory way (i.e., behaving with less verbal aggression towards both mothers and peers), but they may act in a manner that elicits a compensatory response from their social partner (e.g., receiving less verbal aggression from their mother or peer), such as by asking for support, passively avoiding aggressive interactions, or withdrawing from relationships altogether. These behaviors in peer relationships are consistent with the natural individuation from parents that occurs during adolescence (Shulman & Seiffge-Krenke, 1997; Steinberg & Silverberg, 1986). However, our findings also suggest the importance of considering how mothers might respond to teens experiencing paternal verbal aggression. Though the correlations between maternal and paternal verbal aggression were strongly positive at the between-person level, when paternal verbal aggression was higher-than-expected, there was a within-family effect such that mothers were less verbally aggressive than expected. Thus, even highly verbally aggressive mothers may react to counterbalance or offset high levels of paternal verbal aggression, thereby displaying a lower level of verbal aggression than they would if fathers were less aggressive. These findings support the idea that even in a family where overall levels of verbal aggression are high, complex dynamics still exist in how aggression between family members changes over time.

One of the models tested in the current study provides evidence for possible gender differences in responses to paternal verbal aggression. Specifically, male adolescents who experienced more verbal aggression than usual from their father were less likely to behave aggressively towards their mother. In females, experiencing more paternal verbal aggression was unrelated to verbal aggression toward their mother. However, female adolescent verbal aggression toward mothers was associated with experiencing greater paternal verbal aggression the following year. Notably, while two of the other models tested did not significantly differ by gender and the third multi-group model was a poor fit to the data, the pattern of effects was in the same direction, with only males displaying a compensatory response to paternal verbal aggression. There are several possible explanations for these gender differences. First, sons are more likely to look up to fathers and may be more intimidated by paternal aggression (Shulman & Seiffge-Krenke, 1997). As a result, they may behave in a more submissive, compensatory manner in other close relationships. It is possible that verbal aggression in the father-daughter

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relationship is not as intense as in the father-son relationship, thereby not evoking compensatory behavior in daughters. Another possibility is that girls may be more likely to act out in response to paternal verbal aggression (Beckmann et al., 2021), which may explain the positive associations that we observed between adolescent verbal aggression toward mothers and paternal verbal aggression. While father-son relationships are often characterized by an expectation that the son establishes a distinctive identity, fathers are more likely to inhibit the autonomy of their daughters (Cotar-Konrad, 2016; Shulman & Seiffge-Krenke, 1997). Thus, if fathers witness daughters behaving with more verbal aggression toward mothers, fathers may be more likely to display verbal aggression toward daughters in response.

Though the main focus in the current study was understanding how teens respond to verbal aggression in their paternal relationships, two other interesting findings emerged. First, at the within-subjects level, adolescents who were more verbally aggressive toward their peer than expected were less likely to subsequently experience paternal verbal aggression. Although not hypothesized, this finding is in line with a compensation framework, albeit with the paternal relationship now compensating for problems with a close peer. One possible explanation for these findings is that adolescents who display high levels of verbal aggression toward their peers may not be able to tolerate much verbal aggression in the near-term in their relationship with their father, which is in line with the theory that adolescents find aggression across multiple close relationships to be emotionally overwhelming (Stocker, 1994). Another possibility is that adolescents may be more likely to discuss their own aggression in peer relationships with their father, and fathers may serve as a source of support during these conversations. We also observed that higher levels of maternal verbal aggression toward adolescents predicted greater paternal verbal aggression toward adolescents. This finding does not support a compensation process (nor *direct* spillover), but does align with a family systems perspective that intrafamilial conflict processes are reciprocal and inform one another (Gehring et al., 1990). Additionally, the strong, positive associations that we found between maternal and paternal aggression also support the idea that there may be spillover patterns between parents. It is possible that when levels of mother-adolescent conflict are higher than expected, fathers feel the need to take on the role of disciplinarian, thereby prompting higher levels of verbal aggression toward their adolescent (Shanahan et al., 2007). Future studies should continue to examine longitudinal, reciprocal relationships between verbal aggression among different members of the family system.

Compensation may provide a framework for considering how adolescents can use interpersonal processes to regulate intrapsychic reactions. Experiencing verbal aggression from fathers may disrupt adolescents' emotional equilibrium, prompting them to hyper-regulate their emotions in another relationship in an attempt to achieve a more balanced emotional state and avoid further dysregulation. Adolescents may also be more motivated to explore other relationship styles and emotion regulation strategies when one of their relationships is not "working." Close friendships have been shown to provide a context for adolescents to practice and receive feedback about their emotion regulation skills due to the egalitarian structure of these relationships (von Salisch & Zeman, 2018). Thus, compensatory behaviors may be a function of adolescents' adjustments to their emotion regulation strategies across different relationships.

These emotion regulation strategies may develop over the course of a given year that the adolescent is experiencing higher levels of paternal verbal aggression relative to baseline levels. While it is possible that instances of verbal aggression with fathers shape adolescents' behavior in other relationships during the same day or week, and it has been argued that shorter time lags between assessments are preferable when using RI-CLPM (Orth et al., 2021), the fact that we detected relatively strong within-person effects between paternal verbal aggression and adolescent verbal aggression with mothers and peers across a 1-year period suggests that there may indeed be lagged associations between behavior across these contexts. Additionally, other studies utilizing RI-CLPM to examine parent-adolescent conflict have also been successful in detecting associations with various outcomes (e.g., parental psychological control, interparental conflict) with 1-year intervals between assessments (Mastrotheodoros et al., 2019; Sun et al., 2021). Thus, it is possible that adolescent compensatory responses to a period of heightened verbal aggression with fathers may slowly develop over the course of a given year, perhaps in response to the cumulative emotional dysregulation that is likely to occur from aggressive interactions in close relationships.

There were several limitations to the current study that are important to note. First, the present findings are not sufficient to establish causal relations among constructs. It is possible that other unmeasured factors better explain the relationships between adolescent experiences of verbal aggression with fathers, mothers, and peers. Additionally, reports of verbal aggression between adolescents and their mothers and fathers were based solely on the teen's perception of their father's verbal aggression toward them, their mother's verbal aggression toward them, and their verbal aggression toward their mother. Thus, our findings may be limited by not having a measure of parents' perceptions of verbal aggression in their relationship with their adolescent. We also elected to focus on unidirectional effects of paternal verbal aggression towards adolescents, though it is probable that adolescent factors, such as temperamental characteristics, acting-out behavior, and teen's own aggression, can also provoke aggressive behavior from fathers. Further, it is possible that other sources of conflict within the family system, including interparental conflict, teen-sibling conflict, and parental separation/divorce may play a role in predicting paternal verbal aggression, as well as overall adolescent verbal aggression over time. The current analyses provide information about only two of adolescents' relationships within their family system. We were also limited in our ability to adequately test for gender differences in the close peer aggression multi-group model due to missing data for the close peer aggression variables that reduced model fit and required us to select the single-group model to maximize power.

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Finally, our measure of adolescent-peer verbal aggression was observed through a one-time, brief interaction task and, therefore, provides only a limited snapshot of behavior in a laboratory setting. On the other hand, this objective measure was not limited by some of the pitfalls of self-reports, including lack of insight into behavior and social desirability bias.

Nonetheless, the current study has important potential implications for both research and clinical settings. Our findings highlight the value of exploring adolescent behavior across parental and peer contexts at both between- and within-person levels of analysis to obtain a more nuanced view of transactional dynamics between these contexts that are otherwise obscured by cross-sectional designs or purely between-subjects analytic approaches. These transactional dynamics may prove useful for both clinicians and parents focused on changing behavior from a given state. For intervention purposes, the focus is not whether an adolescent in a verbally aggressive family is more verbally aggressive in other relationships overall (a probable outcome), but how adolescents react when they experience *changes* from the environment to which they have become adapted. Teaching adolescents that other close relationships can be important sources of support when experiencing verbal aggression from parents could be a useful tool for increasing the effectiveness of adolescents' emotion regulation strategies both in the medium- and long-term. Additionally, interventions for parents that include psychoeducation about the long-term repercussions of aggressive behavior on adolescent development and that teach parents other ways to engage with their teens may be particularly helpful for reducing the intergenerational spillover of aggression. Ultimately, the current study emphasizes the significant roles of fathers, mothers, and peers in shaping the strategies that adolescents use to navigate verbal aggression in their social relationships.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

This study was approved by the University of Virginia Institutional Review Board (IRB-SBS 2733).

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