Online Supplemental Materials

Infants' Attachment Insecurity Predicts Attachment-Relevant Emotion Regulation Patterns in

Adulthood

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1. Coding Schedule Provided to Coders

[This first page lists the background information for the coding schedule and information relevant to the study. This material was not presented to the coders.]

Development of the Coding Schedule

A new coding schedule was developed to capture verbal and non-verbal indicators of the three emotion regulation categories. The schedule was initially developed by two of the authors (Overall & Girme) who are experienced in coding responses during couples' conflict interactions and developing observational coding schedules to assess behaviors and emotional expressions during couples' discussions. Indicators were drawn from the conflict and emotion regulation literatures including: (1) emotional and behavioral responses included across the most common coding schedules assessing communication during conflict (see Kerig & Baucom, 2004), (2) coding schedules targeting emotional expressions during social interactions (e.g., Specific Affect Coding System, Gottman & Krokoff, 1989), and (3) coding used in experimental research to examine responses of participants instructed to suppress emotional expression (e.g., Gross & Levenson, 1993, 1997) and recent research observing expressive suppression in conflict discussions (Thomson et al., 2018). We also drew upon important theoretical frameworks that distinguish between different types and categories of emotion regulation (e.g., Cassidy, 1994; Gross, 1998; Shaver & Mikulincer, 2007) that closely intersect with the three empirically generated categories by Naragon-Gainey et al. (2017). In particular, theoretical and empirical work founded in attachment theory identify deactivating strategies, hyperactivating strategies, and security-based strategies that share conceptual and behavioral overlap with disengagement, aversive cognitive perseveration and adaptive engagement (Shaver & Mikulincer, 2007). A range of observational research in the attachment literature has assessed a range of behaviors during

dyadic interactions, including couples' conflict discussions, that fall within these different patterns of regulation (e.g., Bouthillier, Julien, Dube, Belanger, & Hamelin, 2002; Campbell et al., 2005; Overall et al., 2013, 2014; Roisman et al., 2007; Simpson et al., 1992; Simpson et al., 1996).

Coding Training

After developing the attachment-relevant emotion regulation patterns coding schedule, examples of each of the types of regulation behaviors were identified in a subset of the existing sample of observed conflict discussions. Independent coders were trained by studying the coding schedule described below and using the video-recorded examples of regulation behaviors enacted during these contexts.

MINNESOTA LONGITUDINAL STUDY OF RISK AND ADAPTATION:
CODING FOR CONFLICT INTERACTIONS

This coding schedule is designed to assess three categories of behavioral and emotional styles that may be evident during couples' video-recorded discussions of a current relationship problem. Each category involves three different category indicators, which assess engagement in the discussion, approach to problem-solving, and experience and expression of emotion.

Coding will be conducted separately for each partner, and each strategy. Thus, the interactions will be viewed six times to provide independent ratings of Strategy A, B, C separately for the female partner and the male partner. In half the couples, female partners will be coded first, and in half the couples, males will be coded first.

Each indicator, and the category overall, will be rated on a 7-pt scales to globally capture the degree to which each individual exhibits the variety of responses falling within each category. Coders will watch the entire interaction and take into account the frequency, intensity and duration of behaviors associated with each category (low = 1-2, moderate = 3-5, high = 6-7).

Strategy A

This category involves a lack of engagement with the partner and the problem being discussed, and a passive and dismissing approach to problem-solving that involves superficial, non-intimate disclosures and suppressed emotional expressions. Low-to-moderate levels of strategy A may involve the person simply not being involved or engaged in the discussion, appearing as they care very little about the issues, avoiding conflict or 'hot' issues and emotions, discussing the issue in an impersonal manner that lacks depth and 'skims the surface', and muted emotional expressions that may appear incongruent with the situation or the person's actual feelings. Higher levels of strategy A are likely to also include actively deflecting the partner's attempts to engage, behaviorally and emotionally withdrawing from the partner, and obvious suppression and concealment of emotions.

Avoidance/Disengagement: *Lack of engagement* with the partner and a *passive* and *dismissing* approach to the problem, which may involve:
➤ avoiding discussing the problem (e.g., diverting attention, hesitating, changing topics, delaying the discussion)
➤ ignoring/refusing to acknowledge the problem, dismissing its importance, and deflecting the partner's concerns and attempts to discuss the issue
➤ conveying little concern about the problem or the partner's views and feelings
➤ disengaging from the partner (e.g., no, reduced or glazed eye contact, physical distancing, closing off, withdrawing warmth and affection)
➤ withdrawing from the discussion (e.g., silent, cold and/or distant)

Superficial problem-solving: Contributions to the discussion and any problem-solving is *superficial, lacks depth, and 'skims the surface'*, such as:
➤ superficial contributions that are impersonal and reveal little about the person's thoughts or feelings (versus meaningful, self-revealing, personal and intimate disclosures)
➤ rational discussion of the problem that is information-oriented and logical, but *lacks* deep

reflection and exploration of the issues, causes and solutions or recognition of the person's (or their partner's) thoughts and feelings about the issues

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Hypo **emotion expression**: Emotional elements of the communication or discussion are *muted* and person *attempts to suppress or conceal his/her emotions*, which may manifest as:

➢ verbal dialogue that does not match the emotion expressed (e.g., communicating anger or hurt with a flat, affect-free voice tone) or emotion expressed does not seem to fit with actual feelings (versus expressions that 'feel' genuine and congruent with actual feelings)
➢ slow and labored *speech* or periods of silence in which person appears to be trying to steady themselves, slow down the interaction, or prevent/recover from emotion
➢ slow and controlled *body movements (*e.g., holding breath, purposeful deep breaths, slow nod, slow shifts in chair, infrequent blinking) which indicate the person is not breathing, blinking, swallowing, talking and moving as they would normally (i.e., non-consciously, automatically)
➢ *physical indicators* that the person is trying to conceal emotion expressions (e.g., holding body back, clasping or sitting on hands, tight closed mouth, biting lips or tongue, covering the mouth, looking away or hiding face)
NB: be careful to distinguish concealment efforts associated with hypo emotion expression from visible attempts to control emotions that are spilling over or becoming overwhelming, which occur in conjunction with hyper emotional responses (see below)

Strategy B

This category involves engagement in the discussion and desires/attempts to connect with the partner, but in ways that (a) fixate on and amplify the symptoms, causes, and consequences of the problem rather than solutions to the problem, (b) emphasize the desires and needs of the self, including being heard and cared for by the partner, and (c) focus on, express, exaggerate and pull emotions. Low-to-moderate levels of strategy B may involve reflecting on the existence rather than solutions to the problem, a somewhat pessimistic outlook, focusing on own perspective, and expressing and discussing emotions, including some emotion-based attempts to elicit reassurance from the partner. Higher levels of strategy B are also likely to include high levels of perseveration and inflexible perspective-taking, negatively biased interpretations and expectations, frustrated attempts to 'make the partner understand', going round in circles or getting 'stuck' on the issue, a sense of helplessness and doom, and high levels of negative emotions or exaggerated emotional displays to pull guilt, attention or reassurance from the partner.

Ruminative problem engagement: Discussing the problem in a way that dwells on and amplifies the causes, symptoms and (negative) consequences of the problem and one's own (negative) thoughts and feelings rather than generating and enacting solutions to the problem. The person is stuck in the problem and maximizes the meaning and severity of the problem.

➢ remains fixated on the causes and (negative) consequences of the problem, including detailed reflections on what the problem is, why it is a problem and how severe the problem is (rather than generating solutions and considering how to enact solutions)
➢ perseverating on personal thoughts and feelings, including restating thoughts, feelings and concerns (e.g., expressing the same sentiments repeatedly in different ways), going over the

same issues or around in circles (and perhaps conveying that the partner 'just doesn't understand'), and not moving forward when partner changes focus or offers solutions

➤ pessimistic appraisals, such as offering more negative interpretations of the problem and the partner's response than is justified and expressing more pessimistic expectations regarding potential solutions and the future of the relationship

Self-focused orientation: Contributions to the discussion and any problem-solving are focused on the self or the self vis-à-vis the relationship, such as:

➤ discussions revolve around the person's own perspective and how the problem affects the self (rather than consequences for the partner)

➤ evident desire or need for the partner to understand, accept and agree with the person's own perspective (and little evidence the person is trying to understand or adopt the partner's)

➤ verbal/non-verbal attempts to connect with the partner that appear to have self-oriented motivations, such as gaining reassurance and feeling more secure

➤ may portray self as needing more help, being less capable, worthy or powerful, and experiencing more negative outcomes than the partner (e.g., 'I'm worse off') or trying harder, doing more, and placing more importance on the relationship than the partner

Hyper **emotion expression**: Person's *emotions are clear*, either directly expressed or visibly conveyed via facial expressions and body language, emotions *may appear exaggerated*, and person may seem to be trying to *pull emotions* from their partner.

➤ emotion-focused dialogue, including considering how the problem and the partner's behavior makes the person feel, questioning the partner about his/her feelings, seeking emotional responses or comfort from the partner, and discussion generally imbued with emotional tone

➤ non-verbal indicators of emotion are obvious and perhaps exaggerated, either purposively (see below) or because the person is overwhelmed by his/her emotions and is having difficultly controlling their emotions and emotional expressions

➤ person appears to be using emotional expressions (e.g., tears, sulking, making sad face, pouting) or appeals to the partner's own emotions (e.g., love, guilt, hurt) to influence the partner or obtain reassurance from him/her

➤ verbal emphasis on words that exaggerate feelings or negative consequences surrounding the issue (e.g., "do you even *care*?", "oh my god… please!", "I *really* think that…")

Strategy C

This category involves acknowledging the problem, active efforts to collaboratively make progress towards solving the problem, and open and self-assured disclosure of thoughts, opinions and emotions. Low-to-moderate levels of strategy C may include acknowledgement of the problem, collaborative efforts to solve or deal with the problem, and a general open and warm manner. Higher levels of strategy C are also likely to incorporate efforts to engage in reflection and reappraisal of the problem to accommodate both partners' views, greater focus on the unit working together to resolve the issue, and disclosing one's thoughts or feelings without being overwhelmed by 'negative' emotions or 'negative' emotions interrupting the flow of the discussion.

Collaborative engagement: Encouraging an equal platform for the *self and partner* by accepting *joint* responsibilities, *encouraging the partner's contribution* to the discussion and problem solving, and operating as a *'relationship team'* including:

➢ creating an open and positive environment by displaying positive affect and warmth during the interaction (e.g., maintaining eye contact, open body posture, signaling engagement via active listening and verbal encouragements)

➢ acknowledging one's own part in the problem and what s/he can do to change and recognizing the partner's role and potential actions without blame and acrimony

➢ accepting, validating and acknowledging the partner's position and attempting to understand the partners views (regardless of whether the self agrees with the partner)

➢ approaching solutions to the problem as a team (e.g., 'we', 'us', 'our') and conveying that the couples can withstand and solve the problem together (i.e., 'we are in it together and we can fix it together')

Approach-orientated problem-solving: *Constructive and direct* efforts to *move forward* and solve or cope with the problem including:

➢ active and constructive efforts to problem-solving, including assessing (but not dwelling on) causes and consequences, offering realistic and achievable solutions, accepting suggestions offered by the partner (i.e., *not* taking over and solving the problem without the partner's input), and striving to overcome challenges

➢ reframing and reappraising problem in ways that reduce any threat or 'negativity' the problem may pose and convey the problem can be dealt with/solved (e.g., benign interpretations of the problem, construing as a challenge rather than a vulnerability, seeing the positives in the situation, viewing as an opportunity to strengthen the relationship, recognizing improvements)

➢ communicating optimistic appraisals of both partner's ability to deal with the problem and enact solutions and expressing positive expectations about the future of the relationship

Balanced emotion: Open and self-assured *expression and acknowledgement* of emotions and feelings without being afraid of conflict or allowing the emotion to take over the interaction. The person is inherently comfortable with their own and their partner's emotions.

➢ open expression and acknowledgement of own emotions, without negative emotions overwhelming or disabling the person, dominating or interrupting the flow of the discussion, or interfering with the connection between the couple

➢ comfortable with each other's emotions, including not being threatened or phased by the partner's negative emotions

➢ responsive to any negative emotions partner expresses or seems to be feeling, but not overly responsive (i.e., recognizes partner's emotions, expresses care and provide comfort if needed, but keeps the discussion moving)

➢ seizing opportunities to understand each other's negative emotions and feelings, being willing to seek and receive emotional support or comfort, and encourage (but not coerce) the partner to do the same

2. Tests for Indirect Effects

Given that we found evidence that *infants'* and *adolescents'* attachment security predicted subsequent attachment-relevant emotion regulation patterns in adulthood, some readers may want to know whether the association between infant attachment security and adult regulation patterns occurs *via* friendship security at age 16. Examining the indirect pathway from infant security to friendship security in predicting adult regulation patterns may be of interest given that the attachment system develops through continued interactions with other developmentally-relevant attachment figures (Ainsworth, 1989; Bowlby, 1969; Thompson, 1999; Waters & Cummings, 2000), and that previous work has demonstrated that greater infant attachment security is associated with greater friendship security later in adolescence (Simpson et al., 2007; Sroufe, Egeland & Carlson, 1999).

First, we ran a multilevel model that regressed *friendship security at age 16* onto the infant attachment security dummy-coded variables, which indexed: (a) stable insecure infants who were insecure at both 12 and 18 months (0 = no, 1 = yes), and (b) unstable insecure infants who were insecure at only 12 or only 18 months (0 = no, 1 = yes). Our model failed to converge, thus we opted for a diagonal covariance structure to ensure that our model converged. Compared to stable secure infants, stable insecure infants reported lower friendship insecurity at age 16 ($B = -.64$, $SE = .29$, $t = -2.20$, $p = .029$, 95% CI = -1.21 to -.06, $r = .18$), but being an unstable insecure infant was not associated with friendship security at age 16 ($B = -.14$, $SE = .23$, $t = -.63$, $p = .53$, 95% CI = -.59 to .31, $r = .05$).

Next, we calculated the indirect effects and associated confidence intervals by using the procedure recommended by Tofighi and MacKinnon (2011) using the *RMediation* Package (also see MacKinnon, Fritz, Williams, & Lockwood, 2007). The confidence intervals for stable infant

insecurity → friendship security at age 16 → balanced regulation patterns (*indirect effect* = -.173, *95% CI* [-.398, -.013]) did not overlap zero. Similarly, the confidence intervals for stable infant insecurity → friendship security at age 16 → hypo-regulation patterns (*indirect effect* = .122, *95% CI* [.001, .309]) did not overlap zero. However, the confidence interval for unstable infant insecurity → friendship security at age 16 → hyper-regulation patterns did overlap zero (*indirect effect* = .022, *95% CI* [-.051, .112]).

Taken together, the tests for indirect effects indicate that infants who experience a stable, consistent pattern of insecurity at both 12 and 18 months display worse regulation strategies in their adult romantic relationships during conflict, attributable in part to their lower friendship security at age 16 – although the effect sizes of these effects are relatively small. The association between unstable infant insecurity and hyper-regulation in adulthood, was *not* explained by their lower friendship security at age 16.

3. Partner Buffering Analyses

Recent research has shown that partners can buffer individuals' insecure reactions (Simpson & Overall, 2014; Overall & Simpson, 2015). Thus, we explored whether romantic partners' regulation strategies during conflict discussions might buffer the link between infant attachment security and adult regulation strategies. To do so, we ran a series of multilevel models that regressed *individuals' regulation strategies* onto their infant attachment dummy-coded variables, which indexed: (a) infants who were insecure at both 12 and 18 months (0 = no, 1 = yes), (b) infants who were insecure at only 12 or only 18 months (0 = no, 1 = yes), along with (c) the main effects and (d) the interaction effects of their *partners'* regulation strategies. We found no evidence that partners' hypo-regulation, hyper-regulation, or balanced regulation strategies moderated the link between infant attachment security and individuals' hypo-regulation, hyper-regulation, or balanced regulation strategies in adulthood ($ts < $ -1.68, $ps > .95$), with one exception.

The interaction between infants who were insecure at 12 or 18 months and their partners' hypo-regulation strategy use predicted individuals' hyper-regulation strategy use in adulthood ($B = .36$, $SE = .15$, $t = 2.42$, $p = .017$, 95% CI = .07 to .66, $r = .20$). This interaction is shown in OSM Figure 1. There was no significant difference in individuals' hyper-regulation strategy use among participants who were secure or stable insecure as infants when their partners exhibited lower levels of the hypo-regulation strategy in adulthood (*slope* = .002, $SE = .27$, $t = .008$, $p = .99$, $r < .00$). However, individuals classified as insecure infants at 12 or 18 months exhibited greater hyper-regulation strategy use compared to those classified as secure infants when their partners exhibited higher levels of hypo-regulation (*slope* = .92, $SE = .28$, $t = 3.32$, $p = .001$, $r = $

.27). This suggests that infants who were insecure at 12 or 18 months are more likely to display the hyper-regulation strategy if their romantic partners' exhibit a hypo-regulation strategy.
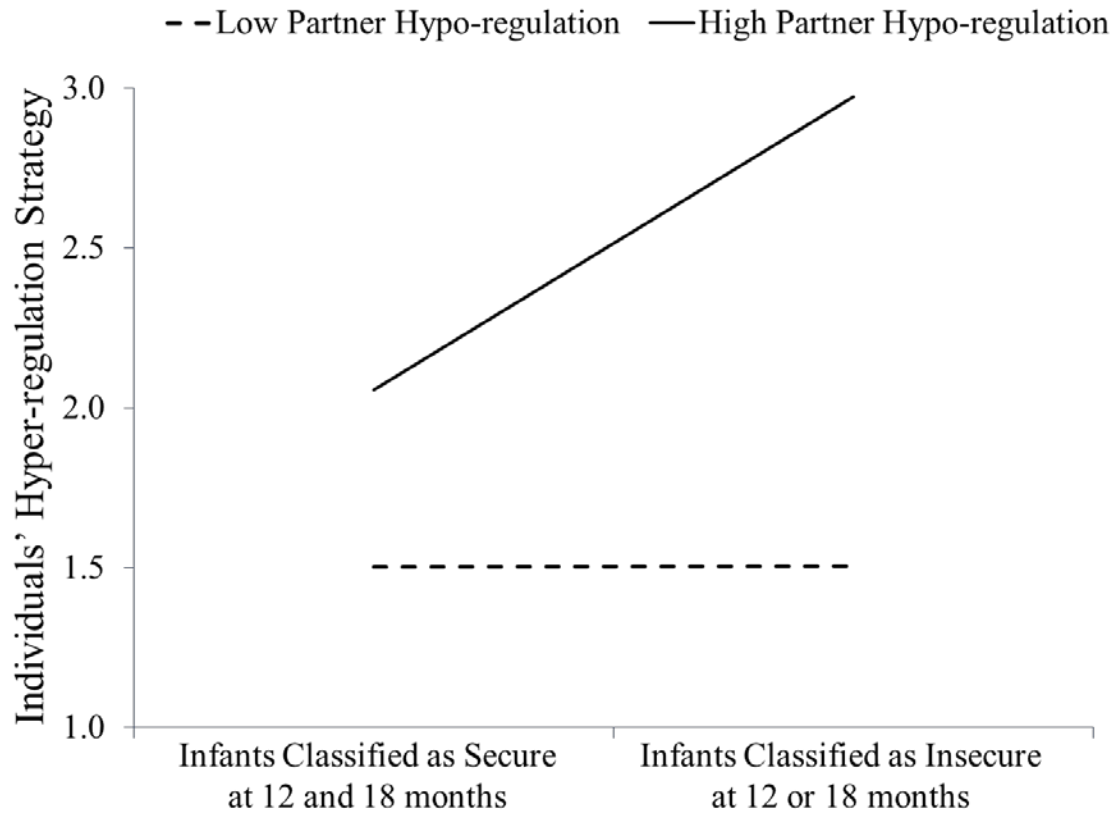
OSM Figure 1. The moderating effect of partners' hypo-regulation strategy on the association between individuals' infant attachment security and adult hyper-regulation strategy. Low and high partners' hypo-regulation strategy are indexed 1 SD below and above the mean.

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