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BRIEF ARTICLE



Beyond positive or negative: variability in daily parent-adolescent interaction quality is associated with adolescent emotion dysregulation

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ABSTRACT

Previous work on the contribution of family environments to adolescent emotion dysregulation has tended to focus on broad parenting characteristics (such as warmth); however, it is possible that day-to-day *variability* in parenting may also relate to emotion dysregulation. The current study sought to test whether inconsistency in the quality of daily parent-youth interactions related to multiple indices of emotion dysregulation in adolescents. Two-hundred-twenty-two adolescents (ages 13–16; 53% female) participated with one parent. Adolescents completed 14-days of diary reporting on the quality of interactions with their parent (negative/neutral/positive) and their emotion dysregulation experiences for each day. Analyses reveal that, beyond the effects of average interaction quality, adolescents with greater variability in the quality of their interactions with their parent reported greater average emotion dysregulation across the days of diary recording and demonstrated greater variability in their ratings of daily emotion dysregulation. Findings were not accounted for by parental warmth or hostility, parent-reported trait-level emotion regulation, or day-level associations between study variables. In these ways, greater variability – and not merely greater negativity – during interactions between parents and adolescents was related to adolescent emotion dysregulation, suggesting that consistency in parent-adolescent relationships may be an important dimension of psychosocial risk to consider within families.

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Developing the ability to manage distress and regulate affective experiences is a critical task of childhood and adolescence that allows youths to modify the intensity or duration of affective responses in order to accomplish their goals (Cole, Michel, & Teti, 1994). Failure to modulate ones' emotions adaptively – herein referred to as emotion dysregulation – can lead to more frequent or disproportionate negative emotions and to more dramatic fluctuations in both positive and negative emotions that interfere with important developmental tasks, such as academic performance and forming peer relationships (Contreras, Kerns, & Weimer, 2000; Graziano, Reavis, Keane, & Calkins, 2007). Not surprisingly, both this dysregulation of emotion, broadly characterised, and emotion

variability, specifically, are widely linked to psychopathology symptoms and diagnoses (Gruber, Kogan, Quidbach, & Mauss, 2013; Thompson, Boden, & Gotlib, 2015), making it critical to understand processes that may contribute to emotion dysregulation.

Throughout childhood and adolescence, parents contribute to youths' emotion regulation and dysregulation such that interactions with parents serve as an initial form of affective scaffolding when children are young (Contreras et al., 2000). By providing predictable and caring responses to infants' distress, parents aid children in their acquisition of emotion regulation strategies, which become more elaborated and child-generated as youths age (Cui, Morris, Criss, Houtberg, & Silk, 2014). Thus, despite developmental

shifts, parents remain influential for youths' emotional responding even through adolescence. Indeed, given the heightened risk for depression and other disorders that emerges during middle- to late-adolescence (Dekker et al., 2007), relationships with parents during this developmental period are significant for psychological adjustment and symptom onset (Cui et al., 2014).

Previous work on the contribution of families to youth emotion dysregulation has tended to focus on negative parenting behaviours, such as harshness or aversive interactions (Chang, Schwartz, Dodge, & McBride-Chang, 2003; Yap, Schwartz, Byrne, Simmons, & Allen, 2010). However, is it possible that *inconsistency* in parenting may also contribute to emotion dysregulation? Here, although inconsistency of parenting behaviours is viewed as independent of the valence of parenting behaviours, it may nonetheless have detrimental effects on adolescents through disruptions to predictability and stability. In line with attachment theory, in parent-youth interactions characterised by less predictable patterns of behaviours, children may be unsure of expectations for the relationship and for their own actions (Bowlby, 1982). This unpredictability, in turn, may undermine self-regulation and psychological functioning (Pham, Taylor, & Seeman, 2001). Indeed, other forms of family inconsistency have been linked to youth mental health. For example, less consistent discipline has been shown to predict psychopathology symptoms in sixth graders (Benson, Buehler, & Gerard, 2008) and fewer family routines have been linked to worse self-control, more internalising and externalising symptoms, and worse perceived emotion regulation (Brody & Flor, 1997; Manczak, Williams, & Chen, 2016). Recently, greater inconsistency in positive interactions with parents was found to relate to youths' depressive symptoms (Lippold, Davis, Lawson, & McHale, 2016).

Although family inconsistency has typically been assessed through global self-report questionnaires that require aggregating across time and experiences (e.g. Benson et al., 2008; see Lippold et al., 2016, for an exception), examining day-to-day variability in relationships between parents and children would capture and quantify inconsistency with greater temporal accuracy (Ram & Gerstorf, 2009). To that end, the current study sought to test whether inconsistency in the quality of daily parent-adolescent interactions over the course of 14 days was related to average emotion dysregulation and emotion dysregulation

variability in adolescent children, independent of their mean levels of relationship quality. It was predicted that greater variability in the daily quality of parent-adolescent interactions would relate to more overall difficulties reported in adolescents' daily diaries of emotion dysregulation and would also relate to greater variability in emotion dysregulation across days. Secondary analyses probed alternative explanations for study results, specifically, whether associations might be accounted for by broader characteristics of the family, trait-level emotion regulation, or day-level associations between emotion dysregulation and relationship quality.

Method

Participants

As part of a larger study of family relationships and physical health, 261 adolescents, ages 13–16, participated with one parent. Families were recruited through community flyers and local advertising. Eligibility included being free from any chronic illness and to be fluent in English. For the current study, 33 dyads were excluded due to missing data on key variables: 22 did not complete daily diaries, 8 did not complete sufficient days of diary reporting to calculate variability, and 3 did not report on demographic characteristics used as covariates. The final sample was therefore composed of 228 dyads who had full data on all primary variables (77% mothers, 53% daughters). The sample was predominantly of European descent (50.2%) and Asian descent (37.1%), reflecting the demographics of the city in which it was conducted. Average family income was in the \$50,000–74,999 Canadian dollar range and parents had on average 16.59 years of education ($SD = 2.64$). Seventy-one percent of parents were married. Comparing dyads with complete data to those who were excluded due to missing data did not reveal any significant differences on any study variables. Descriptive statistics for all variables of are provided in Table 1.

Procedure

During a baseline laboratory visit, parents and adolescents completed questionnaires assessing demographics. Parents reported on their children's perceived trait-level emotion dysregulation and adolescents reported on their parent's perceived warmth and hostility, along with completing other tasks (such

Table 1. Descriptive statistics and bivariate correlations of study variables.

	MEAN	SD	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Relationship Quality (mean)	1.47	.39	-.45**	-.14*	-.13*	.18	.56**	-.37**	.30**	.18**	.02	-.12	.03	.12	-.04
2. Relationship Variability	.42	.24		.24**	.27**	-.25**	-.25**	.23**	-.14*	.00	.15*	.08	.17*	-.09	-.02
3. Emotion Dysregulation (mean)	.30	.15			.48**	-.19**	-.11	.20**	-.04	.03	.21**	-.03	-.04	.05	-.10
4. Emotion Dysregulation Variability	.20	.08				-.16*	-.11	.11	-.10	-.08	.30	.13	.00	.07	-.03
5. Perceived Emotion Regulation	18.22	3.08					.21**	-.18**	.04	.03	.02	-.03	.04	-.03	.01
6. Parent Warmth	27.71	5.42						-.47**	.17**	.09	-.03	-.19**	.05	.09	-.05
7. Parent Hostility	21.32	4.79							-.06	.05	.09	.01	-.14*	-.03	-.08
8. Time Together (mean hours)	3.50	2.82								.53**	.14*	-.14*	-.02	.12	-.10
9. Time Variability	2.20	1.48									.14*	-.15*	-.02	.01	-.02
10. Child Gender		53% female										-.05	.02	.07	-.19**
11. Child Age	14.54	1.07											.04	-.08	.06
12. Minority Status		50% White												-.02	.14*
13. Parent Gender		77% female													.09
14. Income Category		Mean=\$55,000–74,000 range													

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

Note: Child gender and parent gender were coded where 0 = female and 1 = male; minority status was coded where 0 = majority race/ethnicity and 1 = minority race/ethnicity.

as a blood draw) that are not relevant to the present study. Following this laboratory visit, adolescents completed daily diaries of their emotional experiences and their relationship quality for 14 days (described below).

Measures

Daily relationship quality

For 14 days, just before bed, adolescents rated the quality of their daily interactions with their participating parent by responding to the item, "Overall, my day with my parent was ____" using a 3-point scale where 1 = negative, 2 = neutral, and 3 = positive, created by the fourth author. Diaries were completed online and timestamped to ensure compliance. On average, adolescents completed 10.88 diary reports (range = 2–14). To calculate variability, each person's standard deviation of ratings across days was extracted ("Relationship Variability"), paralleling *iSD* as a measure of net intraindividual variability outline by Ram and Gerstorff (2009). To control for overall relationship quality, the mean of ratings was also calculated ("Relationship Quality").

Daily emotion dysregulation

During the same 14-day period, adolescents also responded to four items adapted from the Emotion Regulation Checklist (Shields & Cicchetti, 1997) by the fourth author for the daily diary context. They responded yes/no to whether they "got frustrated," "got angry at others," "noticed I had mood swings across the day," and "recovered quickly from things that made me upset" (reverse-scored) that day. Inter-item reliability was low (Kuder-Richardson 20 index = .38), however, conceptually, these four items correspond to distinct types of affective experiences that contribute to emotion dysregulation and thus may best be viewed as constituting a formative, rather than reflective, scale (Diamantopoulos & Siguaw, 2006). The sum of endorsed difficulties with emotion regulation per day were averaged to assess overall emotion dysregulation, where higher scores indicated greater emotion dysregulation ("Mean Emotion Dysregulation"). Emotion dysregulation *variability* was also computed by calculating each participant's standard deviation of summed items across days ("Emotion Dysregulation Variability").

Parental warmth and hostility

To examine whether any observed associations were due to more global features of the parent-child

relationship, adolescent-reported parental warmth and hostility were assessed and included in secondary analyses. During the baseline lab visit, adolescents completed measures developed by Brody et al. (2001) in which they reported on how frequently their parents (1) acted supportively or lovingly toward them, such as by letting their children know they appreciated them (9 items, $\alpha = .89$, current sample) and (2) used hostile or harsh discipline, such as yelling or corporeal punishment (14 items, $\alpha = .84$, current sample).

Time Spent Together. During diary completion, adolescents also reported the approximate number of hours and minutes they spent with their parent that day. The average and variability of responses over the 2-week period were extracted ("Time Together" and "Time Variability," respectively).

Parent-reported trait-level emotion regulation

During a baseline lab visit, parents reported on their child's trait-level emotion regulation abilities, completing a six-item version of the Emotion Regulation Checklist (Shields & Cicchetti, 1997) rated on a 1–4 scale, where higher scores indicated better emotion regulation abilities ($\alpha = .75$, current sample). The inclusion of this measure in secondary analyses allows us to assess whether associations might be due to more dysregulated adolescents evoking more inconsistent interactions.

Covariates

Adolescents' age, gender, and ethnic/racial minority status, along with parent gender and family income were also assessed and retained as covariates.

Statistical analyses

Descriptive statistics and bivariate correlations were computed. Next, multiple regression analyses were conducted in which mean daily emotion dysregulation and daily emotion dysregulation variability were separately regressed onto relationship variability, along with the covariates of age, genders, ethnicity, and family income. To control for the possibility that relationship variability might be confounded with the mean level of reported quality, relationship quality was also included as a predictor variable. Similarly, daily mean emotion dysregulation was additionally included in the model predicting emotion dysregulation variability to account for the possibility

that average dysregulation might be correlated with variability.

Secondary analyses then probed several alternative explanations for results. First, regressions were re-run covarying parental warmth and low parental hostility to test the possibility that associations were due to better overall parenting. Next, the models of mean emotion dysregulation and emotion dysregulation variability covaried for parent-reported trait-level emotion regulation to assess whether associations were due to more dysregulated adolescents evoking more variable interactions. Lastly, to probe whether associations between emotion dysregulation and relationship variability might simply be due to day-level associations between emotions and relationship quality, a multilevel model using robust standard errors was conducted using Hierarchical Linear Modelling software (Version 6.08; Raudenbush, Bryk, & Congdon, 2004), in which daily ratings of emotion dysregulation were modelled by daily ratings of quality (person centred; level 1), with demographic variables, average relationship quality, and relationship variability (grand-centred; level 2) predicting the intercept and slope of level 1, allowing slope and intercept to vary.

Results

Preliminary analyses

As displayed in Table 1, reports of mean emotion dysregulation and emotion dysregulation variability

assessed through daily diaries were significantly correlated with each other and with perceived emotion regulation. Relationship quality and relationship variability assessed through diaries were likewise correlated with each other and with perceptions of parents as warm and as hostile. Taken together, this supports convergent validity for daily diary items. Across all adolescents' diaries, 6% of interactions were rated as negative, 51% were neutral, and 45% were positive.

Primary analyses

Results of the primary multiple regression analyses revealed that relationship variability was a significant predictor in each model, such that greater relationship variability across 14 days was associated with greater mean emotion dysregulation and greater emotion dysregulation variability (see Table 2). Being female was also associated with greater mean emotion dysregulation and emotion dysregulation variability and being older was also associated with greater emotion dysregulation variability. Notably, average relationship quality was not a significant independent predictor in any of the models once quality variability was included.

Secondary analyses

It is possible that associations between variability in parent-adolescent interactions and emotion dysregulation are due to both factors being associated with more globally positive or negative features of a

Table 2. Multiple regression models predicting emotion dysregulation variables from variability in the quality of parent-child interactions.

Predictor variable	<i>R</i>	<i>R</i> ²	<i>F</i>	Sig.	<i>B</i>	<i>SE</i>	<i>Standβ</i>	<i>t</i>	<i>p</i>	<i>sr</i> ²
Model mean emotion dysregulation	.34	.11	4.03	<.01						
Age					−0.01	.01	−.04	−0.64	.52	.00
Ethnicity					−0.02	.02	−.07	−1.14	.26	.01
Child gender					0.06	.02	.19	2.91	<.01	.03
Parent gender					0.02	.02	.06	0.87	.39	.00
Income					0.00	.01	−.04	−0.67	.50	.00
Relationship quality					−0.02	.03	−.06	−0.77	.44	.00
Quality variability					0.13	.05	.21	2.84	.01	.03
Model emotion dysregulation variability	.55	.31	12.17	<.01						
Age					0.01	.00	.14	2.44	.02	.02
Ethnicity					0.00	.01	−.02	−0.34	.74	.00
Child gender					0.03	.01	.19	3.13	<.01	.03
Parent gender					0.01	.01	.05	0.85	.40	.00
Income					0.00	.00	.03	0.47	.64	.00
Emotion dysregulation					0.22	.03	.41	6.82	<.01	.15
Relationship quality					0.00	.01	−.01	−0.15	.88	.00
Quality variability					0.05	.02	.14	2.03	.04	.01

Note: *sr*² = semi-partial *r*-squared. Mean emotion dysregulation = Mean of diary-reported emotion dysregulation across 14 days. Emotion dysregulation variability = Standard deviation of diary-reported emotion dysregulation across 14 days. Relationship quality = Mean of diary-reported relationship quality across 14 days. Quality variability = Standard deviation of diary-reported relationship quality across 14 days. Child gender and parent gender were coded where 0 = female and 1 = male; minority status was coded where 0 = majority race/ethnicity and 1 = minority race/ethnicity.

parent–child relationship. Relationship variability remained a significant predictor for both mean emotion dysregulation and emotion dysregulation variability when controlling for parental warmth and hostility. Second, it is also reasonable to question whether associations may be due to more dysregulated adolescents evoking more variable interactions. Relationship variability continued to significantly predict greater mean emotion dysregulation and made a marginally significant independent contribution to emotion dysregulation variability ($b = .03$, $SE = .02$, $p = .092$) when covarying parent-reported trait-level emotion regulation.

Lastly, results of the multilevel model revealed a significant coefficient for relationship variability predicting the intercept of level 1 ($b = .12$, $SE = .04$, $p = .003$), indicating that, regardless of daily interaction quality, being a child who experienced greater relationship variability across days was associated with higher daily ratings of emotion dysregulation. There was also a significant day-level effect of interaction quality predicting daily emotion dysregulation ($b = -.10$, $SE = .02$, $p < .001$) wherein worse interaction quality was associated with more emotion dysregulation on that day. There was also a main effect of child gender ($b = -.05$, $SE = .02$, $p = .005$), such that being female was associated with greater daily ratings of emotion dysregulation. (The cross-level interaction indexed by relationship variability predicting the slope of daily quality was not significant; $b = -.12$, $SE = .08$, $p = .117$.)

Discussion

Variability in the quality of daily parent–adolescents interactions – regardless of average relationship quality – was significantly associated with emotion dysregulation in adolescents. Specifically, adolescents who reported greater variability in the quality of their day-to-day interactions with their parent reported greater average emotion dysregulation across the 14 days of diary recording and demonstrated greater variability in their ratings of daily emotion dysregulation, suggesting that adolescents who have more variable interactions with their parent experience more average emotion dysregulation and greater emotion dysregulation variability. Importantly, the observed associations were not accounted for by average relationship quality across the 14 days, by trait levels of parental warmth or hostility, or by trait levels of emotion regulation. Associations also could not be explained by day-level associations between emotion

and quality. In addition, consistent with widely documented age and gender differences in psychopathology symptoms (Dekker et al., 2007), girls showed greater levels of average emotion dysregulation and emotion dysregulation variability and older adolescents had greater emotion dysregulation variability.

That associations with relationship variability emerged even when statistically controlling for the dyad's relationship quality across diary days suggests that other features of a relationship beyond general quality may be important for emotional functioning. Put differently, alternating between positive and negative interactions may add risk in addition to any due to being in a generally poor-quality relationship. For example, whereas a consistently negative relationship might facilitate adolescents identifying other dependable and affirming sources of support, an inconsistent relationship may add risk by trapping adolescents in a cycle of turning to an unreliable parent who often fails to provide the needed assistance. This interpretation is in line with explanations of disorganised attachment outlined in attachment theory (Bowlby, 1982).

Given that emotion dysregulation is a critical contributor to an array of mental health problems (Kovacs, Joormann, & Gotlib, 2008), adolescents who experience greater inconsistency in the quality of their interactions with their parent may be at greater risk for psychopathology if these patterns are sustained. Further, recent work has identified emotion variability as a key dimension that is elevated in individuals with depression and/or social anxiety disorder (Thompson et al., 2015), reinforcing the importance of considering dimensions of variability within the context of psychopathology. Situated with findings from Lippold et al. (2016) showing that greater variability in parent–adolescent positive interactions related to higher youth depressive symptoms, the current study supports an elaborated model in which inconsistency within parent–adolescent interactions fosters greater emotion dysregulation in adolescents, which may increase risk for mental health symptomatology.

Limitations and conclusions

There are several limitations to acknowledge. A primary limitation is the difficulty in separating emotional reactivity (the magnitude of an emotional response) from emotion regulation (how effectively an individual modifies that emotional reaction) in

the current study. Similarly, the adaptiveness of emotion regulation strategies is best evaluated with respect to goal congruence (Klipker, Wruz, Rauer, & Riediger, 2017), which was not assessed. For example, it is possible that variability in emotions may be adaptive in certain contexts (Klimstra et al., 2016). Future work employing validated measures of emotional responding, recovery, and goal congruence should be considered. Second, all assessments were conducted during a single time-period, making the directionality or causality of observed associations difficult to determine. It may be that adolescents with more emotion dysregulation evoke less consistent interactions with their parents. That adjusting for parents' perceptions of emotion regulation prior to the diary assessment period did not account for links between adolescents' reports of daily emotion dysregulation provides some support for our proposed sequencing of associations; however, further work should be done to probe this possibility. Third, to minimise participant burden, daily emotion dysregulation was assessed with four yes/no items and daily interaction quality was assessed with a single three-point rating. Further, the diary items have not been formally validated. Although our approach is consistent with prior diary research, it limited the magnitude of possible measurement variability and resulted in low inter-item reliability for daily emotion dysregulation. More nuanced assessment with established measure would improve understanding of the observed associations. Fourth, although our daily diary approach improves on single-time-point questionnaires, it still requires that adolescents aggregate experiences across the day and did not consider positive and negative interactions separately. Use of ecological momentary sampling would provide an even more accurate approach to assessing consistency (though with increased data collection burden). Fifth, daily emotion dysregulation and interaction quality were rated by the same participant, which may result in source bias where participants rate all constructs in a more negative or positive response style. Future work with multiple reporters and that includes both parents would more accurately capture these dynamics. Lastly, it is unclear how developmental changes related to adolescence may contribute to observed effects. That age was associated with greater emotion dysregulation variability suggests development may continue to play a role in certain aspects of emotional experiencing and, in turn, psychological risk, even within a small age-range.

This is consistent with work suggesting that adolescence is one of the most vulnerable times for the onset of psychopathology, such as depression (Dekker et al., 2007). Future work should compare sequelae of family inconsistency in younger childhood to that of inconsistency during adolescence and should explore whether relationship variability interacts with adolescent psychopathology symptoms.

Despite these limitations and unanswered questions, the current study has several implications for treatment and research. Although working to improve parent-child relationships should remain an important task of family therapy, the present findings imply that aiming to shift parent-child relationship quality too dramatically may be misguided if it invites greater inconsistency and unpredictability for families who are unable to maintain new behaviours. Rather, focusing on sustainable change might be more beneficial. With regards to research, the current work suggests that aggregating across experiences, as is typical for self-report measures of parent-child relationship quality, may overlook an important dimension of family life that is relevant to child emotional functioning. The use of daily diaries in the current study provides particularly strong evidence of the importance of preserving variability by capturing experiences in an ecologically valid manner (Ram & Gerstorff, 2009).

To our knowledge, the current work is the first to demonstrate that greater variability – and not merely greater negativity – during daily interactions between parents and adolescents related to greater adolescent emotion dysregulation and to greater emotion dysregulation variability across two weeks of real-world daily diary assessment. Together, this suggests that consistency in parent-adolescent relationships may be an important dimension of psychosocial risk to consider in linking family environments to adolescent emotional experiences and psychological functioning.

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