

Perceptions of Responsiveness and Rejection from a Romantic Partner: Implications for Individuals and Relationship Functioning

Marianne RICHTER

Morges, Suisse

Thèse de doctorat – Doctoral thesis

Présentée à la Faculté des Lettres et des Sciences Humaines de l'Université de Fribourg
(Suisse)

Presented at the Faculty of Humanities of the University of Fribourg (Switzerland)

2022

Approuvée par la Faculté des Lettres et des Sciences Humaines sur proposition de
Prof. Dr. Dominik SCHOEBI (premier rapporteur)
Prof. Dr. Nadine MESSERLI-BÜRKY (deuxième rapporteuse) et
Prof. Dr. Joëlle DARWICHE (troisième rapporteuse).

Approved by the Faculty of Humanities on the proposal of
Prof. Dr. Dominik SCHOEBI (first examiner)
Prof. Dr. Nadine MESSERLI-BÜRKY (second examiner) and
Prof. Dr. Joëlle DARWICHE (third examiner).

Fribourg, le 3 octobre 2022 – Fribourg, 3rd of October 2022

Prof. Dr. Dominik SCHOEBI, Doyen – Dean

Abstract

From birth, human beings need to be embedded into social ties to function best, because other individuals can provide us with a sense of belonging, which is a fundamental human need. One of the closest bonds we build throughout our life is with our intimate partners. When the relationship involves intimacy, commitment, attachment, and when both partners accept and support each other's needs and goals, individuals may experience an increase in relationship satisfaction as well as physical and mental well-being. However, feeling rejected by a partner may impair the feeling of connectedness and belonging, affect emotional and behavioural responses. Specifically, rejection sensitivity, a heightened fear of rejection may trigger strong emotional responses and have deleterious consequences on individuals' well-being and on relationship functioning.

To build and maintain a close relationship, one must provide and be provided with support and acceptance, thus reinforcing intimacy. In this vein, perceptions of partner's responsiveness is a key process. When we perceive our partner to be responsive to our needs or desires, in turn we naturally strive to respond positively and adequately to our partner's needs and desires. This implies that individuals are interdependent, and changes in one partner prompt changes in the other. Evidence suggests that partners regulate themselves and co-regulate each other in their emotional, psychological, and physiological responses. However, such processes may threaten the relationship when partners face stressful situations or interactions, like the transition to parenthood or rejection. The goal of the present thesis is to provide extensive evidence for the role of perceptions of being accepted or rejected by a significant other on individual and relationship functioning, while considering the contextual settings.

Study 1 examined emotional changes following rejection in a sample of 98 couples and dyadic patterns of rejection sensitivity over the course of one week of ambulatory assessment. The results revealed that rejection triggered negative emotions, but neither rejection sensitive individuals nor dyadic patterns of rejection sensitivity showed emotional changes following rejection. Such findings highlight potential emotional strategies individuals build to protect themselves and what may be the consequences for their relationship.

Study 2 offers an insight on how experiencing daily rejection has implications on perceptions of the partner's responsiveness and whether rejection sensitivity may amplify or dampen these associations, using a sample of 75 young couples. Data from 14 days of an ambulatory assessment showed that rejection sensitivity and rejection experiences do play a significant role in perceptions of responsiveness. Moreover, rejection sensitive women were less sensitive to rejection, through their perceived responsiveness. The findings particularly emphasise the importance of interdependence between partners when facing potential hurtful interactions and the implications for them.

In study 3, we looked at transition to parenthood, a challenging and potentially stressful time for both partners, in which both may need increases in support from each other. We focused on cortisol associations between partners and examined whether stress levels and perceived partner responsiveness were associated with cortisol linkage. Our findings indicated evidence for cortisol linkage across the transition. While stress levels in men were associated with stronger cortisol linkage, perceived partner responsiveness was not associated with linkage between partners. Study 3 shed more light on the coregulation process occurring between partners and its correlates with stress and relational processes.

Taken together, the results of these three studies suggest that perceptions of being accepted or rejected by an intimate partner guide emotional, behavioural and physiological responses of both partners and have important implications for their functioning and their relationship.

Résumé

Dès la naissance, les êtres humains ont besoin d'être connectés avec d'autres personnes pour fonctionner au mieux. En effet, ce sont nos relations avec les autres qui nous assurent un sentiment d'appartenance, qui est un besoin fondamental. Une des relations les plus proches que nous construisons au cours de notre vie, et qui peut nous fournir ce sentiment d'appartenance est celle créée avec nos partenaires. Il est important que la relation implique de l'intimité, de l'engagement, de l'attachement, et que les deux partenaires s'acceptent et se soutiennent mutuellement dans leurs besoins et leurs buts. Ainsi, la satisfaction de la relation et le bien-être physique et mental des partenaires seront plus à même de s'améliorer. Cependant, se sentir rejeté-e peut affecter le sentiment d'appartenance et celui d'être connecté à son ou sa partenaire, et affecter les réponses émotionnelles et comportementales. Spécifiquement, la sensibilité au rejet, une peur élevée de rejet, peut potentiellement susciter une réponse émotionnelle forte. En retour, il peut y avoir des conséquences nuisibles pour le bien-être des partenaires et pour le bon fonctionnement de la relation de couple.

Pour construire et maintenir une relation amoureuse, chaque partenaire doit fournir soutien et acceptation et cela renforce donc le sentiment d'intimité dans la relation. Ainsi, les perceptions de réceptivité du ou de la partenaire sont un processus primordial dans les relations de couple. Quand on perçoit son ou sa partenaire comme étant attentif et réceptif à nos besoins ou nos désirs, nous aspirons naturellement à répondre de manière adéquate aux besoins de notre partenaire. Cela implique que les partenaires sont interdépendants, c'est-à-dire que les changements chez l'un-e, provoque des changements chez l'autre. La littérature suggère que les partenaires se régulent eux-mêmes et se co-régulent dans leurs réponses émotionnelles, comportementales et physiologiques. Cependant, ces processus peuvent mettre à mal la relation quand les partenaires sont confrontés à des situations ou des interactions stressantes, comme la transition à la parentalité ou lors de situations de rejet. Le

but principal de cette thèse est de fournir des évidences plus approfondies sur le rôle que joue les perceptions de rejet et de réceptivité d'un-e partenaire sur les deux partenaires, et sur le fonctionnement de la relation, tout en prenant en compte le contexte.

L'étude 1 investigate les changements émotionnels après des expériences de rejet dans un échantillon de 98 couples, ainsi que les formes dyadiques de sensibilité au rejet, avec des évaluations ambulatoires réparties sur une semaine. Les résultats ont montré que le rejet provoque des émotions négatives, mais ni les personnes sensibles au rejet, ni les formes dyadiques de sensibilité au rejet n'ont montré de changements émotionnels. Ces résultats mettent en exergue les potentielles stratégies émotionnelles que les individus mettent en place pour se protéger, ainsi que les conséquences possibles pour eux et pour leur relation de couple.

L'étude 2 offre un aperçu sur les implications du rejet perçu au quotidien sur les perceptions de la réceptivité du partenaire, et examine si la sensibilité au rejet peut amplifier ou atténuer ces associations. Avec un échantillon de 75 jeunes couples, les données sur 14 jours d'évaluations ambulatoires ont montré que la sensibilité au rejet et les expériences de rejet jouent un rôle significatif sur les perceptions de réceptivité. Les femmes plus sensibles au rejet ont perçu moins de rejet au quotidien, et cela s'est observé à travers leurs perceptions de la réceptivité de leur partenaire. Ces résultats mettent l'accent sur la nature interdépendante entre les partenaires lorsqu'ils font face à des interactions qui peuvent être blessantes, ainsi que les implications pour les deux partenaires.

Dans l'étude 3, nous avons exploré la transition à la parentalité, une période stressante pour les deux partenaires, et qui demande que chaque partenaire se soutienne plus. Nous nous sommes focalisés sur la synchronisation du cortisol entre les partenaires, et si les niveaux de stress et de perceptions de réceptivité du partenaire étaient associés avec cette

synchronisation. Nos résultats montrent qu'il y a une synchronisation des niveaux de cortisol pendant la transition à la parentalité. Alors que les niveaux de stress des hommes ont montré une association avec la synchronisation, les perceptions de réceptivité n'ont montré aucune associations entre les partenaires. L'étude 3 permet d'approfondir les connaissances sur le processus de co-régulation et synchronisation physiologique entre les partenaires ainsi que ses associations avec le stress et les processus relationnels.

Pour conclure, les résultats des trois études suggèrent que les perceptions de réceptivité et de rejet par un partenaire amoureux guident les réponses émotionnelles, comportementales et physiologiques dans les interactions des deux partenaires, et ont des conséquences importantes pour le bon fonctionnement de la relation de couple.

Acknowledgments

First, I would like to thank my supervisor, Prof. Dr. Dominik Schoebi, for his constant and kind support. I thank you for your never-ending patience when explaining (and often repeating explanations) statistics, for the discussions we have had and our collaboration, I have learnt a lot with you. I greatly appreciate working with you and I am deeply grateful for your trust on my work.

My thanks go to Prof. Dr. Nadine Messerli-Bürgy, for helping me to navigate in this world of cortisol research, for our collaboration on the project, and for being part of the jury for my dissertation. Thank you To Prof. Dr. Joëlle Darwiche, for our collaboration with the team in Lausanne, and for evaluating my dissertation.

Then, I would like to thank my colleagues and the amazing people that I have met through this PhD adventure and with whom I have shared a great deal of laughter, discussions, fears, and moments of joy. Thank you, Gina Kouri, Anaëlle Leuba, Tanya Tandon, Claudie Gaillard, Ian Law, Michael Ackert, Esther Liekemeier and Domicelle Jonauskaitė.

Particularly, thank you Michael for your kind support. Thank you for taking the time to revise my thesis, to help me out and to make sure that this adventure was as comfortable as possible for me. I thank you for your support, for taking the time to discuss with me, question me, reassure me, and importantly, thank you for your presence.

Among my colleagues, I need to thank three wonderful, wise and inspiring women that I have met in Fribourg and with whom my PhD would not have been the same. First, Tanya Tandon, thank you so much for your sparkles of joy and positivity that you shared with me, always. Thank you for our coffee breaks, for sharing meals together and inspiring recipes, for our very profound discussions, and for always supporting me when I doubted, encouraging me, “we will make it in the end!”.

Special thanks to Gina, my ray of sunshine since day one, for being the best colleague to work on the project, and for being this supportive, so caring, and strong woman that I know. Thank you for taking the time to read my thesis, revise it, commenting it, for our discussions. I am deeply grateful for our moments of sharing and laughter. You support me, listen to me, laugh with me, feed me with delicious Greek food, and for that I cannot thank

you enough. We share a special passion (but weird) for (not (or barely) understanding) statistics, for working at the post office, coding videos, and laughing. Without you, my PhD experience would not have been the same. You helped me grow professionally and personally, and I am deeply grateful for this. I would not share my kingdom with anyone else other than you.

My infinite thanks go to Anaëlle, first colleague, now a very close and precious friend. Thank you for being this amazing, strong, patient, supportive, understanding and kind person that you are. I would not have wished to be with anyone else to share this period of my life. You are, according to me, the best teammate to write a thesis with. Thank you for being open and honest with me, for our great discussions that always help me grow. I am deeply grateful for your eternal patience and your understanding with my moods and my doubts (also, my stupidity sometimes). Thanks to you, I found new passions for swimming, meditating, puzzles... I thank you for your constant support. I am forever grateful for this car ride with you to the opposite side of France, bringing us right in front of our favourite place, the ocean. This remains one of the best memories of my PhD I have with you. My thumb and my index finger are making a heart shape for you.

Then I would like to thank my close friends, without their support and presence, my life would not be the same today: Cécile Homberg (and Camille Maye), Noémie Loup, Anaëlle Leuba, Nadia Barmaverain, Alexandra Signorini, Lim DaHye and Lee Bokyeong. A special thanks to Cécile, for the never-ending patience, for being always so supportive and caring. Thank you for listening to my phd-related joys, complains, and adventures through the years. Thank you for always being so open, honest and trusting. Most importantly, I am eternally grateful and thankful for being able to laugh so much with you at everything and anything. This is very precious to me.

Finally, I would like to thank my family. My parents, Michèle and Jean-François Richter, for their support and trust in my abilities and that I would do well. Thank you to my siblings: Arnaud, Françoise, Eric, Philippe and Johana for making me laugh and for their presence in my life. A great thank to my three amazing favourite nephews, Noah, Nathan and Mathis, for being a bubble of fresh air when I needed it.

Merci – Vielen Dank – Thank you – Ευχαριστώ – Спасибо – धन्यवाद – 고마워

“We accept
the love
we think
we deserve.”

Stephen Chbosky
The perks of being a wallflower

Table of Contents

Abstract	iii
Résumé	vi
Acknowledgments	ix
Table of Contents	xii
List of Tables	xiv
List of Symbols and Abbreviations	xvi
1. Introduction	1
2. Seeking acceptance and avoiding rejection in romantic relationships	3
2.1. <i>The importance of acceptance and the threat of rejection</i>	4
2.2. <i>Heightened fear of rejection, the case of rejection sensitivity</i>	5
2.3. <i>Individuals' responses to rejection</i>	6
2.3.1. Emotional responses	6
2.3.2. Behavioural responses	7
2.4. <i>Long-term consequences of rejection sensitivity for romantic relationships</i>	7
2.4.1. The self-fulfilling prophecy	8
3. Finding a balance between the self and the relationship	11
3.1. <i>Relationship maintenance and the Intimacy process</i>	11
3.1.1. Intimacy and relationship well-being	13
3.2. <i>Choosing self-protection</i>	15
3.2.1. The risk regulation model	16
4. Stress responses and implications for the relationship	18
4.1. <i>Strain in close relationships</i>	19
4.1.1. Sources of stress	19
4.1.2. Implications of stress for relationships	20
4.2. <i>Activation of the physiological system</i>	21
4.3. <i>Psychological and physiological associations in coregulation</i>	22
4.3.1. Negative cycle of reciprocity	22
5. Brief overview of the methodology	26
5.1. <i>Diary studies</i>	26
5.2. <i>Dyadic data analysis</i>	26
6. Aim of the present thesis and presentation of the contributions	28

6.1. <i>Study 1</i>	28
6.2. <i>Study 2</i>	29
6.3. <i>Study 3</i>	29
7. Study 1: Rejection in romantic relationships: Does rejection sensitivity modulate emotional responses to negative interactions?	31
8. Study 2: Rejection Sensitivity in Intimate Relationships: Implications for Perceived Partner Responsiveness	56
9. Study 3: Cortisol linkage of couples across the transition to parenthood: Stress levels and perceived partner responsiveness as moderators	71
10. Discussion	95
10.1. <i>Study 1</i>	95
10.2. <i>Study 2</i>	97
10.3. <i>Study 3</i>	100
10.4. <i>General discussion</i>	102
10.5. <i>Limitations and implications for future research</i>	104
10.6. <i>Implications for clinical practice</i>	107
11. Conclusion	110
References	111
Appendix	128

List of Tables

Table 1.1.	Correlation matrix for between and within subjects
Table 1.2.	Momentary associations for H1: experiences of rejection, rejection sensitivity and negative emotions
Table 1.3.	Momentary associations for H2a, b: negative interactions, rejection sensitivity and emotional recovery
Table 1.4.	Momentary associations for H3a: Experiences of rejection, the own's and the partner's rejection sensitivity
Table 1.5.	Momentary associations for H3b: dyadic patterns of rejection sensitivity on negative affect
Table 2.1.	Descriptive statistics for all variables
Table 2.2.	Momentary associations between rejection experiences and perceived partner responsiveness
Table 3.1.	Mean and standard deviation of cortisol levels and perceived partner responsiveness for women and men, across three days of assessment, at pregnancy, 6 months post-partum and 18 months post-partum
Table 3.2.	Correlation matrix for cortisol levels and perceived partner responsiveness at pregnancy, 6 months and 18 months post-partum
Table 3.3.	Associations of cortisol linkage with time measurements, cortisol levels, and perceived partner responsiveness
Table A.1.	Associations between perceived partner responsiveness, rejection experiences and rejection sensitivity
Table B.1.	Associations of partners' cortisol diurnal slopes with time measurements, cortisol levels, and perceived partner responsiveness
Table B.2.	Associations of cortisol diurnal slopes and perceived partner responsiveness
Table B.3.	Associations of AUCg with time measurements, cortisol levels, and perceived partner responsiveness
Table B.4.	Associations of AUCg and perceived partner responsiveness
Table B.5.	Associations of partners' cortisol awakening responses with time measurements, cortisol levels, and perceived partner responsiveness
Table B.6.	Associations of cortisol awakening responses and perceived partner responsiveness

Table C.1. Associations of cortisol linkage between partners and control for confounders

List of Symbols and Abbreviations

APIM	Actor-partner interdependence model
A-RSQ	Adult Rejection Sensitivity Questionnaire
AUCg	Area under the curve to the ground
CAR	Cortisol awakening response
CBT	Cognitive-behavioural therapy
EMA	Ecological momentary assessment
HPA	Hypothalamic-pituitary-adrenal
RS	Rejection sensitivity
RSQ	Rejection Sensitivity Questionnaire
PPR	Perceived partner responsiveness
M	Mean
MBSR	Mindfulness-Based Stress Reduction program
BSI	Mindfulness-based interventions
MLM	Multilevel modelling
SD	Standard deviation
SE	Standard error
α	Cronbach's coefficient of internal consistency
b	Beta coefficient
Chi ²	Chi-squared test
p	Probability value
r	Pearson correlation coefficient
t	T-test of difference

1. Introduction

From birth, human beings are deeply rooted into social connections. Interactions with others are crucial for individuals. They shape and contribute to the regulation of emotional and behavioural responses (Leary, 2015; Sbarra & Hazan, 2008) and provide them with a sense of belonging and of acceptance, a fundamental human need (Baumeister & Leary, 1995). One of the closest bonds individuals build throughout their life is with a romantic partner. Interestingly, we show ourselves most vulnerable with our intimate partner, and at the same time, we must trust them enough not to hurt us (Murray et al., 2006). In this vein, perceptions that our partner rejects us alter the sense of belonging and often trigger negative emotional and behavioural responses (Leary, 2015). Especially, when one is rejection sensitive, that is, has an intense fear and concern over rejection, there is an elevated risk to harm relationship functioning (Downey & Feldman, 1996).

Positive relationship processes, such as perceived partner responsiveness, are a good indicator of satisfying relationships and contribute greatly to the good functioning of romantic relationships and to individuals' well-being (Reis & Gable, 2015). When we perceive our partner to be responsive, we strive to respond positively to our partner's needs and desires, which fosters intimacy between partners and strengthens feelings of acceptance (Reis & Gable, 2015; Reis & Shaver, 1988). However, if individuals experience rejection in their daily life, their responses may be affected and both perceptions of partner's responsiveness altered. Similarly, when partners experience stress, they also transmit it to each other. Perceived partner responsiveness, as a positive relational process, may buffer against stressful times or major life events (Randall & Bodenmann, 2017). Thus, couples at risk for relationship distress or experiencing stressful situations may be more likely to experience lower well-being and intimacy, and an increase of physical and mental health

outcomes (Cowan & Cowan, 1995; Randall & Bodenmann, 2017). These relationship dynamics highlight how partners' responses affect and guide each other (Butler, 2011).

The aim of the present thesis is to further understand the role perceptions of rejection and responsiveness from a romantic partner play on individuals' responses, and the implications for relationship functioning. Specifically, we examine responses to rejection in rejection sensitive individuals, through changes in emotions and in perceptions of the partner responsiveness. We then look at physiological responses in partners, and whether stress and perceived partner responsiveness may buffer these responses.

We will first define rejection, how it may threaten individuals' well-being and shape their emotional and behavioural responses. We define a specific disposition, which is rejection sensitivity, and its implications for romantic relationships. The second section elaborates on perceived partner responsiveness, a positive relational process that contributes to building and maintaining satisfying relationships. Then, we highlight the importance of interdependence in interactions and the risk individuals may take to be closer to their partner. The third section presents how stress influences romantic relationships through physiological coregulation between partners. We explain the role of stress and stressors that may emerge in relationships, how individuals react to them and the consequences for their health and well-being. We also provide explanations on the methodology used in the present thesis. Finally, we introduce the three studies contributing to this thesis. In the discussion section, we first present the contribution of the studies, discussing the implications of the findings at the individual and dyadic levels. We then present some implications for clinical practice, several limitations and propose some future directions.

2. Seeking acceptance and avoiding rejection in romantic relationships

Social interactions are essential for individuals' well-being and contribute to their comfort, happiness and security (Baumeister & Leary, 1995; Laurenceau et al., 2005; Murray, 2005). Specifically, Interacting with a significant other provides human beings with a sense of belonging, which involves feelings of acceptance and of connectedness (Baumeister & Leary, 1995). There are two criteria to satisfy the need for belongingness. First, individuals must have frequent, close, and positive interactions with a significant other. Second, these interactions must be perceived as bearing a reciprocal affective concern, care, stability, and a sense of continuity in the future. These two criteria are met in romantic relationships. When the relationship involves feeling of intimacy, attachment or commitment, individuals are more likely to feel accepted (Baumeister & Leary, 1995). Evidence suggests that perceiving a romantic partner's approval or support may cause profound changes in individuals' ability to sustain personal feelings and self-worth (Murray et al., 2001).

However, when one perceives or experiences rejection by an intimate partner, it may disrupt both own's and partner's emotional and behavioural responses and have consequences for relationship functioning. While the literature has already provided support for responses to rejection and to acceptance in romantic relationships (Downey & Feldman, 1996; Leary, 2010; Reis & Gable, 2015), underlying mechanisms linking individuals' responses to rejection and the implications for their partner and the relationship still need to be further explored. In the following section, we first define acceptance and rejection, including rejection sensitivity, a personal disposition which causes critical changes in relationship functioning. We then elaborate on the consequences of rejection and rejection sensitivity at the individual and dyadic levels.

2.1. The importance of acceptance and the threat of rejection

Acceptance is a subjective experience that arises through perceived relational value, which indicates how much importance an individual values his or her relationship with another individual. Acceptance, as opposed to rejection, falls along a continuum, which includes different shades of acceptance and rejection, ranging from maximal inclusion (i.e., others seek out the individual) to maximal exclusion, that is, others physically reject, ostracize or abandon the individual (Leary, 2001).

Feeling accepted by a romantic partner may manifest differently. For instance, when one shows either support, care, validation or responds adequately to his or her partner's needs, there is a high chance that need for acceptance and connectedness that all individuals thrive for are fulfilled (Leary, 2010). In the existing literature, perceived support or perceived responsiveness are often associated with acceptance. Individuals seek for their partner to find comfort, reassurance when faced with stressful life events, daily hassles (B. C. Feeney & Collins, 2015; Neff & Karney, 2005) or with positive life events (Zahavi et al., 2018). Additionally, support from the partner helps to regulate relationship functioning, and receiving higher levels of spousal support is associated with greater marital satisfaction (Neff & Karney, 2005), as well as more self-affirmation, sense of security, connectedness and commitment (Murray et al., 2001).

On the opposite side of the continuum, rejection naturally thwarts the fundamental need for belongingness of human beings (Baumeister et al., 2007) and impairs feelings of connectedness with close others. Rejection ranges from ignoring or avoiding someone, to explicitly excluding or banishing someone (Leary, 2010). Feelings of rejection usually arise when one perceives that his or her relational value to someone is exceedingly low or not as high as they would like it to be (Leary, 2001, 2010). Besides, despite being accepted and liked, some individuals may still perceive rejection from their interacting partner (Leary,

2010). Furthermore, rejection hurts more when it is from a person with whom one has a close and valuable relationship (Jones & Barnett, 2022).

2.2. Heightened fear of rejection, the case of rejection sensitivity

Fear of rejection can be more intense and pervasive for certain individuals. Rejection sensitive people anxiously expect, readily perceive and tend to overreact to rejection or any ambiguous cues that may appear as rejection (Downey & Feldman, 1996; Feldman & Downey, 1994). Drawing from both the attachment theory and the social-cognitive theory, rejection sensitivity is conceptualized as a cognitive-affective processing disposition, which develops through childhood. When children experience parental rejection in responses to their needs, it shapes their expectations, values and self-regulation schemes built to face new interactions. As a result, children learn to expect and may be concerned about rejection when they express their needs or vulnerabilities and learn to interpret ambiguous feedback as rejection (Feldman & Downey, 1994). Thus, to measure rejection sensitivity, the Adult Rejection Sensitivity Questionnaire (A-RSQ; Berenson et al., 2009; Feldman & Downey, 1994) was developed using expectancies of rejection, which are moderated by individuals' concerns regarding the outcome of the situation or the behaviour. The scale presents interpersonal situations applied for adults, including interactions with friends, relatives, significant others, or strangers. Each situation proposes an interaction in which one has to disclose or express a need or vulnerability, which likely activates expectations and anxious thoughts about rejection (Downey & Feldman, 1996). This questionnaire encompasses the extent to which individuals fear rejection with their expectations, and the extent to which these expectations may elicit concern or anxiety to them.

In the long run, rejection sensitive individuals may become hypervigilant and tend to avoid rejection as much as possible, develop self-protective reactions when faced with

rejection or maladaptive behaviours. Rejection-related learnt behaviours have consequences on their interpersonal interactions (Downey & Feldman, 1996).

2.3. Individuals' responses to rejection

The literature has widely investigated responses to rejection but not always in the context of romantic relationships. Rather, rejection in close relationships has been assessed in association with rejection sensitivity. In the following section, we describe emotional and behavioural responses to rejection. Then we elaborate more specifically on how rejection sensitivity shapes relationship functioning.

2.3.1. Emotional responses

Overall, evidence from reviews suggests that rejection has a negative emotional impact on people (Blackhart et al., 2009; Gallegos & Gasper, 2018; Gerber & Wheeler, 2009). When one feels devalued or rejected by someone, it is distressing, causing negative emotions such as hurt feelings, anger, sadness, shock or loneliness (Buckley et al., 2004; J. A. Feeney, 2005; Gallegos & Gasper, 2018; Leary et al., 2001, 2006; Leary, 2010), and there is evidence for decrease in positive emotions (e.g., happy, delighted, cheerful) following rejection (Gallegos & Gasper, 2018). Some authors also argue that rather than experiencing negative emotions, individuals feel numb following rejection (Baumeister et al., 2007; Blackhart et al., 2009). Interestingly, in the literature, it is not precisely clear yet for how long emotional responses to a rejection experience persist over time, and how fast or slow individuals emotionally recover from such experiences in daily life. Evidence suggests that following rejection, adolescents rather tend to dwell into negative emotions, through the use of rumination and avoidance as coping strategies (Zimmer-Gembeck, 2015). However, this study assessed peer-rejection and did not specifically measure daily rejection and related-emotions. If confronted with repeated rejection on a daily basis, it may become tougher for rejection

sensitive individuals to leave their negative emotional states and may further reinforce maladaptive and protective behaviours.

2.3.2. Behavioural responses

The need to belong encompasses mutuality, which is thought to cause individuals to feel more accepted, but also to respond positively to their partner (Baumeister & Leary, 1995). Given the loss of sense of belongingness that individuals may experience following rejection, they naturally seek to restore acceptance (Gerber & Wheeler, 2009). Therefore, when they sense indications of disapproval or disinterest from someone, they adapt their behaviours accordingly (Leary, 2001). As a result, once rejection-related emotions arise, individuals display different types of behaviours. Because rejection may act as a precursor to aggression, antisocial or hostile behaviours may be induced in response (Leary et al., 2006). Rejection also causes individuals to withdraw from social interactions, aiming at reducing the risk of being hurt further (Leary, 2010). Contrarily, prosocial behaviours have also been observed, such as conforming oneself to others' incorrect judgments, or contributing more to group task (Leary et al., 2006).

2.4. Long-term consequences of rejection sensitivity for romantic relationships

The combination of experiencing rejection from a romantic partner and being rejection sensitive may considerably jeopardize relationship functioning (Jones & Barnett, 2022). Often self-protective strategies are used to regulate emotional states arising from rejection. However, they are not all beneficial for relationships. Similarly to responses to rejection in low rejection sensitive individuals, existing evidence highlights associations between rejection sensitivity and hostile, avoidance and withdrawal behaviours (Ayduk et al., 1999, 2003; Berenson et al., 2009; Downey et al., 2007; Harper et al., 2006). Indeed, some studies investigating couples suggested that rejection sensitive individuals tend to emotionally distance themselves from their romantic partner by fear of intimacy and closeness, and are

less complementary in their behavioural responses when faced with others' affective cues (Meehan et al., 2018; Norona & Welsh, 2016). One may assume that individuals would rather be the rejecter than the rejected, to avoid the risk of being hurt. Rejection sensitivity has also been associated with self-silencing behaviours (Ayduk et al., 2003; Harper et al., 2006; Romero-Canyas et al., 2013) and suppressing one's opinions (Ayduk et al., 2003), which may indicate a desire to preserve and maintain the relationship (Purdie & Downey, 2000), and attempts to restore acceptance from the rejection source (Romero-Canyas et al., 2013). Especially for women, despite these attempts to secure their relationship, if they still experience rejection, they display heightened hostility because their efforts to gain acceptance by self-silencing themselves are not met (Romero-Canyas et al., 2013).

In daily interactions, evidence suggests that rejection sensitive men's jealousy and controlling manners, and rejection sensitive women's hostility and diminished emotional support cause both rejection sensitive individuals and their partners to report more dissatisfaction with their relationships (Downey & Feldman, 1996). Rejection sensitive women report more conflicts following perceived rejection in their intimate relationships (Ayduk et al., 1999). Additionally, rejection sensitivity seems to prevent partners from engaging in positive interactions (Schoebi et al., 2012), and has been associated with lower levels of positive and accepting behaviours (e.g., trying to make the partner happy) in daily life towards intimate partners following conflict (Ayduk et al., 2003). Distancing and avoiding interactions by fear of rejection may hinder individuals to engage in shared activities with their partner (Norona & Welsh, 2016), which in turn undermines relationship satisfaction or motivates thoughts of relationship dissolution.

2.4.1. The self-fulfilling prophecy

Given the emotional responses rejection sensitive individuals experience, they may focus solely on calming their own emotions, rather than identifying and responding

adequately to their partners' emotional experience or needs (Meehan et al., 2018). Therefore, they use maladaptive strategies such as avoidance, withdrawal, or hostile behaviours to avoid potential rejection, and often fail to activate warm and supportive behaviours towards their partner, especially when one is in distress. Thus, it elicits the actual rejection they feared so much in the first place (Downey et al., 1998; Meehan et al., 2018). Eventually, it may instigate a vicious circle in the relationship.

For instance, a study specifically examined the possibility of a self-fulfilling prophecy ignited by rejection sensitive individuals' behaviours. Using both daily diary method and an interaction task in a laboratory setting, they measured conflict situation and its possible effects on behaviours (Downey et al., 1998). First, the momentary assessment suggested that rejection sensitivity predicted relationship dissatisfaction and thoughts of breaking up for both men and women following naturally occurring conflict situations. In addition, rejection sensitive women felt more negative about their relationship, and their partners felt more dissatisfied on days preceded by a conflict. Second, the interaction task study highlighted that high rejection sensitive women behaved more negatively during conflict, which in turn caused their partners to feel significantly more angry about their relationships (Downey et al., 1998). In this vein, aggressive behaviours in response to rejection are also more likely to provoke rejection from the partner (Leary et al., 2006).

In brief, rejection threatens individuals' needs for belongingness and acceptance (Baumeister & Leary, 1995), which triggers emotional and behavioural responses (Blackhart et al., 2009; Leary, 2001). While individuals naturally seek to restore acceptance from their partner, responses to rejection may not always be the most efficient and adaptive. Specifically, rejection sensitivity bears an important potential to alter relationship functioning (Downey & Feldman, 1996; Galliher & Bentley, 2010; Meehan et al., 2018).

Experiences of stronger negative emotions and longer emotional recovery following rejection may bear consequences for individuals' functioning and how they balance between their personal well-being and their relationship.

3. Finding a balance between the self and the relationship

In romantic relationships, partners may encounter difficulties, related to various factors, such as personal traits, like rejection sensitivity, daily situations or stressful events that bear a risk to overshadow the relationship. There are many protective factors that help to maintain close relationships, or provide important resources to promote adaptation (Holt-Lunstad et al., 2010). Responsiveness is a noteworthy process to look at because it encompasses different constructs sharing behavioural similarities and properties, such as empathy, warmth, social support, capitalization or acceptance (Reis & Clark, 2013; Stanton et al., 2019). These attributes enhance relationships functioning through different psychosocial, behavioural and physiological pathways and strongly predict well-being (Thomas et al., 2017). Moreover, they occur in a large variety of contexts (Stanton et al., 2019), which allows for a better understanding of such protective processes in relationships. When faced with rejection, individuals must choose between self-protection or relationship maintenance and both choices have implications for the relationship. Choosing self-protection may lead to miss opportunities of closeness and intimacy or even trigger further rejection (Downey et al., 1998; Overall & Hammond, 2013), while responding with acceptance or supportive behaviours rather strengthens relationships and well-being.

In the following section, we describe the model of intimacy process, which is a positive relational process occurring between two individuals. We then elaborate on how choosing between relationship maintenance and self-protection determine individuals' behaviours and how they regulate themselves in their interactions with their romantic partners.

3.1. Relationship maintenance and the Intimacy process

The intimacy process is a transactional and communication process that encompasses two key components that help develop and enhance intimacy: self-disclosure and perceived

responsiveness. Indeed, the model implies that individuals first disclose information about themselves, and in turn, are responsive to each other and perceive responsiveness from the other. Such interacting episodes foster intimacy between partners. Importantly, the felt intimacy highly depends on repeated interactions over time between partners. Experiencing repeated intimate interactions with a partner causes individuals to interpret and comprehend these shared moments, and thus builds perceptions that their relationship is meaningful to them (Laurenceau et al., 1998).

Specifically, self-disclosure reflects verbal communication about personal relevant information, opinions, feelings, emotions of one partner to the other (Laurenceau et al., 1998). Responsiveness refers to the process through which intimate partners attend to and support each other's needs, goals and motives (Reis & Clark, 2013). Similarly, perceived partner responsiveness reflects the extent to which one's partner perceives the other as responding adequately to his or her needs, goals, and motives.

The model of intimacy process starts with an interaction between two partners. Partner B discloses to partner A an aspect of the self, such as personal desires, needs, feelings, or discusses a specific situation occurring (e.g., conflict, stress-related, future event, positive event). There are many situations in which individuals may wish to experience intimacy, such as need for affection, support, desire for guidance or sharing feelings. In response to disclosure, Partner A then displays behaviours expressing responsiveness, and partner B may perceive it as such (Reis & Shaver, 1988). Responsiveness involves understanding, validation and caring (Reis & Gable, 2015; Reis & Shaver, 1988). *Understanding* comprises the capacity of partner A to comprehend the partner's self (e.g., feelings, goals, needs, weaknesses, strengths). *Validation* refers to how partner A respects, values, and accepts his or her partner's self. *Caring* reflects genuine expressions of affection and concern for the

partner's well-being (Reis & Gable, 2015; Reis & Shaver, 1988). When partner B perceives that A is responsive, that is, understanding, validating, and caring, in turn B displays responsive behaviours, perceived as such by A. Thus, it is an interactive process as there are feedback loops, in which displays of responsiveness from one partner will influence the future responses of the other (Reis & Gable, 2015). Importantly, partners' responses to each other depend on their own needs, goals and motives and how they perceive their partners' needs and goals (Reis & Clark, 2013).

3.1.1. Intimacy and relationship well-being

When individuals perceive their partner as responsive, they feel more comfortable disclosing personal information or showing emotional vulnerability toward the significant other (Stanton et al., 2019). As a result, if both partners are responsive towards each other and if both perceive responsiveness from each other, a positive process is instigated, which will promote intimacy, trust and relationship satisfaction, as well as personal well-being (Reis & Clark, 2013; Reis & Gable, 2015). As such, responsiveness and perceived responsiveness are a core aspect in close relationships, that strongly contribute to individuals' health and well-being and ensure satisfying relationships (Reis & Gable, 2015; Slatcher & Schoebi, 2017). The literature demonstrates that perceived responsiveness predicts higher intimacy (Debrot et al., 2012; Laurenceau et al., 1998, 2005; Manne et al., 2004), better relationship quality (Canevello & Crocker, 2010; Luginbuehl & Schoebi, 2020; Reis et al., 2004; Reis & Shaver, 1988; Slatcher & Schoebi, 2017; Smallen et al., 2021), better health outcomes (Selcuk et al., 2017) and a sense of security, connectedness, closeness and belongingness for individuals (Selcuk et al., 2017; Slatcher & Selcuk, 2017).

Furthermore, perceived responsiveness also buffers the effects of stress in relationships. depending on the nature of stressful situations and on how much control they have on it, individuals may react differently (Dooley et al., 2018). In their study, authors

found that perceptions of the partner responsiveness were higher when the stressor was more salient to both partners, compared to when the stress of the situation was somehow less visible and apparent for partners. Additionally, having a responsive partner was associated with better subjective coping (Dooley et al., 2018). Interestingly, when individuals receive social support from their partner, they benefit more when the partner is also perceived as responsive in the support provided (Maisel & Gable, 2009). Such results may point to the necessity to distinguish between the nature of different stressors and stressful situations or events and what are thus the implications for partners.

Contrarily, in absence of responsiveness, partners may experience discontent or in the worst case, relationship may dissolve. Several aspects hinder perceived responsiveness: challenging situations, periods of uncertainty or daily events in which partners' perceptions of responsiveness may be impaired, such as conflicts, or events that bear the potential of hurting individuals (Dooley et al., 2018; J. A. Feeney, 2004; Reis et al., 2004; Smallen et al., 2021). Besides, responsiveness is rooted into personalities and relationship history of individuals (Reis & Gable, 2015). There are some personal vulnerabilities that impair perceived responsiveness, such as low self-esteem (Murray et al., 1998) or insecure attachment style (Reis et al., 2004). Particularly, rejection sensitivity biases individuals in their perceptions of partner's responsiveness and acceptance, especially if their partner's behaviours are perceived as negative or less caring and accepting (Downey et al., 1998; Downey & Feldman, 1996). In turn, because rejection sensitive individuals tend to display distant or hostile behaviours when rejected, their partners may also perceive less responsiveness in their interactions. While the literature highlight the dyadic nature of perceptions of rejection in couples, there are no clear evidence for the implications of rejection and rejection sensitivity on a positive relationship process such as perceived partner responsiveness and the consequences for both partners. Besides, responsiveness reflects

acceptance from the partner, which is directly opposed to rejection. If rejection or rejection sensitivity threatens perceptions of responsiveness, relationship may also be at higher risk to dysfunction.

3.2. Choosing self-protection

Being committed in a romantic relationship entails that the behaviours of one partner affect the outcomes of the other. Drawing from the interdependence theory (Kelley & Thibaut, 1978), individuals obtain outcomes from their relationship not solely based on their individual actions but rather it depends on the mutual influence existing between both partners (Reis, 2020). The interdependence structure may be considered as the foundation upon which social psychological processes are drawn (Rusbult et al., 2008), and aims at explaining how couples' interactions are established (Meuwly & Schoebi, 2017). Individuals must consider their preferences, but also their partners' preferences, and the situation in which the situation occurs. As a result, when both partners manage to resolve discrepancies between their own's and their partner's motives or needs, individuals' goals become shared (Reis, 2020). Moreover, when the needs of both partners are fulfilled, both may feel satisfied (Rusbult & Van Lange, 2008). Also, perceiving that a partner does respond to one's needs further enhances relationship satisfaction and intimacy.

For example, a study investigated predictions in the intimacy process. Participants were married couples, and they completed daily reports including questions on disclosure, self-disclosure, perceived partner responsiveness, intimacy and communication patterns (Laurenceau et al., 2005). Results showed that both disclosing and self-disclosing behaviours were significantly predictive of ratings of intimacy in everyday life, with the presence of higher levels of perceived partner responsiveness strengthening the association. Interestingly, authors also found that higher levels of demand-withdraw communication were associated with lower levels of intimacy reports for both spouses (Laurenceau et al.,

2005). Such results indicate high contingency between own's and partner's behaviours, and thus highlight how both partners are attuned to each other's responses. Moreover, and interestingly, at the individual level, perceptions of the partner's behaviour are filtered by personal motives and needs, which helps individuals navigating in their relationships while simultaneously balancing their personal interests with their relationship.

3.2.1. The risk regulation model

In this vein, building a relationship implies that individuals grow closer to their partners, which naturally increases interdependency between partners. The closer we grow, the more vulnerable we become to our partner. To build a satisfying close relationship, and thus to fill needs for belonging and connectedness, individuals must take this risk of dependence, which may have a cost. Therefore, one has to balance self-disclosure towards a significant other with the risk of being hurt or rejected (Murray, 2005; Murray et al., 2002, 2006). The risk regulation model proposes that individuals need to negotiate between self-protection and relationship maintenance, which implies to activate a cognitive, affective and behavioural regulatory system. Thus, individuals adjust their cognitions and their behaviours in situations bearing potential risks of rejection (Murray et al., 2006). Individuals first gauge whether the situation is considered as sufficiently safe and whether their partner is willing to respond adequately to their needs. Perceiving signs of acceptance from the partner provides them with a sense of being valuable, which motivates them to seek for more closeness. However, if one perceives rejection from the significant other, he or she will rather avoid situations in which the partner may be unresponsive. Individuals then respond accordingly to what they perceive, that is, either behaving to promote closeness and dependence, or minimizing the pain from rejection by avoiding situations or behaving more negatively (Murray et al., 2003). Specifically, individuals manage to either find assurance that the risk of rejection is minimal in their relationship, thus allowing for closeness, or

instead, decide on keeping distance or dissolving their relationship because they perceive low commitment from their partner (Murray et al., 2006).

Applied to rejection sensitivity, high rejection sensitive individuals encounter more difficulties in finding confidence that their partner will be responsive and supportive. Because rejection sensitive individuals tend to underestimate their partner's satisfaction with the relationship and their commitment (Downey & Feldman, 1996) or attribute them less supportive and validating behaviours (Reis et al., 2004), they may decide not to take the risk of closeness. Instead, they would rather use self-protection strategies over relationship maintenance to avoid possible rejection (Murray et al., 2001, 2002). As a result, self-protective behaviours may take the shape of distancing, avoiding or cold behaviours, as seen previously, and may bear a risk to undermine positive relational processes, such as perceived partner responsiveness, that helps strengthening relationship functioning.

Taken together, high intimacy contributes greatly to the development and the maintenance of close relationships (Laurenceau et al., 2005; Pagani et al., 2019; Reis & Shaver, 1988; Smallen et al., 2021) through disclosure of information and the abilities of individuals to respond adequately to their partner. However, if individuals experience difficulties in perceiving their partner's acceptance cues, they may choose self-protection when faced with potentially threatening situations (Murray, 2005). Thus, they miss opportunities to foster closeness and intimacy (Overall & Hammond, 2013). Both partners must adapt to each other and to occurring situations, always considering and balancing their personal goals and needs with their partner's.

4. Stress responses and implications for the relationship

Individuals strive to experience security, belongingness and acceptance and they obtain these only through social interactions with others. Thus, individuals need to maintain a certain internal emotional and psychological stability. To do so, they need to self-regulate themselves on the one hand. That is, when one perceives discrepancies between his or her goals and current state, discomfort and dissatisfaction may arise (Overall & Simpson, 2013). In response, individuals aim to reduce these discrepancies to restore balance and comfort, as it is described with the risk-regulation model, for example (Murray et al., 2006). On the other hand, romantic relationships involve not only the self's but also the partner's desires and feelings, which subsequently implies to consider the partner to maintain a certain homeostasis (Overall & Simpson, 2013). As a result, individuals involved in romantic relationships experience changes in their emotional and physiological states, in regard to their perceptions about their partner and external unfolding situations (Overall & Simpson, 2013; Saxbe & Repetti, 2010), which thus contributes to maintain emotional and physiological stability in close relationships (Butler & Randall, 2013). However, in time of stress, partners may have a hard time to regulate themselves and concurrently regulate and support their partner. Depending on the context and stressors, but also on individuals own's characteristics, experiences of stress and support are often shaped differently.

In this section, we first explain the role of stress, differentiate types of stressors and we elaborate on physiological responses to stress. Then we explain the literature related to physiological associations between partners and the possible implications for relationship functioning. Specifically, we highlight the physiological patterns that are reflected in couples' interactions.

4.1. Strain in close relationships

Intimate relationships play a critical role in our personal well-being, and both our mental and physical health (Proulx et al., 2007; Robles et al., 2014; Whisman & Baucom, 2012). Overall, evidence indicates that individuals with low functioning relationships show poorer health outcomes (Cacioppo & Hawkley, 2003; Kiecolt-Glaser et al., 2003). High relationship satisfaction is associated with higher happiness for both partners (Proulx et al., 2007), better health, and lower risk of mortality (Robles et al., 2014). Relationship dissatisfaction also correlates with high marital conflict or hostile behaviours between couples with greater cardiovascular reactivity (e.g., elevated blood pressure and heart rate), poorer immune system, poorer sleep quality (Robles et al., 2014), and with a wide range of psychiatric disorders and symptoms, such as depressive symptoms, mood, anxiety and substance disorders (Whisman, 2007; Whisman & Baucom, 2012).

4.1.1. Sources of stress

There are different reasons to explain why individuals experience relationship distress, and thus reduced general well-being. A typology of internal and external stress sources has been suggested by Randall & Bodenmann (2009). First, stress may arise inside the relationship, originating within the couple. Tensions or conflicts due to discrepancies between each partner's needs or attitudes may lead individuals to experience more stress. Furthermore, individuals bring their personal vulnerabilities from previous life experiences in their relationship, which may contribute to elevated stress (Karney & Bradbury, 1995). Second, stress outside the relationship also shapes relationship functioning. External events may encompass financial strain, chronic illness, natural disasters, transitions, or any misfortune and challenges couples may encounter (Karney & Neff, 2013). Taking a recent example, the Covid-19 pandemic brought many couples to stay together at home for a considerable larger amount of time compared to the usual, which may have exacerbated risk

factors for relationship distress, such as intimate partner violence (Moreira & Pinto da Costa, 2020), higher frequency of conflicts (Luetke et al., 2020) and higher levels of relationship dissatisfaction (Williamson, 2020). Furthermore, we differentiate between chronic stressors, which are stable and have long-lasting effects on individuals, with acute stress, which has temporary effects. For instance, a normative challenging time for couples is the transition to parenthood, which may considerably bring heightened stress (Cowan & Cowan, 1995) along with demands to adapt to the new role as parents. Individuals must balance between their personal needs and the needs of their relationship as well (Glade et al., 2005) and it may demand some time to adjust. Finally, minor stressors represent daily hassles, distressing, or irritating demands, such as forgetting a meeting or being late. Major stressors may be critical life events, such as unemployment, accidents, or death of a significant other (Randall & Bodenmann, 2009).

4.1.2. Implications of stress for relationships

Importantly, both partners considerably influence each other's stress experiences, irrespective of the nature of the stress (Randall & Bodenmann, 2009, 2017). If one fails to respond adequately when faced with stress, his or her partner may also have difficulties eliciting regulatory responses. Specifically, if couples undergo chronic, repeated or accumulated stress, it may compromise individual's capacity to regulate oneself, which is known as social allostatic load (Saxbe et al., 2020). In the long run, when faced with stressors, responses used to restore homeostasis may lose flexibility and efficiency and impair intimate relationship functioning. For instance, supporting the partner may put a strain on individuals. Accumulation of stress may hinder partners' abilities to cope with stressors, to provide adequate support to their partners, and they may be more sensitive to their partner's stress (Neff & Broady, 2011). Moreover, providing support in time of stress may undermine relationship satisfaction. On the one hand, the partner providing support may

feel strained by the felt stress and by supporting the partner. On the other hand, the receiver, being highly stressed, may not be able to fully perceive responsiveness from their partner (Smallen et al., 2021). A study investigated transition to parenthood and perceptions of the partner responsiveness, in associations with attachment style. Results showed that when both partners had higher levels of stress and reported being highly responsive, relationship satisfaction was diminished. These associations were emphasized when partners reported being more avoidant or reported more frequent negative interactions (Smallen et al., 2021). Such findings provide interesting insight regarding the implications of partners' support when experiencing stressful events, as well as the role of personal trait.

4.2. Activation of the physiological system

The literature on romantic relationships has sought to elucidate physiological mechanisms underlying emotional and behavioural responses in the dyadic context. Mainly because physiological measures are worth investigating as they are objective measures of relationships (Meyer & Sledge, 2020). The neuroendocrinological system has been widely explored, often within individuals, with hormones such as testosterone or oestradiol (Edelstein & Chin, 2019). Specifically, cortisol is a stress hormone, notably responsive to social inputs, such as social threat or social support (Edelstein & Chin, 2019), which permits to measure individuals and couples processes, as well as the associations between the two (Saxbe & Repetti, 2010). Thus, researchers have examined cortisol as an interdependent physiological measure and its possible implications for romantic relationships.

In response to both acute and chronic stress situations, individuals' physiological responses involve the activation of the hypothalamic-pituitary-adrenal (HPA) axis, a neuroendocrine system within humans' body. When faced with a stressor, the human system activates the hypothalamus of the brain, which secretes corticotropin-releasing hormone (CRH). In turn, the hormone stimulates the pituitary gland to produce adrenocorticotropic

hormone (ACTH). The ACTH then signals the release of cortisol from the adrenal glands. Once released, cortisol, the end product of the HPA-axis, serves as a feedback loop to inhibit the hypothalamus and the pituitary gland (Nicolson, 2008; Saxbe, Khoddam, et al., 2018). The role of cortisol is to influence the availability of glucose in the body, which is needed to activate fight or flight responses when faced with a stressful situation. Thus, stress responses are regulated at the individual level. Besides, individuals' responses are highly dependent on their partner's responses and stress responses are co-regulated in social interactions (Randall & Bodenmann, 2017).

4.3. Psychological and physiological associations in coregulation

The phenomena of reciprocally regulating one another on emotional and physiological states occurs consciously and unconsciously in everyday life (Butner et al., 2007). Evidence points to such observations. For instance, results from cohabiting couples indicate that partners mirror their daily positive and negative affect, and even more when they spent more time together (Butner et al., 2007). Additionally, women's emotional experiences when separated from their partners were transmitted after reunion (Schoebi, 2008). Drawing from the definition of Butler & Randall (2013), one may define this coregulation phenomenon as bidirectional linkage of emotional changes between two partners, which also implies linkage of physiological changes between individuals.

4.3.1. Negative cycle of reciprocity

Some researchers have investigated different patterns of interactions and possible associations with marital satisfaction. Drawing from patterns of communication defined by J.M. Gottman, they examined whether exchanges of negative affect would activate physiological systems and cause similar patterns of physiological associations between partners (Levenson & Gottman, 1983). To assess physiological responses, they used heart rate, pulse transmission, skin conductance level and general somatic activity. Results

indicated that partners in distressed relationships presented greater reciprocity in their negative affect when in a conflict interaction. Interestingly, the authors also found higher physiological linkage between partners, reflecting how partners may feel trapped in a feedback loop of negative affect, thus potentially impairing relationship satisfaction (Levenson & Gottman, 1983).

Additionally and interestingly, evidence also indicates that negative states between partners tend to be transmitted to one another more than positive states (Saxbe & Repetti, 2010). If partners are more stressed, they may easily transmit their physiological states to their partner, which may thus also point to negative reciprocity. For instance, a study examined physiological and emotional coregulation within couples. They assessed both mood and cortisol fluctuations over the course of three days, and particularly the possible linkage between partners' moods and cortisol levels. Results suggested that partners' negative moods were associated with each other over the three days. Cortisol levels of both men and women were positively associated. Interestingly, when partners reported higher relationship dissatisfaction, they had a stronger cortisol linkage. The linkage was also stronger when partners were reunited (either in the morning or in the evening), indicating that when together, partners were more likely to transmit to each other their emotional and physiological states (Saxbe & Repetti, 2010).

Such findings also provide relevant information for associations between physiological and psychological states, and specifically how perceptions of the relationship by one partner may be transmitted to the other through different pathways. Several studies attempted to further develop the underlying mechanisms of physiological linkage and associations with relationship functioning. To date, evidence repeatedly indicated existing associations of cortisol levels between partners in laboratory settings and in everyday life

(Braren et al., 2020; Edelstein et al., 2015; Khaled et al., 2021; Laws et al., 2015; S. Liu et al., 2013; Papp et al., 2013; Pauly, Michalowski, et al., 2020; Saxbe et al., 2015; Saxbe & Repetti, 2010; Schneiderman et al., 2014). Then, associations with several different relationships characteristics that may heighten or dampen relationship functioning were examined. Specifically, cortisol linkage was found to be positively associated with negative behaviours, such as demand-withdraw or hostility. Nevertheless, evidence also showed that time spent together, touch or empathy were associated with greater cortisol linkage (Timmons et al., 2015). Hence, to date, it is still not conclusive whether linkage between partners may signal adaptive or maladaptive processes.

However, physiological linkage may not uniquely point to either positive or negative outcomes but may also be dependent on contextual factors or potential stressors occurring in individuals' and couples. Much research measured physiological linkage in associations with rather negative or conflictual situations, or in daily life. There is a need to broaden empirical research on the topic, for instance by focusing on more specific and normative situations emerging in individuals' life. Some situations may naturally trigger stress and thus negative or maladaptive responses. They may also enhance positive processes, such as support and responsiveness, which have been proved to regulate stress responses and predict healthier stress regulation (Ditzen, Hoppmann, et al., 2008; Slatcher et al., 2015).

One specific life event that is gaining increasing attention from researchers on cortisol linkage and romantic relationships is the transition to parenthood. On the one hand, because future parents are more likely to experience increases of stress with the arrival of the child. Investigating physiological linkage may shed more light on its implications for relationships and the partners' well-being. Among the few studies that focused on linkage and relationship characteristics in pregnancy, one found that cortisol associations between partners were

stronger when mothers reported higher psychological stress and when fathers had higher cortisol secretion (Braren et al., 2020). These findings suggest that psychological and physiological stress are interdependent. On the other hand, another study indicated that stronger linkage was associated with less negative conflict behaviours (Khaled et al., 2021). Individuals' abilities to respond adequately and constructively to their partners in time of stressful events may contribute to maintaining stability in their relationship (Karney & Bradbury, 1995). Thus, looking at perceived partner responsiveness may also help to elucidate what physiological linkage reflects for couples in this specific context.

In brief, close relationships serve as a resource when faced with stressful events (Kiecolt-Glaser et al., 2003). Moreover, both partners' experiences of stress and abilities to regulate themselves are highly dependent on each other at the emotional and physiological levels. If partners are not able to regulate themselves, negative feedbacks may quickly be instigated (Levenson & Gottman, 1983), which often have negative consequences on individuals and relationship functioning. However, it is essential to carefully consider both the context and the type of stress couples experience, as it may differ from one to the other, when measuring physiological linkage.

5. Brief overview of the methodology

The contributions of the present studies examine real-time dynamics, that is, how interpersonal processes unfold between partners in their daily life. There is a large variety of methodologies to consider when assessing interpersonal and dyadic processes in romantic relationships (Laurenceau et al., 2005; Loughheed & Hollenstein, 2018) as well as statistical approaches (Cook & Kenny, 2005; Kenny et al., 2006). We present here the methodological approaches and analysis that are used in the present thesis.

5.1. Diary studies

To elicit dynamics between partners and be able to measure them over the course of a relatively long time, researchers may use diary methods, that is, ecological momentary assessment (EMA). This method helps to capture emotion dynamics (Randall & Schoebi, 2018) for instance, or any everyday experiences (Laurenceau & Bolger, 2005). Indeed, participants complete regular assessments about their psychological states, emotions, behaviours, or events occurring through the day. Responses are provided several times a day and over the course of several days (Laurenceau & Bolger, 2005). This methodological approach is interesting as it allows to observe how processes, – often assessed in laboratory settings, unfold in more naturalistic and spontaneous contexts (Bolger et al., 2003). Diary methods also help to gather information about contextual factors and to measure more in depth interpersonal phenomenon (Laurenceau & Bolger, 2005). These methods are widely used in the literature, for instance to measure the effects of rejection on individuals (Downey & Feldman, 1996), intimacy in couples (Laurenceau et al., 2005) or to assess coregulation of affect (Schoebi, 2008).

5.2. Dyadic data analysis

Investigating relationship processes and interpersonal interactions implies that we look at dyads, which compound two individuals. The fundamental concept of dyadic data analysis

is the non-independence of partners. In other words, one cannot consider two partners of a dyad as being fully independent from one another. Rather, they share something in common (Kenny et al., 2006). To measure interdependence within relationships, one may use the Actor-Partner Interdependence (APIM; Cook & Kenny, 2005), which allows to investigate how two partners are correlated in their behaviours and emotions. Interestingly, as the observations of both partners are linked, the knowledge of one partner's score also provides information about the other partner's score (Cook & Kenny, 2005). Thus, the model allows to predict an individual's outcome by his or her own predictor (*actor effect*) as well as by his or her partner's predictor (*partner effect*).

Additionally, another method particularly fitted for dyadic data is multilevel modelling. This method is used for the analysis of clustered data. The dyadic data encompasses multiple levels, that is, there is a hierarchy of units, with one unit nested within another one. For instance, using repeated measures (e.g., diary studies) may involve that measurement at each time point are nested within individuals (Kenny et al., 2006; Ledermann & Kenny, 2017). Thus, one can measure the between-group variation, that is, how individuals' scores vary from one person to another one. The within-group variation allows to see how scores within individuals vary from one time of measurement to the other. Multilevel modelling also allows to measure actor and partner effects.

The three contributions of this thesis use diary studies to assess for emotional changes and rejection (study 1), perceptions of rejection and responsiveness from the partner (study 2) and perceived partner responsiveness combined with repeated saliva sampling across three days, multiple times per day (study 3).

6. Aim of the present thesis and presentation of the contributions

Perceptions of responsiveness and rejection shape individuals' responses to their partner, which strongly affect relationship functioning. The three contributions of this thesis aim at understanding to what extent these perceptions change individuals in their emotional, behavioural, and physiological responses, considering contextual settings and individual dispositions. The first two contributions of this thesis focus on rejection sensitivity and rejection experiences in daily life, considering the implications for emotional changes and perceptions of responsiveness. The third contribution examines physiological linkage between partners and aims at investigating patterns of linkage across transition to parenthood, and to what extent perceived responsiveness and stress are associated with physiological linkage.

6.1. Study 1

The first study aims at understanding emotional changes in rejection sensitive individuals, following daily rejecting interactions. In line with existing associations between negative affect and rejection experiences, we examine whether rejection sensitivity is associated with slower recovery of negative emotions after rejection experiences. Moreover, we explore differences in the associations between dyadic patterns of rejection sensitivity and emotional recovery following rejection. If both partners are rejection sensitive and perceive rejection, they may experience stronger negative emotions and recover from these slower, compared to when one or none of the partners are sensitive to rejection. This study uses data from 98 couples ($N = 196$) expecting their first child. Participants completed a smartphone-based momentary assessment four times a day over one week, to report on their daily rejection experiences and felt emotions.

6.2. Study 2

The second study investigates associations between rejection, rejection sensitivity and perceived partner responsiveness in everyday life. If rejection sensitive individuals feel rejected, they may have more difficulty perceiving responsiveness from their partner. Additionally, we explore whether rejection sensitive individuals perceived more daily rejection and the implications for perceived partner responsiveness in both partners. Perceptions of partner's responsiveness may be impaired because rejection sensitive individuals choose to protect themselves and may distance themselves from their partner. In turn, their partner may perceive them as less responsive, which could mitigate intimacy in the long run. 75 couples (N = 150 individuals) completed a smartphone-based ambulatory assessment over two consecutive weeks, with four assessments every day. Couples reported on their daily perceptions of partner responsiveness, and whether they felt rejected by their partner.

6.3. Study 3

The third study examines momentary associations of cortisol between partners across transition to parenthood. Strong cortisol linkage suggests distress in couples, and challenging times, such as transition to parenthood, may bring individuals to experience concurrently heightened stress and need of partner's support. In this study, we investigate possible existing associations of cortisol between partners and whether these daily cortisol linkage increase across transition to parenthood. We examine whether stress levels of one or both partners and perceived partner responsiveness moderate the associations of cortisol during this particular time. For this study, 69 couples (N = 138 individuals) were assessed at pregnancy, and at respectively 6 months and 18 months after the birth of their child. Partners completed a three-day salivary collection, four times a day and concurrently, they answered

a smartphone-based ambulatory assessment to evaluate their perceptions of their partner responsiveness.

7. Study 1: Rejection in romantic relationships: Does rejection sensitivity modulate emotional responses to negative interactions?

Abstract

Rejection is a very stressful experience and individuals tend to avoid it as much as they can. In intimate relationships, experiences of rejection can shape interaction dynamics between partners. Highly rejection sensitive people anxiously expect that their partner will reject them and overreact to any ambiguous cues that could be rejection. Because highly rejection sensitive people focus on the threat or risk of rejection, they may have a hard time disengaging from rejection-related emotions and cognitions, and therefore, persevere in a rejection-focused state. Moreover, their maladaptive response to rejection may also interfere in their capacity to regulate their emotions. The prolonged experience of strong negative emotions, along with maladaptive attempts to respond to rejection, may undermine key relationship maintenance processes that contribute to relationship functioning, and lead negative reciprocity in intimate interactions. The goal of the present study was to shed light on how individuals experience rejection-related emotions, and whether rejection sensitivity is associated with stronger negative responses to rejection and less efficient downregulation of negative emotions after experiencing rejection. In addition, we aimed at examining dyadic patterns of rejection sensitivity, as associated with negative emotion dynamics following rejection experiences. Results showed that rejection sensitivity is not associated with changes in negative affect. Moreover, dyadic patterns of rejection sensitivity does not explain variance in persistence of negative emotions in rejection situations. Our results are discussed in the light of how individuals may display avoidant strategies, which may further lead to dysfunctional dynamics in intimate relationships.

Rejection in romantic relationships: Does rejection sensitivity modulate emotional responses to negative interactions?

Intimate relationships affect us emotionally, for better and for worse (Schoebi & Randall, 2015). One of the most painful interpersonal experiences is social rejection. Feeling rejected by an intimate partner may be particularly hurtful because people allow themselves to be vulnerable, to build intimacy and trust. It would thus not come as a surprise if relational situations that bear the potential for rejection triggered anxiety and negative emotions. However, people likely differ in the extent to which they suffer emotionally and recover from the pain of rejection. Rejection sensitive individuals are thought to be more sensitive to and more vigilant for rejection than others (Downey & Feldman, 1996). On the one hand, this might contribute to their anxiety in interpersonal situations, make them perceive rejection more readily and show stronger and more lasting emotional responses to negative or ambiguous interactions. On the other hand, as a self-protective strategy, these individuals may allow themselves less to get emotionally involved with their partners, thus preventing vulnerability to acute rejection experiences. Identification of such tendencies is important, as they may undermine closeness and intimacy lastingly. The current research examines associations between rejection sensitivity and emotional responses to and regulation after potentially hurtful interpersonal situations.

Experiences of rejection in romantic relationships

Feeling rejected by a romantic partner is likely a deeply hurtful experience for most people. Rejection experiences are subjective and involve interpretations of social cues, and they may therefore arise in diverse interpersonal situations, such as perceiving a lack of support when expected, or experiencing unresponsive behaviours and disinterest from the partner (Leary et al., 2001). Thus, not only conflicts and tense interpersonal situations, but

also other situations where loyalty, support, approval, or validation are expected from a partner, bear a potential for feeling rejection. Because experiencing unconditional acceptance from a close partner is a basis for feeling validated, supported and understood (Laurenceau et al., 1998), cues of rejection are experienced as threatening intimacy, and are therefore highly stressful. People therefore seek to avoid or prevent such experiences if possible (Baumeister et al., 2007; Romero-canyas et al., 2011), and are likely to show strong affective reactions if they occur (Gallegos & Gasper, 2018; MacDonald & Leary, 2005).

Rejection sensitivity and emotional responses to perceived rejection

Because rejection threatens peoples' sense of acceptance and is highly stressful, it triggers negative emotions and motivates regulatory behaviours to cope with the threat and to restore acceptance (Baumeister & Leary, 1995; Buckley et al., 2004; MacDonald & Leary, 2005). A growing literature has documented emotional and behavioral responses to rejection. For example, experimental manipulations of increasing rejection caused individuals to experience more intense sadness and hurt feelings, and these feelings were stronger than those of participants who felt constant rejection (Buckley et al., 2004).

These negative emotional responses tend to go along with negative behavioral responses during interactions, which may prolong negative interactions and interfere with the downregulation of negativity. Situations where jealousy emerges, for example, are perceived as rejecting and hurtful, trigger anger and fear, and can prompt aggressive behaviours (J. A. Feeney, 2005; Leary et al., 2006; Rajchert et al., 2019). Presumably, rejection sensitive individuals should be particularly likely to face such distressed interpersonal situations.

Rejection sensitive individuals tend to anxiously expect rejection from their partner and readily perceive ambiguous cues as rejection (Downey & Feldman, 1996) and rejection

sensitivity has been found to be correlated with measures of emotional or behavioral dysregulation, such as anxiety as well as insecure attachment (Downey & Feldman, 1996; Gao et al., 2017; Pearson et al., 2011). Rejection sensitive individuals also often react strongly to ambiguous situations and respond with maladaptive behaviours (Berenson et al., 2009; Downey & Feldman, 1996; Norona & Welsh, 2016). They may have learnt that seeking support or acceptance from a significant other may lead to rejection, and such anxious expectations of rejection fosters hypervigilance to rejection-related cues. As a result, rejection sensitive individuals tend to show defensive and self-protective behaviours in critical relational situations, rather than responsive and supportive behaviours (Downey & Feldman, 1996), which is likely to trigger negative reciprocal responses from a partner, and increase or prolong interpersonal stress (Murray et al., 2003).

A disposition to focus on negative cues and respond readily to these with negative emotions and defensive or hostile behaviours is likely to contribute to difficulties in emotion regulation and adjustment in intimate relationships (Randall & Schoebi, 2018; Schoebi & Randall, 2015) and may contribute to persistence in negative emotional states. In a study over three weeks, rejection sensitive students in committed relationships showed more emotional distance from their partner, and in turn, were more dissatisfied in their close relationships (Downey & Feldman, 1996; Norona & Welsh, 2016). Rejection sensitivity was also associated with increased reciprocation of the partner's behaviours and attitudes. While rejection sensitive individuals were warm in response to their partner's positive affect, they displayed distant and cold behaviours when facing their partner's negative affect. Importantly, when a significant other was distressed, rejection sensitive individuals failed to respond to their partner with warmth (Meehan et al., 2018).

Taken together, negative emotional and behavioral responses to perceived rejection are thus likely to prolong interpersonal distress and to trigger further cues of rejection from

the partner (Downey et al., 1998; Meehan et al., 2018). These responses are likely to interfere with the downregulation of negative emotions and with interpersonal adjustment. Therefore, rejection sensitive individuals may linger longer in a negative emotional state after potentially rejecting situations.

Rejection sensitivity, perceived rejection, and emotion regulation

It is possible that rejection sensitive individuals use a variety of strategies to regulate negative emotional states arising with rejection. For example, they may avoid situations of intimacy and closeness specifically because it involves a risk for feeling rejected, and the negative affective experiences associated with rejection. Keeping emotional distance from the partner and disconnecting from rejection-related emotions may thus appear as a viable strategy to reduce the experience of rejection (Berenson et al., 2009; Norona & Welsh, 2016), a strategy that is often used by individuals with an avoidant attachment style (J. A. Feeney, 2005). Rejection sensitive individuals, like those with an avoidant attachment style or individuals low in self-esteem, may prefer to maintain a sense of safety by reducing closeness with significant others (Murray et al., 2003, 2006).

Rejection sensitive individuals are also likely to suppress their emotions in threatening intimate interactions, thus engaging in self-silencing behaviours (Ayduk et al., 1999; Harper et al., 2006). Suppressing anger-related emotions was found to be an ineffective emotion regulation strategy (Szasz et al., 2011), and suppression of negative emotions impedes their effective regulation, and incurs costs for well-being and social and intimate relationships (Butler et al., 2003; Impett et al., 2012; McRae & Gross, 2020). If these emotion regulation strategies are also used in situations that harbor no objective threat to them (Berenson et al., 2009), individuals are likely to miss opportunities to build and maintain intimate bonds with their partner, which may further contribute to emotional instability and an impaired

interpersonal emotion regulation capacity in a relationship (Luginbuehl & Schoebi, 2018; Schoebi & Randall, 2015).

Dyadic patterns of rejection sensitivity and negative emotions in interpersonal interactions

Rejection sensitive people may have a hard time to disengage from rejection-related emotions and thoughts in the face of tense or ambiguous interactions, and their maladaptive responses to rejection may foster distressed interactions. This is likely to affect their partners, who were found to be less satisfied with their relationship and think more about ending them (Downey et al., 1998). A person's negative response can be perceived as rejection by the partner and if both partners are prone to perceive rejection, it may instigate cycles of negative reciprocity in intimate interactions. Along with a reduced capacity to regulate emotions (Baumeister et al., 2007), we would expect that elevated rejection sensitivity in both partners would give rise to negative reciprocal dynamics in distressed interactions, and contribute to prolonged negative emotions in such couples. In contrast, in couples where only one partner shows elevated rejection sensitivity, the other partner may buffer negativity during interactions.

The current study

In the current study, we examined emotional responses to interpersonal situations that can give rise to perceptions of rejection (i.e., disappointments, conflicts, or misunderstandings). Furthermore, we tested individual and dyadic effects of rejection sensitivity on emotion dynamics following these interpersonal situations. Specifically, we expected that rejection sensitive individuals reported stronger increases of negative emotions than individuals low in rejection sensitivity (Hypothesis 1). Furthermore, we expected that rejection sensitive individuals showed a less rapid downregulation of negative emotions (Hypothesis 2a) and a less rapid recovery of positive emotions following negative

interactions, than individuals low in rejection sensitivity (Hypothesis 2b). Finally, we expected that dyadic patterns of rejection sensitivity predicted increased negativity following the experience of negative interactions (Hypothesis 3). We expected that mutually high levels of rejection sensitivity in both partners were associated with stronger (Hypothesis 3a) negative emotions, and a reduced downregulation of negative emotions over time (Hypothesis 3b) than dyadic patterns of one partner or none of the partners being high in rejection sensitivity¹. To test our hypotheses, we used data from a project on the transition to parenthood. The couples in our sample were all expecting their first child. While this situation is unique and may differ from other samples on the level of demographic characteristics, couples are nonetheless likely to also experience difficulties in their daily negative interactions, as other couples do (Don & Mickelson, 2014; Kohn et al., 2012; Lawrence et al., 2007; J. A. Simpson & Rholes, 2019). Moreover, rejection sensitive individuals in committed long term relationships may show different emotional patterns as a response to rejection than younger rejection sensitive individuals, because they have developed earlier in life regulation strategies to manage their relational experiences (Silvers et al., 2012).

For the purpose of this study, we used data collected between March 2019 and the end of August 2020. The present study has been preregistered (during data collection) on the open science platform osf.io (<https://osf.io/wyz4r>).

¹ Contrary to the pre-registered protocol for the current study, we did not test our initial hypothesis 3b, in which we predicted more frequent negative emotions when both partners are rejection sensitive. Because the available data on emotions is not categorical, we cannot straightforwardly assess the frequency of negative emotions. We have therefore not included this hypothesis in the current paper.

Material and method

Participants

Because the current study is part of a larger research project on couples' transition to parenthood, couples were recruited during the second or third trimester of their first pregnancy, and data collection took place at four time points (in the second or third trimester of pregnancy, 6 months after the birth, 12 months post-birth and 18 months post-birth). The data used for the current paper were collected at the first assessment time point. Recruitment started in March 2019 and is ongoing. Data from participants that enrolled between March 2018 and August 2020 were used in this paper. Inclusion criteria were: individuals identified as being in a heterosexual relationship, were German- or French-speaking, over 18 years old, lived together in a common home, and expected their first child. Each couple was compensated with 800. – Swiss Francs (approximately 900 US Dollars) for participation in all parts of the study.

Participants were recruited via flyers through midwives, gynecologists, birth center and prenatal courses, and via social media and word-of-mouth. Posters were distributed in universities, pharmacies, supermarkets, and hospitals. Potential participants could get in contact with the study via email or phone call to obtain more information about the study. They were also provided with a detailed information sheet and had the opportunity to ask questions and discuss study participation with a researcher on the phone. Both partners had to provide consent to participate in the study. Until August 2020, 98 couples ($N = 196$ participants) completed the first part of the study, and their data were used for this study.

On average, women's age was 31.95 years ($SD = 3.69$) and men's age was 33.50 years ($SD = 4.17$). At the time of recruitment, couples were in a relationship for an average of 6.62 years ($SD = 3.11$). Participants reported relatively high levels of education, with 66% of the

sample reporting holding a university degree, 11.3% indicated another type of advanced training, 11.3% completed an apprenticeship, 6.1% were students, 4.2% completed high school, and 0.9% had the secondary school degree. At the time of the data collection, 71.7% of the sample reported being employed, 8% were employed in an executive function, 10.8% were self-employed and 9.4% were not working.

Procedure

All couples completed a first set of assessments in the second or third trimester of pregnancy. All participants were informed about the study content and procedure, and both partners provided informed consent before data collection started. The data used in the present study was collected as part of a baseline online questionnaire after enrollment, and a week-long smartphone-based momentary assessment that started after the participants completed the baseline questionnaire. The baseline questionnaire included questions on the relationship, their mental health, their well-being, and demographics. Momentary assessments were prompted four times per day (8h00, 12h00, 18h00 and 21h30), over seven consecutive days (i.e., at 28 time points; $M = 23.2$; 17.2% missing data points). The momentary assessments included questions about daily interactions with the partner, own's and partner's affect, interpersonal behaviours, stress, experiences of rejection, intimacy, and relationship satisfaction. Other assessments of the study included a diagnostic interview on mental health, home visits with interactions tasks, physiological measures (cortisol and heart rate frequency) in the lab and on three days of their daily lives. The project obtained approval from the ethics review board of the regional government.

Measures

Adult Rejection Sensitivity. Rejection sensitivity was measured with the Adult Rejection Sensitivity Questionnaire (A-RSQ; Berenson et al., 2009, 2011; Downey et al., 2006), a

revised version of the Rejection Sensitivity Questionnaire (Downey & Feldman, 1996). Participants were presented with vignettes of nine different situations, in which rejection might be possible (e.g., *After a bitter argument, you call or approach your significant other because you want to make up*). Two items assessed participants' perceptions for each situation: the likelihood that individuals would be rejected, and the degree of concern that participants would feel regarding the possible outcome of each situation. Respondents answered on a 6-point scale the likelihood (1 = *very unlikely*; 6 = *very likely*) and their level of concern (1 = *unconcerned*; 6 = *very concerned*). In the current study, we focused on the concern of rejection dimension. All concern ratings were averaged to obtain a mean score for each participant's concern of rejection. Internal consistency for this measure was high (men: $\alpha = .807$; women: $\alpha = .803$).

Affect. At each report, participants were asked how they felt in the moment, and they were presented with six different descriptors of affective states to answer the question: two positive affective states (i.e. *cheerful, happy*) and four types of negative affective states (i.e. *irritated, lonely, depressed* and *worried*). For each item, participants reported how they felt by means of a 10-point scale (1 = *not at all*; 10 = *very*). Reports of the items were averaged to obtain a positive affect and a negative affect score. Consistency was high for positive affect items (females: $\alpha = .914$; males: $\alpha = .891$), and satisfactory for negative affect items (females: $\alpha = .724$; males: $\alpha = .774$).

Rejection experiences. To build a variable that reflects negative interactions likely to involve potential rejection cues, we used a number of momentary reports on different interpersonal experiences. We used different indicators of situations that have been used to measure potential rejection from a significant other in the literature (Downey & Feldman, 1996; Murray et al., 2002; Purdie & Downey, 2000). Two questions assessed directly whether participants felt rejected by their partner in the last hour, and whether they felt they were

mistreated by their partner in the last hour, by means of a 10-point scale (1 = *not at all*; 10 = *very*). Because we observed a right-skewed, bimodal distribution with a high frequency of scores of 1 and 2, likely indicating no rejection or mistreatment, we defined scores higher than 3 as an indication of rejection or mistreatment. We also included two other variables that reflected the perception of the partner as a) short-tempered or b) distant in the relationship (*during our last contact, my partner was ...*). A score higher than 3 for each item was considered as rejection. Finally, we also included reports on relationship events with a potential of perceived rejection: *tensions or conflicts, misunderstanding and disappointments*. Participants indicated whether these events occurred during the hour prior to the report (1 = yes; 0 = no). We then aggregated these data, creating a binary variable indicating whether none (=0) one or more (=1) of these interactions occurred.

Time. We also including a “time trend” variable, reflecting the order of the 28 reports of the momentary assessment. Based on this variable, we created a time variable centered at the time point of negative interaction reports (coded 0 at this time), spanning over the subsequent three time points (code 1, 2 or 3, respectively). This variable was used to estimate slopes starting at rejection time points.

Analyses

The current study included dyadic data that features repeated measures. We used a multilevel modelling approach to model the non-independence of emotional states at the within- and between-person levels (Bolger & Laurenceau, 2013), testing equations that included separate coefficients for the two partners of the couple. Daily reports (Level-1) of both partners were modelled as nested within couples (Level-2). The effects of negative interactions (Level-1 predictor) were estimated at the within-couple level. Because our sample included heterosexual couples, dyad’s members were distinguishable by their

reported gender (Kenny & Cook, 1999). At the within-couple level, we only examined actor effects (H1 and H2a, b), with participants' own reports of negative interactions predicting their ratings of positive or negative emotions at the same time points. Effects of rejection sensitivity (Level-2 predictor) were modelled at the between-person level, along with control variables (i.e. average negative and positive affect and rejection sensitivity level). For H3a, b, we also examined partner effects, reflecting partners' rejection sensitivity predicting participants' own ratings of negative emotions. All variables entered at Level-2 were centered at the grand mean.

For the first hypothesis, equation 1 investigated whether high rejection sensitive individuals reported stronger negative emotions after negative interactions with their partner.

$$(1) \text{ NEGATIVE EMOTIONS}_{ij} = b_{0j} + \\ b_{1j}(\text{NEGATIVE INTERACTIONS}_{ii}) + \\ b_{2j}(\text{REJECTION SENSITIVITY}_{ij}) + \\ b_{3j}(\text{RS} * \text{NEGATIVE INTERACTIONS}_{ij}) + r_{ij}$$

Negative emotions_{ij} represents the current report of negative emotions of one participant *i* (man or woman) at time *t*. The estimate *b_{0j}* reflects the mean level of a participant's report of negative emotions when all other predictors are held constant. The estimate for *b_{1j}* reflects the within-subject actor effect of negative interactions of a participant *i* at a time *t*, that is, the effect of a negative interaction report of a person on his or her own negative emotions. The estimate *b_{2j}* reflects the between-subject actor effect of rejection sensitivity of a participant *i*. The estimate for *b_{3j}* reflects the interaction effect of individuals' rejection sensitivity and their own reports of negative interactions at time *t*. This estimate represents a cross-level interaction and can be interpreted as the moderator effect of rejection sensitivity on participants' effects of negative interactions on their negative emotions. The error term *r_{ij}* reflects the residual variance.

To test whether negative emotional states of rejection sensitive individuals decreased more slowly, or that their positive emotional states increased less rapidly than those of individuals who are not rejection sensitive (H2), we extended the first model. In this analysis, we only used data from the time points where negative interactions were reported, and the three reports immediately following these time points. Instead of the negative interaction variable, the time slope variable centered at the time of the negative interaction was included at Level-1 (b_{4j}), which reflects the number of reports since the report of a negative interaction over the span of four reports. In this model, the intercept captures the negative or positive affect at the report of a negative interaction, and the estimate for b_{4j} captures the linear trend of negative or positive emotional states after negative interactions. Finally, we added the interaction term between the individual's rejection sensitivity score and the time trend variable (b_{5j}). The estimate for this coefficient reflects the degree to which participants' degree of linear change in negative or positive emotional states after a negative interaction differed as a function of their level of rejection sensitivity.

To test whether dyadic patterns of rejection sensitivity might be predictive of stronger negative emotional states following rejection-related interactions (H3a, H3b), we extended the models at level-2. We included the partner's rejection sensitivity variable alongside the individual's own rejection sensitivity variable, and also the interaction term between own's and partner's rejection sensitivity variables. To examine the effect of individual and dyadic rejection sensitivity on emotional responses to and emotional dynamics after negative interactions, we estimated effects of cross-level interaction terms between rejection sensitivity predictors and the negative interaction parameter (H3a), or the linear time trends (H3b). Models were run in R with the package nlme (Pinheiro et al., 2018; R Studio Team, 2015).

Results

Descriptive statistics

Correlation matrix for within and between subjects are presented in Table 1.1. On average, rejection sensitivity was low, and high values were infrequent. The average score of rejection sensitivity scores for men was 2.52 ($SD = .81$) and 2.57 ($SD = .93$) for women. Rejection sensitivity scores did not differ significantly between men and women (paired-samples $t(97) = .44, p = .67$). The mean level of negative interactions was $M = .19$ ($SD = .16$) for men and $M = .16$ ($SD = .15$) for women, representing no significant gender difference (paired-samples $t(97) = 1.53, p = .13$). Men and women also reported comparable levels of positive affect (men: $M = 7.62, SD = 1.19$; women: $M = 7.50, SD = 1.12$; paired-samples $t(97) = 1.29, p = .20$), but men reported significantly higher levels of negative affect ($M = 1.03; SD = .90$) than women ($M = .84; SD = .71$; paired-samples $t(97) = 2.03, p = .05$).

Table 1.1.

Correlation matrix for between and within subjects

	1	2	3	4	5	6	7	8
1. Positive affect F	–							
2. Negative affect F	–.48**	–						
3. Rejection experiences F	.04	.47**	–					
4. Rejection sensitivity F	–.1	.13	.04	–				
5. Positive affect M	.60**	–.33**	–.31**	–.13	–			
6. Negative affect M	–.26**	.34**	.31**	.14	–.61**	–		
7. Rejection experiences M	–.22*	.29**	.40**	.19	–.44**	.59**	–	
8. Rejection sensitivity M	–.15	.10	–.02	.20	–.29**	.21*	.17	–

Note. F = Female; M = Male; * $p < .05$. ** $p < .01$.

Association of higher rejection sensitivity with stronger negative affect

For hypothesis 1, we examined whether individuals higher in rejection sensitivity experienced stronger negative emotions after negative interactions, compared to less rejection sensitive individuals. As shown in Table 1.2, in negative situations, we found no significant increase in men's negative affect. Women's negative affect increased significantly, by .89, in these situations. Rejection sensitivity was not associated with changes in negative affect following negative interactions, neither for men nor for women (men: $b = .05, p = .64$; women: $b = -.07, p = .54$).

In hypothesis 2, we expected that following negative interpersonal interactions, more rejection sensitive individuals would show a slower decrease in negative emotions and a slower increase in positive affect than their less rejection sensitive counterparts would. Results are presented in Table 1.3. Rejection sensitivity was not associated with the degree to which individuals recovered from their negative emotions after rejections (men: $b = .01, p = .87$; women: $b = .01, p = .89$). Additionally, the association between rejection sensitivity and the recovery of positive emotions after rejection was not significant for males ($b = .01, p = .94$) or females ($b = .03, p = .39$).

Table 1.2.
Momentary associations for H1: experiences of rejection,
rejection sensitivity and negative emotions

Variable	Negative emotions		
	<i>b</i>	<i>SE</i>	<i>p</i>
Rejection sensitivity F	.08	.07	.25
Rejection sensitivity M	.18	.10	.06
Rejections experiences F	.89	.10	<.001***
Rejection experiences M	.55	.09	<.001***

Note. *** $p < .001$. F = female; M = male.

Table 1.3.

Momentary associations for H2a, b: negative interactions, rejection sensitivity and emotional recovery

Variable	Negative emotions			Positive emotions		
	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>
Recovery x RS F	.01	.05	.89	.03	.07	.63
Recovery x RS M	.01	.05	.87	.01	.06	.94
Recovery F	-.37	.04	<.001***	.47	.06	<.001***
Recovery M	-.27	.04	<.001***	.34	.05	<.001***

Note. *** $p < .001$. F = female; M = male; RS = Rejection Sensitivity.

Dyadic patterns of rejection sensitivity and modulation of negative affect

To examine hypothesis 3a, we tested whether dyadic patterns of rejection sensitivity were associated with stronger negative affect after negative interactions (see Table 1.4). Specifically, we expected that mutually high rejection sensitivity would be associated with more negative affect in partners than when only one partner or none of the partners scored relatively higher in rejection sensitivity. Testing the interaction between both partners' rejection sensitivity suggested that the combination of partners' rejection sensitivity did not explain variance in strength of rejection effects on negative affect (men: $b = -.02$, $p = .91$; women: $b = -.08$, $p = .62$). A main effect suggested that rejection sensitive men reported less negative affect in relationships where both partners reported similar levels of rejection sensitivity ($b = -.25$, $p = .04$).

Next, we examined whether the extent of downregulation vs. persistence of negative affect over time was associated with dyadic rejection sensitivity patterns (Hypothesis 3b). The results are presented in Table 1.5. Dyadic patterns of rejection sensitivity did not explain variance in the persistence of negative affect after rejection-relevant interactions (men: $b = .05$, $p = .34$; women: $b = -.03$, $p = .66$).

Table 1.4.

Momentary associations for H3a: Experiences of rejection, the own's and the partner's rejection sensitivity

Variable	Negative emotions		
	<i>b</i>	<i>SE</i>	<i>p</i>
Rejection experiences F	.89	.11	<.001***
Rejection experiences M	.57	.09	<.001***
Rejection sensitivity F	.09	.08	.21
Rejection sensitivity M	.16	.10	.12
RS F partner	.07	.08	.40
RS M partner	.10	.09	.27
RS F x rejection experiences F	-.06	.13	.66
RS M x rejection experiences M	.10	.12	.42
RS F x RS F partner	-.13	.09	.17
RS M x RS M partner	-.24	.12	.04
RS F x RS F partner x rejection experiences F	-.08	.16	.62
RS M x RS M partner x rejection experiences M	-.02	.14	.91

Note. *** $p < .001$. F = female; M = male; RS = Rejection sensitivity.

Table 1.5.

Momentary associations for H3b: dyadic patterns of rejection sensitivity on negative affect

Variable	Negative emotions		
	<i>b</i>	<i>SE</i>	<i>p</i>
Recovery F	-.35	.04	<.001***
Recovery M	-.29	.04	<.001***
Rejection sensitivity F	.03	.12	.81
Rejection sensitivity M	.26	.14	.06
RS F partner	.07	.13	.60
RS M partner	.12	.12	.33
RS F x recovery F	-.02	.05	.65
RS M x recovery M	-.04	.05	.45
RS F partner x recovery F	.05	.05	.34
RS M partner x recovery M	.01	.04	.85
RS F x RS F partner x recovery F	-.03	.06	.66
RS M x RS M partner x recovery M	.05	.06	.34

Note. *** $p < .001$. F = female; M = male; RS = Rejection sensitivity.

Discussion

The aim of the current study was to investigate whether higher levels of rejection sensitivity, and dyadic patterns of rejection sensitivity, were associated with stronger and persisting emotional responses in daily rejection-relevant interactions. The first hypothesis predicted that after an experience of rejection, individuals with higher rejection sensitivity

would report more negative affect than their less rejection sensitive counterparts. The results did not confirm this hypothesis. The data showed a strong and reliable association between rejection experiences and elevated negative emotional states, suggesting that at times when rejection experiences were reported, individuals reported more negative emotional states than at times when no rejection experiences were reported (Buckley et al., 2004; Rajchert et al., 2019). However, the results suggested that individual differences in the strength of this effect were not attributable to differential levels of rejection sensitivity. Multiple explanations may apply for this null finding. First, it is possible that variance and range of rejection sensitivity present in the current sample, and particularly the number of participants showing high levels of rejection sensitivity, were insufficient to document such an effect. Second, if rejection sensitive individuals tend to engage in avoidance strategies in their intimate interactions (Berenson et al., 2009), they may indeed have applied these strategies in the negative interactions we studied, which may have dampened the negative emotional impact in these situations. Such strategies may enable them to navigate equally well through everyday life situations, where the rejection potential is relatively low, as non-rejection sensitive individuals. Stronger responses of rejection sensitive individuals would thus emerge only in situations where avoidance strategies would fail to prevent intense experiences of rejection, and studies sampling a longer time span than the current study would be necessary to capture these situations, which are likely less frequent in samples of relatively non-distressed couples. In a broader context, this finding does not necessarily point to an adaptive management of negative interactions of rejection sensitive individuals. On the relational level, negative consequences of rejection sensitivity could emerge nevertheless due to applying avoidance strategies. Negative consequences would not appear immediately after negative interactions, but rather in the long run. Indeed, evidence suggests that both

partners feel less satisfied in their relationship if one partner is rejection sensitive and distances him- or herself (Downey & Feldman, 1996; Norona & Welsh, 2016).

Hypothesis 2 predicted that following an experience of rejection, rejection sensitive individuals would recover less rapidly from negative interpersonal experiences, as reflected by a slower decrease of negative emotions and a slower increase of positive emotions after a rejection interaction. Again, the data did not support this prediction. Rejection sensitive individuals did not differ significantly in their emotional recovery, when compared to less rejection sensitive individuals. While prior evidence suggests that after a daily rejection event, rejection sensitivity was associated with maladaptive behavioral responses that are harmful for relationships functioning (Downey et al., 2007; Downey & Feldman, 1996; Norona & Welsh, 2016) such as self-silencing (Ayduk et al., 1999; Harper et al., 2006), this did not manifest in more negative emotional sequelae to negative interpersonal situations. To maintain a healthy and close bond with the significant other, individuals must balance self-protection needs and prosocial behaviours which may render them vulnerable (Murray et al., 2006). Rejection sensitive individuals may prefer to minimize the pain of rejection by reducing closeness or suppress any emotions that may arise from negative rejection interactions. If individuals chose to engage in behaviours such as self-silencing, thus suppressing their emotions, neither negative nor positive emotions may have been showed in the results. However, by engaging in such behaviours, individuals may not benefit from the partner's help in regulating negative emotions (Schoebi & Randall, 2015).

We predicted dyadic effects of rejection sensitivity, expecting that when both partners were highly rejection sensitive, they would experience stronger negative emotions compared to when only one or none of the partners reported higher levels of rejection sensitivity. This assumption was based on the reasoning that mutual sensitivity to rejection would enhance negative reciprocal dynamics between partners, and thus increase response intensity and

prolong negative emotional states. The evidence did not support this hypothesis. When both partners scored relatively higher in rejection sensitivity, they did not show stronger negative emotional reactions to rejection interactions, and neither did their negative emotions linger longer.

Defined as the disposition to anxiously expect and readily perceive rejection from others (Downey & Feldman, 1996), rejection sensitivity is a characteristic that on a conceptual level, concerns primarily the likelihood of perceiving or experiencing rejection, and less so the intensity or sequelae of a response. Our hypotheses were mostly informed by research suggesting more negative responses to rejection (Downey & Feldman, 1996; Norona & Welsh, 2016). The current data do not undermine the validity of the construct *per se* but fail to offer support for the assumption of more negative experiences of distressed interactions when it comes to individuals' daily lives. On the one hand, we could speculate that a generalized view, as assessed by common measures of rejection sensitivity, might not reflect the immediate experiences in the very situations in which they occur, but manifest only after more elaborate cognitive processing. On the other hand, it might be the case that, to the extent that rejection sensitivity is a learned response, it may be interaction partner specific, and be less likely directed toward the intimate partner in relatively well-functioning couples (Romero-Canyas et al., 2010). Finally, it is possible that the situations we sampled, in a random week of couples' daily lives, do not reflect the kind of experiences that are sufficiently severe to generate the variability in responding necessary to detect the proposed effects of rejection sensitivity in a sample of adults in their thirties.

However, it is also possible that sensitive individuals prevent or avoid potentially hurtful situations on purpose (Berenson et al., 2009). They may aim at protecting themselves from the pain of rejection, thus, reducing emotional arousal. Research on insecure attachment, a correlate of rejection sensitivity (Downey & Feldman, 1996), offers more

potential explanations (Mikulincer & Shaver, 2005). Indeed, anxious-avoidant and anxious-ambivalent individuals are more likely to be rejection sensitive (Feldman & Downey, 1994). When confronted with rejection from a significant other, individuals with an avoidant attachment style inhibit strong emotions and distance themselves from the partner to avoid threatening thoughts that would activate their attachment needs. Such individuals are also less prone to react with anger when they are confronted with their partner's negative behavior, and less distress and less negative emotions following a hurtful event (J. A. Feeney, 2005; Mikulincer & Shaver, 2005). Instead, they were found to distance themselves from the partner and show more hostility (Mikulincer & Shaver, 2005).

The data presented here offers no evidence for the relevance of dyadic patterns of rejection sensitivity of partners' emotional adjustment, and the suspected higher levels of negative reciprocity in couples. Again, research on adult attachment suggests that couples in which one partner was secure were more able to handle conflictual situations than couples where both partners showed elevated levels of insecurity (Pietromonaco & Greenwood, 2004). It is conceivable that a secure partner in the relationship may buffer the effects of rejection sensitivity, thus preventing negative emotional dynamics in the couple. Importantly, evidence suggests that when both partners were insecure, they engaged more in mutual avoidance and withdrawal from communication (Domingue & Mollen, 2009). To the extent that these findings extend to rejection sensitivity, a mutual use of avoidant strategies in couples with higher levels of rejection sensitivity in both partners could feed avoidance cycles. But these negative dyadic dynamics would manifest rather in heightened avoidance and disengagement than in intense mutual expressions of negative emotions and would therefore not necessarily become visible on the level of stronger and prolonged negative affect in the immediate aftermath of a negative interaction. But in the long run,

these dynamics might still contribute to more dysfunctional interactions (Johnson & Bradbury, 2015).

The current study suffers from several limitations. First, high levels of rejection sensitivity were relatively rare in our sample. Therefore, most participants may be unlikely to display the strong behavioral or emotional responses to negative interactions that we expected for higher levels of rejection sensitivity. Second, the measure of rejection sensitivity we used is based on self-reported experiences in response to general interpersonal situations. Such reports do not necessarily reflect rejection responses to everyday life interactions. Self-report on specific daily rejection-relevant interactions may capture a different kind of responses representing more immediate reactions to rejection. Moreover, the questions included in the momentary assessment were not all referring to the same time points and it may have been a source of systematic error variance. Furthermore, our sample consisted of couples expecting their first child. It may be that during this particular time of pregnancy, emotional responses differ. Both partners may be more focused on their future child, and more willing to override negative relational sentiments. Finally, we collapsed indicators of different negative interpersonal situations into a single indicator of rejection situation. While this strategy has the advantage to provide a broader range and a higher frequency of negative situation samples, it also makes it more likely that these situations were of minor importance to the participants, and therefore less likely to actually activate a full blown, self-protection-oriented response. One possible way to address this limitation would be to use longer sampling periods and to focus on more severe negative experiences. This would increase chances that more impactful events of rejection occur in this period.

In conclusion, the current study did not support the assumption that rejection sensitivity plays a predominant role in modulating emotional reactions and their regulation following an experience of rejection in intimate relationships. Rejection sensitivity was not

associated with stronger negative emotions, or the course of these emotions after rejection interactions, and neither were dyadic patterns of rejection sensitivity. To our knowledge, this study is novel in that it uses a wide array of daily interpersonal situations that may trigger rejection, and in that it is the first study examining emotion dynamics after tense interpersonal situations as associated with rejection sensitivity. Future studies could shed more light on the relevance of rejection sensitivity for negative emotion dynamics in intimate relationships by focusing on samples including higher levels of rejection sensitivity and by including age differences to assess existing differences in emotion regulation strategies.

8. Study 2: Rejection Sensitivity in Intimate Relationships: Implications for Perceived Partner Responsiveness²

Abstract

The goal of the study was to investigate whether and how perceptions of rejection are predictive of perceptions of the partner's responsiveness, and the intimacy felt with a romantic partner, daily. Moreover, we examined whether people who are more anxious and sensitive to rejection perceived more rejection in daily life and whether this foreshadowed perception of the partner to be less responsive. Analyses of daily data from a sample of 75 couples (N = 150) who reported on their daily relational experiences suggest that rejection sensitivity and rejection experiences play a significant role in couples' felt intimacy in daily life, and specifically for perceptions of responsiveness. Results also indicate that for women, rejection sensitivity is associated with more rejection experiences. We discuss the current results from a clinical and from a social psychological perspective, and we highlight how anxious apprehension and experience of rejection, and its interpersonal consequences, can be further considered in clinical practice.

Keywords: rejection sensitivity, perceived partner responsiveness, intimacy, momentary assessment

² Citation: Richter, M., & Schoebi, D. (2021). Rejection sensitivity in intimate relationships: Implications for perceived partner responsiveness. *Zeitschrift für Psychologie*, 229(3), 165–170. <https://doi.org/10.1027/2151-2604/a000448>

Rejection Sensitivity in Intimate Relationships: Implications for Perceived Partner Responsiveness

Social rejection is one of the most hurtful experiences for human beings. Concern about social rejection may help to ensure social integration and the maintenance of important relationships (Leary, 2001), and the satisfaction of our basic need to belong (Baumeister & Leary, 1995). Yet, high levels of anxiety about others' acceptance can become an important vulnerability that can undermine mental health (Ayduk et al., 2001; Gao et al., 2017). A compromised ability to maintain supportive relationships may play an important role (R. T. Liu et al., 2014), as the fear of rejection interferes with opening up and trusting others (Ayduk et al., 1999). Chronic fear of rejection – rejection sensitivity - may therefore operate as an enduring vulnerability that compromises individuals' capacity to experience the benefits of close social relationships. It may also play an important role in why individuals who suffer from anxiety disorders and depression often fail to maintain satisfactory relationships (Coyne et al., 2002; Whisman, 2007).

A crucial question to answer is how high rejection sensitivity affects the process through which couples build – or fail to build - closeness, trust, and intimacy in their developing relationship. More specifically, we focus on how rejection sensitivity and rejection experiences affect a key variable – the perception of partner responsiveness – that is crucial for the development of intimacy (Reis & Gable, 2015). Rejection sensitivity may operate via hypervigilance to rejection cues, leading individuals to perceive rejection where others would not, or via amplifying affective reactivity to negative interpersonal cues (Downey & Feldman, 1996). Another possible mechanism is that rejection sensitivity disposes toward self-protective, defensive interpersonal dispositions (Levy et al., 2012), which affect the communication processes through which intimacy is established (Reis et

al., 2004). The current research first examines the correlates of rejection sensitivity regarding interpersonal perception and behaviours, before exploring the potential role rejection sensitivity may play for perceived partner responsiveness in intimate relationships.

Rejection sensitivity, interpersonal perception and behaviours

A rejection sensitive person anxiously expects to be rejected by others and perceives and overreact to rejection more readily than others (Downey & Feldman, 1996). Thus, close interpersonal interactions are particularly challenging because of the looming risk to suffer rejection (Romero-Canyas et al., 2010). While experiencing rejection is hurtful, rejection sensitivity often prompts more negative interpersonal behaviours, such as more jealousy, controlling behaviour, more hostility and less supportive behaviours (Downey & Feldman, 1996; Meehan et al., 2018), and may foster aggression or even domestic abuse (Leary et al., 2006).

Maladaptive patterns of interpersonal behaviours may be rooted in self-protective goals when facing probable rejection. For instance, attentional avoidance strategies in rejection sensitive individuals lead them to disconnect from their emotions in interactions that are not actually threatening (Berenson et al., 2009). This may involve the concealment of important personal information from the other, thus undermining communication and responsiveness to the partner's needs. Overreacting to biased perceptions of rejection may even provoke actual rejection from the partner: An analysis suggested that behaviour of rejection sensitive women predicted negative responses from their romantic partners, and both partners reported less relationship satisfaction (Downey et al., 1998). Rejection sensitivity may also prevent partners from engaging in positive interactions. For example, while people's positive attitudes toward their partner when returning home spilled over into

more positive interactions with the partner at night, this was not the case for rejection sensitive individuals (Schoebi et al., 2012).

In this vein, the risk regulation model offers an interesting perspective of how interpersonal vulnerabilities like rejection sensitivity, may translate into distressed romantic interactions (Murray et al., 2006). Engaging in intimate relationship requires tolerating a high degree of interdependence, and therefore an elevated risk of being rejected. Partners who perceive a situation as potentially threatening are more likely to protect themselves by minimizing closeness with the other. Because rejection sensitivity may bias individuals' perceptions, highly rejection sensitive individuals may experience difficulties to engage in mutually responsive interactions and prompt negative behaviours, even when a partner is experiencing distress. Such self-protective interaction patterns may affect perceptions of partner responsiveness.

Rejection sensitivity and the intimacy process

To maintain a supportive and satisfactory intimate relationship, partners need to engage in a transactional process, in which they share their feelings and needs and respond to the partner's disclosures in supportive ways (Reis & Shaver, 1988; Reis & Gable, 2015). The partner's response must be perceived as responsive to one's needs, to convey a feeling of being understood, validated and cared for (Laurenceau et al., 2005). Then, interactions in which needs are disclosed clearly, and in which the partner responds adequately to these needs, achieve higher levels of intimacy and deepen trust over time (Laurenceau et al., 2005). By engaging in such communicative cycles also promotes satisfaction with the relationship (Reis & Gable, 2015; Reis & Shaver, 1988).

The communication process requires subjective perceptions and evaluations of the partner's disclosures and responses, which opens the doors for ambiguity. A bias toward perceiving cues of rejection can disrupt the process of disclosure and responsiveness, and further deepen insecurity (Overall & Hammond, 2013). Rejection sensitive individuals may be reluctant to disclose their feelings when sensing a risk of rejection, be less closely attending to the partner's disclosures, therefore showing less responsiveness.

In the current study, we use data from both partners of 75 young couples to test this possibility. We first tested our expectations that individuals that have high rejection sensitivity and their partner report more rejection in their daily lives (H1). Next, we focused on the within-subject level to test whether perceptions of rejection interfere with mutual perceived responsiveness. We tested the assumption that when individuals felt rejected by their partner, they perceived their partner as less responsive (H2a). Further, we tested that their partner also perceived them as less responsive (H2b). Finally, we examined whether rejection sensitivity predicted lower levels of perceived partner responsiveness in both partners (H3). We also explored whether associations between perceptions of rejection and partner responsiveness were amplified or dampened when rejection sensitivity was high. Using repeated measures allowed us to assess between- and within-subjects, that is, how individuals differ between each other (H1; H3), and how each partner differs at different time points (H2a,b; exploratory analyses).

Method

Participants

Participants were German-speaking couples, with both partners over 18 years old and willing to participate. Couples were recruited through ads in newspapers, flyers distribution

in institutions and by word-of-mouth advertising. The final sample consisted of 75 heterosexual couples ($N = 150$ individuals), aged between 18 and 58 years old. On average, women were 23.4 years old ($SD = 7.1$) and men were 26.1 years old ($SD = 7.6$). Relationship duration of individuals was on average 2.7 years ($SD = 2.2$). Among participants, 69.9% were students, 28.4% were employed and 2.1% were self-employed. 44.5% of the participants lived in a shared flat, 21.2% lived with their partner, 21.2% at their parents' home, 9.6% lived alone and 3.4% lived in a shared flat with their partner and others.

Procedure

Data collection was divided into two sections: (a) participants completed a baseline questionnaire, and then (b) enrolled in a smartphone-based ambulatory assessment over two consecutive weeks, with four assessments per day (upon awakening, 12pm, 6pm and before bed). Overall, each participant completed 56 time points ($M = 54.5$; 9.8 % missing data points). Upon instruction, participants provided informed consent, ran a trial momentary assessment. The study was approved by the internal ethics review board of the Department. Participants received an amount equivalent to \$50 as compensation, or course credits if they were students.

Measures

Perceived partner responsiveness (PPR). At each report, participants indicated to what degree their partner was a) understanding and b) supportive during their last contact, using an 8-point scale ranging from 0 (*not at all*) to 7 (*very*). We averaged the ratings of both items to create a score for PPR. The consistency of the two items was high across females ($\alpha = .83$) and moderate for males ($\alpha = .67$).

Daily rejection experiences. At each report, participants rated to what extent they felt rejected during the last contact with their partner, on an 8-point scale ranging from 0 (*not at all*) to 7 (*absolutely*). Participants indicated a rejection experience in 14% of the reports.

Rejection sensitivity (RS). We used 4x2 items of the Rejection Sensitivity Questionnaire (RSQ; Downey & Feldman, 1996). Participants were presented with four hypothetical situations in which rejection by a significant other was possible. The RSQ assessed (1) the level of anxiety about the outcome of the situation (e.g., *How concerned or anxious would you be over whether or not your significant other would want to make up with you?*), on a 6-point scale ranging from 1 (*very unconcerned*) to 6 (*very concerned*). Then, participants rated (2) the degree of expectation for rejection (e.g., *I would expect that he/she would be at least as eager to make up as I would be*), on a 6-point scale (1 = *very unlikely*; 6 = *very likely*). We computed the mean across all items to create a total RS score. The scale yielded a satisfactory internal consistency for males ($\alpha = .76$) and moderate consistency for females ($\alpha = .62$).

Data analysis

Our sample consisted of dyads and included repeated measures, therefore we took into account non-independence between the two partners in an actor-partner interdependence model (APIM; e.g., Cook & Kenny, 2005). We adjusted for time trends at the within-subject level by including a variable reflecting the sequential number of the repeated measurement at the level-1. Models were run with RStudio and the package nlme (Pinheiro et al., 2018; R Studio Team, 2015).

For H1, we examined both actor and partner effects of RS on individual differences in rejection experiences. Actor effect represented the effect of own RS on own rejection

experiences, while the partner effect measured how rejection sensitivity of an individual affected the partner's experience of rejection.

For H2a, b and H3, we tested a multilevel variant of an APIM, to examine the within-subject level, and incorporate non-independence at the within and between-person levels (Bolger & Laurenceau, 2013). Each daily report (Level-1) was modelled as nested within the female or male partner of a couple (Level-2). Reports of daily rejection experiences were used as a within-person predictor and centered at the individual mean of each participant. At the between-person level, RS was entered as a moderator of the association between daily rejection experiences and PPR. RS scores were centered at the grand mean of all participants. For exploratory analyses, we also tested the cross-level interaction between RS and rejection experiences. The coefficients for the interaction terms reflect the degree to which RS modulates the effects of rejection experiences on PPR.

Results

Descriptive statistics of all variables are presented in Table 2.1. Rejection sensitivity did not differ significantly between men and women ($t_{131} = .413, p = .681$). The partners' RS was moderately correlated ($r = .122; p = .164$), but partners' daily rejection experiences were not ($r = .063; p < .001$).

Table 2.1.
Descriptive statistics for all variables

Variable	Male			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Perceived partner responsiveness	4.89	1.62	4.99	1.64
Rejection sensitivity	2.92	.86	2.89	.79
Daily rejection	.61	.89	.55	.86

Note. $N = 75$ couples (150 individuals). Perceived partner responsiveness ranges from 0 (not at all) to 7 (very). Rejection sensitivity ranges from 1 (very unconcerned/very unlikely) to 6 (very concerned/very likely). Daily rejection ranges from 0 (not at all) to 7 (absolutely).

To test H1, we examined actor- and partner effects of RS on reported rejection experiences. The results suggested moderate interdependence of rejection experiences ($b = .046$, $SE = .021$, $p = .030$), and no gender differences in actor effects ($\text{Chi}^2(1) = .029$; $p > .5$). A pooled actor estimate was non-significant, however ($b = .074$, $SE = .038$, $p = .054$). The partner effect of women's RS on men's rejection experience was significant and positive, suggesting that highly rejection sensitive women's partners reported more rejection in daily life ($b = .113$, $SE = .023$, $p = .023$). Men's partner effect on women's rejection was not significant ($b = -.046$, $SE = .057$, $p = .426$).

Next, we examined associations between daily rejection experiences and the own and the partner's perceived responsiveness (H2a, b), and associations with RS (H3; Table 2.2). Significant actor effects suggested that women and men's daily rejection experiences were negatively associated with their own perceptions of the partner's responsiveness (women: $b = -.560$, men: $b = -.608$). Supporting H2b, we found significant partner effects for women and men, suggesting that when participants felt rejected, their partners also perceived them

as less responsive than at other times (women: $b = -.112$, men: $b = -.068$). We found no significant main effects of RS for women ($b = .120$) or men ($b = .014$). Thus, H3 was not supported, suggesting that individual differences in RS were not related to perceptions of partner responsiveness.

Table 2.2.

Momentary associations between rejection experiences and perceived partner responsiveness

Variable	Perceived partner responsiveness		
	<i>b</i>	<i>SE</i>	<i>p</i>
Daily rejection F	-.560	.029	<.001***
Daily rejection M	-.608	.027	<.001***
Partner daily rejection F	-.112	.037	<.001***
Partner daily rejection M	-.068	.027	.028*
Rejection sensitivity F	-.12	.271	.374
Rejection sensitivity M	.014	.383	.931
Moderator RS daily rejection F	.080	.060	.004**
Moderator RS daily rejection M	-.024	.107	.535
Moderator RS partner daily rejection F	.032	.031	.297
Moderator RS partner daily rejection M	.033	.029	.269

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. F = female; M = male; RS = Rejection sensitivity.

Exploratory analyses (Figure 1) yielded a significant moderator effect of RS for women's actor effect ($b = .080$), suggesting that rejection sensitive women's perceptions of

the partner's responsiveness were less contingent on their perceptions of rejection than those of their less sensitive counterparts. We did not find an equivalent coefficient for males ($b = .024$). Partner effects of rejection on PPR were not related to RS.

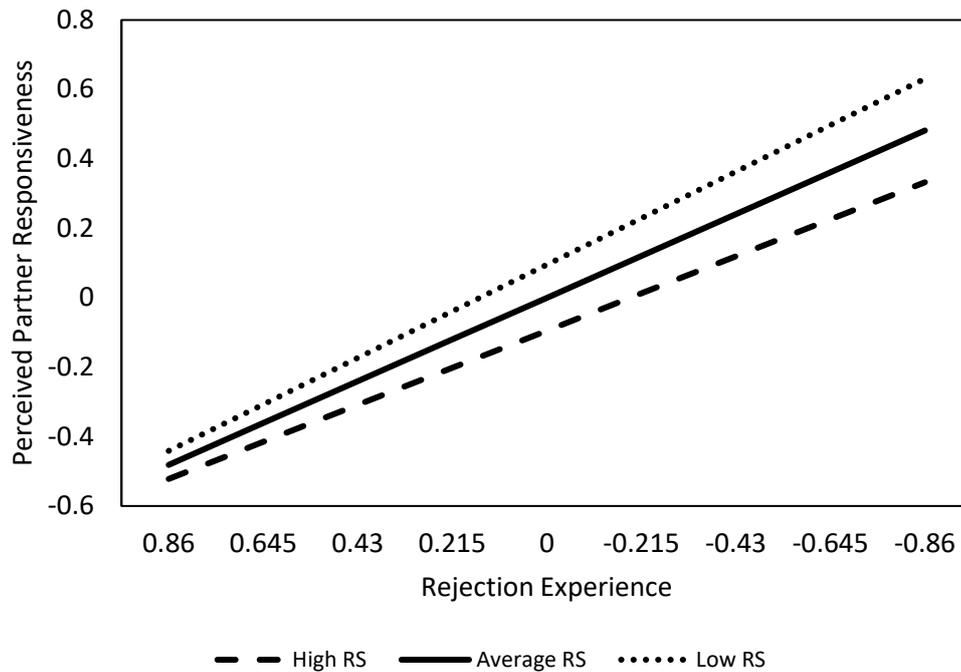


Figure 1. Association between Rejection Experiences and Perceived Partner Responsiveness, at high (1 *SD* above average), average, and low (1 *SD* below average) Rejection Sensitivity (RS).

Discussion

The goal of the present study was to investigate the role of RS for the daily experience of rejection and perceptions of partner responsiveness in intimate relationships. For H1, we found no evidence that RS was associated with more perceived rejection, but partners of rejection sensitive women felt more rejected in daily life. As expected, we found that both men and women's perceptions of the partner's responsiveness varied as a function of felt

rejection (H2a), and supporting H2b, that when participants experienced rejection, they were perceived as less responsive by their partners. For H3, RS was not associated with lower levels of PPR in daily life. Finally, exploratory analyses suggested that rejection sensitive women's perceptions of their partner's momentary responsiveness were less contingent on their felt rejection, while the equivalent effects for men and moderator effects of RS on partner effects of rejection were not significant.

Our findings did not confirm an association of RS and levels of felt rejection but suggest that RS was nevertheless associated with perceptions of rejection in couples, via significant partner effects. Besides confirming a close association between perceptions of rejection and reduced partner responsiveness, the finding that participants were also perceived as less responsive when they reported feeling rejected further emphasizes the dyadic nature of the effects. One possible explanation may be that constant anxious expectations of rejection biases perceptions of individuals while interacting with a significant other (Downey & Feldman, 1996). As a result, partners of RS women may report more rejection experiences if their rejection sensitive partner displays more hostility and provides less emotional support because of these biases, slowly eroding their relationship (Downey & Feldman, 1996).

These findings on associations between perceived partner responsiveness and rejection are important, as individuals seek acceptance in their partner, which manifests through the partner's ability to respond to the other's needs (Reis & Gable, 2015). Therefore, a high correspondence between felt rejection and perceptions of the partner's responsiveness reflects a response that is consistent with the subjective experience of the person in the given context (Luginbuehl & Schoebi, 2020), flagging a situation where the intimate partner shows a lack of acceptance and might not be able to satisfy their needs.

The data did not confirm that high RS disposes toward more negative perceptions of the partner, which is surprising because perceptions of partner responsiveness should capture expectations about the partner's acceptance. The data might reflect the possibility that rejection sensitive individuals avoid rejection to prevent being hurt (Berenson et al., 2009; Romero-Canyas et al., 2010), and nevertheless report similar frequencies of rejection as their less sensitive counterparts. Similarly, their rejection-related anxiety may lead them to avoid thinking about and prevent reporting non-acceptance.

Exploratory analyses indicated that rejection sensitive women were less sensitive to rejection experiences regarding PPR, which might suggest that individuals disconnect from their emotions. Rejected individuals are more likely to be emotionally insensitive, showing diminished empathy towards their partner (Baumeister et al., 2007). This may particularly apply to RS women, as they tend to provide less emotional support to their partner (Downey & Feldman, 1996). If we apply the risk regulation model (Murray et al., 2006) to rejection sensitive individuals, they should be motivated to avoid rejection, thus protecting themselves by minimizing closeness with their partner. Not activating the emotional system might prevent them from responding adequately to the other's requests (Meehan et al., 2018), and provoke actual rejection (Downey et al., 1998).

On the long run, the accumulation of interpersonally stressful situations, in combination with a communication process may erode interpersonal processes and constitute a vulnerability to mental disorders such as anxiety or depression (Coyne et al., 2002; Whisman, 2007). Our findings may inform individuals' functioning and how perception biases are built in severe cases of rejection, such as ostracism or bullying. Thus, the current results emphasize the importance of targeting cognitive evaluations of acceptance and rejection in interpersonal interactions in therapeutic interventions in cases of individual

or interpersonal distress. It suggests key elements of interpersonal interactions (e.g., emotional unresponsiveness), involving individuals and their partners, as targets of interventions to improve or prevent rejection-related negative outcomes. This may decrease distress levels and thereby risk for more severe mental health issues for individuals high in rejection sensitivity or maladaptive interpersonal schemas more generally. Mindfulness based approaches may be of promise in this regard (see e.g., Janovsky et al., 2020).

Limitations

Several limitations of this study warrant for caution when interpreting these results. The current sample consists of relatively young couples, which might be relevant for couples in the process of consolidation. Moreover, the sample does not include a large portion of rejection sensitive individuals. Data of the current sample may therefore not portray the effects of high RS very accurately, and data from a clinical sample of individuals with elevated RS might have produced different results.

The current study is correlational, and therefore, causal interpretations of the coefficients cannot be conclusive and should be made with caution. Specifically, it is also conceivable that perceptions of the partner's non-responsiveness may contribute to perceptions of rejection, rather than the inverse, or that both variables represent parallel, but different cognitive evaluations of the same experience. Supplemental material on these results is available online (<https://osf.io/bu7dk/>)³.

In the current study, we examined whether RS played a role in rejection experiences and perception of responsiveness in intimate relationships. Our results did not provide

³ Supplemental material can also be found in Appendix A.

support for associations between individuals' RS and their daily interpersonal perceptions or reactivity, but rather RS individuals' responsiveness evaluations are less contingent on momentary perceptions of the partner. At the same time, partner effects emphasized the relevance of RS for relational outcomes. While the specific mechanisms behind these findings remain unknown, it is possible that rejection sensitive individuals disconnect from their emotions when experiencing rejection, which may render them less sensitive to social cues, but also interfere with communication processes, and relationship functioning on the long term. Future work may further explore these possibilities in more detail.

9. Study 3: Cortisol linkage of couples across the transition to parenthood: Stress levels and perceived partner responsiveness as moderators

Abstract

Cortisol linkage between romantic partners have been associated to positive and negative indicators of relationship functioning, like marital distress, but also with shared moments or less conflict behaviours. Cortisol is a marker of stress and is particularly sensitive to social inputs. Thus, stronger or dampened associations of cortisol may reflect stress-related dynamics in a couple or positive relational processes. The birth of a first child is a challenging period for couples, and they may experience acute or chronic stress. At the same time, couples also need increase support from their respective partner, which helps to adapt to the changes that occur during this time. Perceived partner responsiveness contributes greatly to relationship satisfaction and to maintaining relationship functioning.

In this study, we expected positive cortisol linkage between partners across the transition to parenthood but be stronger at postpartum measurement. We examined whether high levels of stress was associated with stronger cortisol associations and whether perceived partner responsiveness was associated with dampened cortisol associations. We used data from a project ongoing at the University of Fribourg. 69 Swiss couples (N = 138) collected saliva samples for three days and completed a smartphone-based momentary assessment, during pregnancy, at 6 and 18 months postpartum. Results partially confirmed our hypotheses, partners showed positive cortisol linkage, which grew stronger from pregnancy to 6 months, but not to 18 months after the birth. Moreover, when men's stress levels were higher, cortisol linkage grew stronger. However, perceived partner responsiveness was not associated with dampened linkage between partners. The findings put into perspective what processes cortisol associations may reflect in couples.

Cortisol linkage of couples across the transition to parenthood: stress levels and perceived partner responsiveness as moderators

Interdependence is a defining characteristic of intimate relationships, and intimate partners' interdependence also involves the physiological level (Butler, 2011). Examining partners' linkage in cortisol across situations and time, and testing moderators of this linkage helps to better understand physiological interdependence in romantic relationships. The transition to parenthood is a period during which such links may be particularly salient, given that the birth of a first child is broadly considered as a positive, yet life-changing experience, and at the same time can exert considerable stress for both partners (Cowan & Cowan, 1995).

A growing literature addresses the possibility that within close relationships, stress is shared and co-regulated, contributing to the interdependence of partners' psychological and physiological processes (Levenson & Gottman, 1983). Yet to date, it remains unclear whether associations between partners' stress responses, as reflected by cortisol output, are reflections of adaptive and/or maladaptive relational processes (Timmons et al., 2015). While cortisol output is a stress marker, it is also known to be sensitive to social support (Saxbe & Repetti, 2010), which has been linked to decreased cortisol levels (Ditzen et al., 2019; Ditzen, Schmidt, et al., 2008; Slatcher et al., 2015).

When faced with important life changes and increasing demands during the transition to parenthood, both partners are likely to also experience new and unique moments of intimacy and joy. Therefore, increasing stress experiences can go along with both positive and negative relational experiences during the transition to parenthood, and along with more intense interactions in the relationship. Cortisol linkage may thus become stronger during this transition. At the same time, both partners may need increased support from each other. Perceiving the partner to be responsive and supportive enhances relationship satisfaction and

positive health outcomes. Through challenging time, perceived responsiveness may thus contribute to diminish stress levels between partners (Smallen et al., 2021). The present study investigates cortisol associations between partners, whether the strength of these associations increases across the transition to parenthood, and whether they vary as a function of stress levels and perceived partner responsiveness.

Cortisol linkage in romantic relationships

Romantic relationships are among the closest social bonds individuals build in life. Intimate partners are often highly interdependent in their daily concerns and goals. They engage in frequent daily interactions, care for each other, coordinate their tasks and activities, and include the partner in their plans and goals. As a result, their mental and physical states may become highly contingent (Pauly, Gerstorf, et al., 2020; Saxbe & Repetti, 2010; Schoebi, 2008).

Research has mostly focused on associations between self-reported psychological states between partners, such as experienced stress, emotions, or mood (Butner et al., 2007; Saxbe & Repetti, 2010; Schoebi, 2008). In the past decade, associations among romantic partners' moment-to-moment fluctuations of physiological states have gained increased interest. Specifically, studies have investigated within-relationship associations of hypothalamic-pituitary-adrenal (HPA) axis activity, and cortisol output as an objective marker of stress (Laws et al., 2015; Saxbe & Repetti, 2010). Such studies have provided evidence that romantic partners' daily fluctuations of physiological states are in synchrony (Pauly, Gerstorf, et al., 2020; Timmons et al., 2015).

Physiological linkage may be considered as the result of an interpersonal process of communication and coregulation between partners (Braren et al., 2020; Sbarra & Hazan, 2008). It may reflect that both partners experience stress in their relationship, partners' joint

adjustment to stressful experiences, or how they are impacted by each other's experiences of stress (Edelstein & Chin, 2019). Thus, the coregulation of cortisol levels may point to important processes at the core of relationship functioning. Authors have conceptualized how partners up-or down-regulate each other states and how, when couples fail to coregulate, partners are subject to increased stress (Sbarra & Hazan, 2008). Coregulation may help promoting a feedback loop which may maintain stability in the relationship (Butler, 2011). Evidence highlights that partners synchronize their emotional and physiological states to a certain extent (Saxbe & Repetti, 2010; Timmons et al., 2015). However, there are not yet clear and consistent evidence that shows what cortisol linkage specifically reflects in relationship functioning or when it may reflect important aspect of relationship.

Cortisol linkage in different settings

Couples' associations of cortisol levels have been examined in various settings and periods of a relationship, such as cohabiting couples in the early stages of romantic love, couples in the early years of marriage, and older couples or parents with children (Laws et al., 2015; S. Liu et al., 2013; Papp et al., 2013; Pauly, Gerstorf, et al., 2020; Saxbe & Repetti, 2010; Schneiderman et al., 2014). Studies have also examined cortisol in laboratory (e.g., during conflict interaction paradigms), investigating cortisol secretion in response to specific stress situations. More naturalistic environments allow to trace how cortisol unfolds across days in real life situations (Timmons et al., 2015) and to study its correlates in individuals' daily lives.

High levels of cortisol across the day are predictive of poorer health outcomes and heightened relationship distress (Saxbe et al., 2008; Slatcher et al., 2015). For example, conflicts with negative communication, such as hostility, increase cortisol reactivity which in turn leads to deleterious health outcomes (Meyer & Sledge, 2020). Moreover, mutually

high levels of stress in partners may reflect reciprocal loops of negativity (Braren et al., 2020). Indeed, the literature suggests that when there are patterns of exchanges of negative affect between partners, these are accompanied by similar patterns in their physiological states (Levenson & Gottman, 1983). If both partners experience elevated stress, they may have a hard time to respond positively towards each other, which may be reflected in their cortisol linkage.

Transition to parenthood and cortisol linkage

The birth of a first child is a major life event that brings new challenges and changes for the parents and their relationship (Edelstein et al., 2015). These include sleep disruptions and psychosocial stress, and increase the risk to develop problems regarding psychological and physical health (Saxbe, Rossin-Slater, et al., 2018), by amplifying pre-existing vulnerabilities (Cowan & Cowan, 1995).

As both partners are more likely to experience stress after the birth, the stress experience of one partner is more likely to cross over to the other partner (Cowan & Cowan, 1995), leading not only to accumulation of stress in both partners, but also to a closer linkage of each other's physiological stress response (Braren et al., 2020). Several studies have investigated cortisol linkage in couples during pregnancy or postnatal periods. Most studies provided evidence for prenatal cortisol linkage (Berg & Wynne-Edwards, 2002; Braren et al., 2020; Edelstein et al., 2015; Khaled et al., 2021; Storey et al., 2000). At postpartum, one study found limited significant results for cortisol linkage between mothers and fathers (Berg & Wynne-Edwards, 2002) while another study found evidence for cortisol linkage two years after the birth of an infant (Saxbe et al., 2015).

To better understand the significance and functionality of cortisol linkage, associations between the strength of cortisol linkage and relationship functioning have been examined

(Timmons et al., 2015). Several studies found that stronger cortisol linkage was associated with poorer relationship functioning, lower marital satisfaction and relationship distress (Laws et al., 2015; Saxbe & Repetti, 2010), more spousal strain and disagreement (S. Liu et al., 2013), diminished empathy (Schneiderman et al., 2014), and increased maternal stress during pregnancy (Braren et al., 2020). Yet, some results pointed to an association of cortisol linkage with positive or neutral relationship processes, such as more time spent together (Khaled et al., 2021; Papp et al., 2013; Saxbe & Repetti, 2010), or less negative behaviours in conflict during pregnancy (Khaled et al., 2021).

Perceived partner responsiveness and support

Responding positively to the partner's disclosures of needs or concerns during stressful times conveys a sense of being understood, cared for and validated to the partner (Reis & Clark, 2013). It fosters sentiments of trust and affection, motivates reciprocation of attention and care to the partner, and promotes relationship quality and perceptions of support when facing stressful events or chronic stress (Canevello & Crocker, 2010; Smallen et al., 2021; Ter Kuile et al., 2017).

When both partners of a couple experience stress, it seems likely that such interpersonal experiences are intensified. Experiencing stress may prompt individuals to seek support from a partner. But it may also compromise one's attention to the partner's needs, or one's capability to offer and provide support to the partner, and thereby undermine positive interactions and lead to tensions. Interestingly, higher levels of perceived responsiveness before pregnancy predicted better adaptation during parenthood (e.g., decreased concerns about being a good parent and about marital changes). This may suggest that perceiving the partner to be responsive to one's needs can dampen the impact of stressors

during the transition to parenthood (Ter Kuile et al., 2017), and dampen stress responses and cortisol linkage in the relationship.

The present study

The present study aimed to better understand how the transition to parenthood affects interdependent stress responses of intimate partners. To this end, we examined cortisol levels, cortisol linkage between partners, and perceived partner responsiveness across the transition to parenthood. This study used daily data collected from 69 couples during pregnancy, at 6 months postpartum and 18 months postpartum. Cortisol data were obtained from saliva samples collected 4 times per day over three consecutive days. We expected positive associations between partners' cortisol fluctuations during pregnancy and at 6, and 18 months after birth (hypothesis 1). Moreover, we expected that the strength of cortisol linkage between partners would increase from pregnancy to 18 months after birth (hypothesis 2), and we expected this increase to occur as a function of increases in parents' physiological stress levels. We therefore predicted that increases in stress levels would be associated with increases in the strength of cortisol linkage between partners (hypothesis 3). Because perceiving the partner as responsive can enhance adaption to stress, we expected that higher levels of perceived partner responsiveness in parents would be associated with dampened cortisol linkage between partners (hypothesis 4). Finally, in a post hoc analysis, we assessed cortisol linkage using only perceived partner responsiveness as a moderator.

Method

Participants

Inclusion criteria comprised being over 18 years old, living together, speaking fluently either French or German and expecting a first child together. Couples were recruited through gynaecologists, midwives and hospitals, flyers, mailing lists, prenatal courses, and word-of-

mouth. Each couple received 800. – Swiss Francs (approximately 900 US Dollars) for participation in all parts of the study.

Data from 69 heterosexual couples expecting their first child together ($N = 138$) and having participated in the entire study were used. Mean age for women was 32.1 years old ($SD = 3.7$) and 33.8 years old ($SD = 4.5$) for men. At the time of recruitment, couples reported to be in a relationship on average for 5.8 years ($SD = 3.2$), and all couples lived in Switzerland. Participants reported a relatively high level of education, with 61.3% having a university degree, 14.6% completed another degree of advanced education, 12.4% completed an apprenticeship, 6.6% were students at a higher education institution, and 5.1% completed high school. On average, 73% participants reported being employed, 10.2% of which in an executive function, 7.3% reported being self-employed and 9.5% were not employed.

Procedure

The current study is part of a larger longitudinal project on the transition to parenthood, which started in April 2019. Couples completed assessments at four time points: during the second or third trimester of pregnancy (T1), and at 6-months (T2), 12 months (T3) and 18 months postpartum (T4). The third time point was not used in the present study as no saliva samples were collected at that time. The study was approved by the relevant ethics committee of the region.

At T1, T2 and T4, participants completed an online questionnaire including demographics questions, questions on their well-being, their relationship and health. At T1, a researcher visited each couple at their home, where interactions tasks were done. All participants provided informed consent to participate in the study and were instructed to complete a week of momentary assessment. During this week, they collected saliva samples

on three consecutive working days, 4 times a day, wore an electrocardiogram for 72 hours, and reported on their momentary experiences via a smartphone app 4 times a day during seven consecutive days. The research assistant answered all questions about the study and the measures and was available by phone if questions arose later. Once the assessment week was completed, participants sent back the material via a pre-paid courier package. T2 assessments included the online questionnaire and the assessment week. Each couple received a parcel with all material and instructions were provided again by phone before the assessment week, as well as on a protocol included with the material. T4 assessments were similar to T1 and included the online questionnaire, a visit at the couples' home and the assessment week.

Salivary cortisol measures. Across the three time of assessment, saliva samples were taken directly after awakening ($M = 7:16$ a.m.), + 30 min ($M = 7:50$ a.m.), before lunch ($M = 12:34$ p.m.) and before dinner ($M = 19:08$ p.m.), using Salivette (Sarstedt) collection devices. Cotton swabs were stored in a plastic bottle assigned to each partner, using the Medication Event Monitoring System (MEMS; AARDEX Ltd.) to measure time of saliva collection and provide accurate slope estimation. At each time of collection, participants retrieved one of the cotton swabs from the plastic bottle, rolled it in their mouth for one minute, put it back in the tube and refrigerated the sample afterwards. In addition, at each time point, participants completed a protocol with date and time of saliva collection and were instructed not to eat or drink, smoke, brush their teeth or do sport one hour before taking a sample. Saliva samples were then stored at -30°C in the freezer at the Lab and later shipped to the laboratory (Dresden Lab Service, Dresden, Germany). The lab used a commercial chemiluminescence immunoassay and the intra and interassay coefficients for cortisol were both below 7%. Participants provided 96.8 % out of 12 scheduled samples within the three days of assessments at T1, 96.6% at T2, and 94.1 % at T4. Outliers in cortisol data can bias

results, therefore all the values smaller or larger than 4 *SD* from the time of collection were dropped. Additionally, because the distribution of cortisol data were skewed, data were log-transformed prior to statistical analysis.

Covariates. The protocol completed by participants as well as demographics information assessed at each evaluation were used as covariates in the models. Specifically, we controlled for regular medicine intakes, working hours (night shift), and breastfeeding at T2 and T4. We also controlled whether participants completed the evaluation during the lockdown, due to the Covid-19 pandemic from March to June 2020 (only T1 and T2), and whether participants smoked before taking a saliva sample, had a food or drink intake and did physical exercise to adjust for possible influences on cortisol secretion (Stalder et al., 2015).

Perceived partner responsiveness (PPR). Momentary assessments of perceived partner responsiveness from the three days of cortisol measurement were used. At each prompt, participants reported with three items whether they perceived their partner to be understanding, validating, and caring, using a 10-point scale ranging from 0 (*not at all*) to 10 (*extremely*). We created a mean score of the three items. On average, scores of perceived partner responsiveness over the three days of assessment used were high for both women ($M = 8.29$; $SD = 1.60$) and men ($M = 8.23$; $SD = 1.65$). On a between-person level, internal consistency was high across women ($\alpha = .91$) and men ($\alpha = .95$) across the three times of evaluation.

Statistical analyses

To analyse the data, we used a multilevel modelling approach (MLM), to accommodate for multiple sources of non-independence due to repeated measures data across days and within dyads (Bolger & Laurenceau, 2013). The analyses used ML

estimation to accommodate missing data and variation in time intervals between repeated measures (Hruschka et al., 2005; Nicolson, 2008). Repeated measures of individuals' diurnal cortisol were nested within days, and days were nested within couples. To test our hypotheses, our analyses used cortisol levels⁴. Analyses were performed in R with the package nlme (Pinheiro et al., 2018; R Studio Team, 2015) and the software Statistical Package for the Social Sciences (SPSS; version 28).

Each participant had cortisol data from four sampling time points per day, for three consecutive days, at T1, T2 and T4 (a maximum of 36 samples). Cortisol varied *within* and *between* the three times of assessment (i.e., TTP assessments). Within TTP assessments, we calculated the mean for each participant across the 12 samples and centered at the person mean. In other words, the within TTP assessments cortisol variable reflected the variation of cortisol for each participant, within each assessment (T1, T2, T4). We used this variable to estimate cortisol linkage between partners. To reflect variation of cortisol levels between TTP assessments, we calculated an average cortisol score for each participant at each TTP assessments and centered this variable at the person mean. This variable reflected changes of the individual's average cortisol levels across the three TTP assessments. Thus, each participant had one value representing the mean of their cortisol secretion at each time point. This variable reflected the stress levels of both men and women at each time point.

In hypothesis 1, we predicted cortisol associations between partners. Thus, women's diurnal cortisol measurement was predicted by her partner's diurnal cortisol measurement. In equation 1, $WCort_{ij}$ represents the cortisol score at time i of the female partner of couple

⁴The models using diurnal cortisol slopes, cortisol awakening response, and area under the curve instead of cortisol levels were also ran. The tables with the results can be find in Appendix B.

j , $Mcort_{ij}$ reflects the cortisol score at time i of the male partner of couple j . The parameter for r_{ij} represents the within-couple residual at time i of the woman in couple j .

$$1 \quad wCort_{ij} = \beta_{0j} + \beta_{1j} (Mcort_{ij}) + r_{ij}$$

In hypothesis 2, we predicted that the associations of cortisol between partners would be stronger across transition to parenthood. Hypothesis 3 predicted that high levels of stress levels of one or both partners across the three measurement times would predict stronger cortisol linkage between partners. Similarly, for the hypothesis 4, we predicted that high levels of perceived responsiveness of one or both partners would dampen cortisol linkage.

Thus, for hypotheses 2, 3 and 4, we extended equation 1 and included two time indicators $t1t2$ and $t2t4$ to distinguish between T1 and T2, and T2 and T4 respectively. We also included two interaction terms, between cortisol levels $Mcort_{ij}$ and $t1t2$, and between cortisol levels and $t2t4$ respectively. It allowed us to measure whether cortisol associations would grow stronger between T1 and T2, and then between T2 and T4 (see equation 2).

$$2 \quad wCort_{ij} = \beta_{0j} + \beta_{1j}(Mcort_{ij}) + \beta_{2j}(t1t2) + \beta_{3j}(Mcort_{ij})(t1t2) + \beta_{4j}(t2t4) + \beta_{5j}(Mcort_{ij})(t2t4) + \beta_{6j}(CortisolM_{ij}) + \beta_{7j}(Mcort_{ij})(CortisolM_{ij}) + \beta_{8j}(CortisolW_{ij}) + \beta_{9j}(Mcort_{ij})(CortisolW_{ij}) + \beta_{10j}(PprM_{ij}) + \beta_{11j}(Mcort_{ij})(PprM_{ij}) + \beta_{12j}(PprW_{ij}) + \beta_{13j}(Mcort_{ij})(PprW_{ij}) + r_i$$

Then, we added the cortisol levels across the three measurement times for each partner, which were used to reflect stress levels of men and women. The estimates $CortisolM_{ij}$ and $CortisolW_{ij}$ indicate respectively men's stress levels at time i of the male partner in couple j , and women' stress levels at time i of the female partner in couple j . The average mean of

perceived partner responsiveness for each partner, centered at the person-mean was introduced in the model. The estimates $PprM_{ij}$ and $PprW_{ij}$ reflect the mean of perceived partner responsiveness at time i of the male partner in couple j , and of the female partner in couple j . Both variables were centered at the person mean.

Results

Descriptive statistics

The means and standard deviation of the cortisol levels and perceived partner responsiveness across days and times of measurement are presented in Table 3.1 and correlation matrix between the main variables in Table 3.2. For each hypothesis, we controlled for potential confounders that could have influenced our results, however, none of the covariates had an influence on cortisol associations. Therefore, we did not include the results of the confounders in our tables⁵.

⁵ Supplemental material of the results with the confounders can be found in Appendix C.

Table 3.1.

Mean and standard deviation of cortisol levels and perceived partner responsiveness for women and men, across three days of assessment, at pregnancy, 6 months post-partum and 18 months post-partum

	Pregnancy				6 Months Post-Partum				18 Months Post-Partum			
	Women		Men		Women		Men		Women		Men	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Day 1</i>												
Awakening	0.98	0.20	0.88	0.23	0.79	0.30	0.91	0.26	0.83	0.32	0.82	0.31
Awakening + 30 min	1.13	0.18	0.93	0.36	0.75	0.50	0.86	0.49	0.88	0.39	0.88	0.42
Before lunch	0.73	0.26	0.37	0.25	0.28	0.29	0.41	0.36	0.36	0.33	0.36	0.40
Before dinner	0.39	0.26	-0.11	0.34	-0.13	0.30	-0.24	0.43	-0.09	0.42	-0.16	0.33
Average cortisol levels	0.81	0.36	0.51	0.52	0.42	0.52	0.48	0.61	0.48	0.54	0.48	0.56
<i>Day 2</i>												
Awakening	0.96	0.17	0.85	0.21	0.75	0.29	0.86	0.33	0.75	0.43	0.79	0.40
Awakening + 30 min	1.10	0.24	0.95	0.23	0.76	0.43	0.80	0.54	0.71	0.65	0.83	0.54
Before lunch	0.78	0.13	0.39	0.41	0.28	0.32	0.30	0.38	0.33	0.31	0.32	0.44
Before dinner	0.42	0.17	-0.13	0.27	-0.16	0.30	-0.18	0.33	-0.06	0.44	-0.09	0.34
Average cortisol levels	0.81	0.31	0.51	0.52	0.40	0.51	0.46	0.58	0.44	0.57	0.47	0.57
<i>Day 3</i>												
Awakening	0.96	0.18	0.85	0.23	0.76	0.28	0.85	0.29	0.72	0.38	0.84	0.32
Awakening + 30 min	1.09	0.17	0.96	0.31	0.76	0.44	0.83	0.52	0.83	0.48	0.92	0.39
Before lunch	0.79	0.15	0.31	0.25	0.19	0.45	0.34	0.33	0.34	0.39	0.33	0.30
Before dinner	0.45	0.16	-0.07	0.32	-0.16	0.45	-0.22	0.36	-0.06	0.44	-0.03	0.45
Average cortisol levels	0.82	0.29	0.51	0.50	0.38	0.57	0.45	0.58	0.45	0.54	0.52	0.53
Perceived Partner Responsiveness	8.54	1.47	8.51	1.50	8.11	1.78	8.14	1.70	8.25	1.56	8.10	1.69

Note. N = 138. Cortisol data presented are log-transformed; Average cortisol levels represent the mean of cortisol levels across days and between the three times of measurement.

Table 3.2.

Correlation matrix for cortisol levels and perceived partner responsiveness at pregnancy, 6 months and 18 months post-partum

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Cortisol mean T1 women												
2. Cortisol mean T1 Men	.67**											
3. Cortisol mean T2 Women	.55**	.63**										
4. Cortisol mean T2 Men	.56**	.69**	.56**									
5. Cortisol mean T4 Women	.52**	.52**	.45**	.44**								
6. Cortisol mean T4 Men	.60**	.62**	.56**	.63**	.60**							
7. PPR T1 Women	.01	.02	-.01	.00	.07	.03						
8. PPR T1 Men	-.01	.01	.04	.07	.06	.08	.43**					
9. PPR T2 Women	.03	.08	.03	.03	-.01	.11**	.36**	.21**				
10. PPR T2 Men	-.02	.01	.02	-.05	.02	-.01	.40**	.64**	.50**			
11. PPR T4 Women	.07	.05	.01	.04	.14**	.09*	.56**	.22**	.39**	.32**		
12. PPR T4 Men	.02	.09	.03	.06	.04	.07	.34**	.56**	.32**	.62**	.41**	

Note. *** $p < .001$, ** $p < .01$, * $p < .05$. PPR = Perceived Partner Responsiveness; T1 = pregnancy; T2 = 6 months post-partum; T4 = 18 months post-partum; PPR = perceived partner responsiveness.

Hypothesis 1 and 2: couples' cortisol linkage and associations across the transition to parenthood

We predicted that men's and women's cortisol levels would be positively associated with each other across the three time points (hypothesis 1). The results suggest that cortisol levels of men were significantly associated with cortisol levels of women across the day ($b = .17, p < .001$) after controlling for time of sampling, and confounders. The confounders included controlling for pregnancy and breastfeeding, whether participants reported doing nightshifts, had regular intake of medicine, and whether they were evaluated during the lockdown. Next, we tested the prediction that the strength of the linkage between men's and women's cortisol levels increased across the transition to parenthood (hypothesis 2). The data suggest that across transition to parenthood, the association between men's and women's cortisol levels increased in strength, from T1 to T2 ($b = .15, p < .001$) but not from T2 to T4 ($b = -.03, p = .25$).

Hypothesis 3: couples' cortisol associations and stress levels

We further predicted that the strength of the linkage between partners' cortisol levels would grow stronger when stress levels of one or both partners were higher. The results are presented in Table 4. Results showed that when the average of cortisol across the measurement points were higher for men, there was a significantly stronger cortisol linkage between the partners ($b = .82, p < .001$). However, we did not find similar results for women ($b = .05, p = .59$). When women had higher levels of cortisol at the TTP assessments, cortisol linkage was not stronger.

Hypothesis 4: couples' cortisol linkage and perceived partner responsiveness

Our fourth hypothesis predicted that higher levels of perceived partner responsiveness would dampen cortisol linkage between partners. Results showed that neither levels of

perceived responsiveness of men ($b = -.01, p = .59$) nor of women ($b = .01, p = .08$) decreased cortisol levels' associations between the two partners. Results are presented in Table 3.3.

Table 3.3.

Associations of cortisol linkage with time measurements, cortisol levels, and perceived partner responsiveness

	Cortisol Women		
	<i>b</i>	<i>SE</i>	<i>p</i>
Intercept Women	.85	.03	<.001***
Cortisol Men	.61	.03	<.001***
Pr-6pp	.10	.04	.01**
6pp-18pp	-.03	.02	.24
Cortisol Men x Pr-6pp	.20	.05	<.001***
Cortisol Men x 6pp-18pp	-.06	.04	.10
Men Average Cortisol	.38	.08	<.001***
Women Average Cortisol	.99	.07	<.001***
Cortisol Men x Men Average Cortisol	.82	.12	<.001***
Cortisol Men x Women Average Cortisol	.05	.09	.59
Perceived Partner Responsiveness M	-.01	.02	.48
Perceived Partner Responsiveness W	.01	.02	.49
Cortisol Men x Perceived Partner Responsiveness M	-.01	.03	.59
Cortisol Men x Perceived Partner Responsiveness W	.04	.02	.08

Note. *** $p < .001$, ** $p < .01$, * $p < .05$. M = men; W = women; Pr-6pp = time indicator for pregnancy (-1) and 6 months post-partum (1); pr-18pp = time indicator for 6 months postpartum (0) and 18 months post-partum (1).

In addition to the models displayed for our hypotheses, we explored a model with only perceived partner responsiveness as a moderator. Results showed that high levels of perceived responsiveness of men dampened cortisol linkage between partners ($b = -.08, p = .008$). Contrarily, women's high levels of perceived partner responsiveness strengthened associations of cortisol between the two partners ($b = .07, p = .005$).

Discussion

The aim of this paper was to examine cortisol linkage between partners across transition to parenthood, and whether stress levels and perceived partner responsiveness were associated with stronger or weaker cortisol linkage. We expected positive cortisol associations between partners (hypothesis 1) and an increase of these associations across the transition to parenthood (hypothesis 2). Our results showed that partners' cortisol levels were positively associated. Across the transition to parenthood, cortisol linkage grew stronger from pregnancy to 6 months after the birth, but not from 6 months to 18 months after the birth of the child. We also expected that associations of cortisol would be stronger when cortisol levels were higher (hypothesis 3), and associations would be dampened when levels of perceived partner responsiveness were higher (hypothesis 4). We found that higher cortisol levels of men predicted stronger cortisol linkage, but that was not the case with cortisol levels of women. Furthermore, perceived partner responsiveness was not associated with dampened cortisol linkage between the two partners, neither for women nor for men.

Cortisol linkage across the transition to parenthood

The findings of our first hypothesis confirms the results of prior studies, showing a cortisol linkage between partners (Doerr et al., 2018; Laws et al., 2015; S. Liu et al., 2013; Pauly, Michalowski, et al., 2020; Saxbe et al., 2015; Saxbe & Repetti, 2010), also during pregnancy (Braren et al., 2020; Khaled et al., 2021). Moreover, our second hypothesis was partially confirmed, as couples showed stronger cortisol linkage between pregnancy and 6 months after the birth, but the linkage did not grow stronger 18 months after the birth. There is evidence for cortisol associations between the two partners, for two years following the birth of their child, even though not all couples experienced the transition to parenthood

(Saxbe et al., 2015). However, the study was not longitudinal, which makes it difficult to draw any conclusion on possible differences of cortisol linkage before and after birth.

The first six months after the birth of a baby are often particularly demanding. Indeed, the arrival of a child is a stressful situation, in which both partners need to adjust to the changes. For instance, new parents experience sleep deprivation, which strongly influence their mood and emotions, and thus their interactions (Medina et al., 2009). They may also sense a lack of control over their new routine with a baby, or perceive less self-efficacy in their parental behaviours (Keeton et al., 2008). Simultaneously, given the completely new situation, partners are in need of greater support from each other, which may be more difficult to provide in that moment (Smallen et al., 2021). Therefore, partners may experience heightened levels of stress from birth to 6 months post-partum, which is reflected in their physiological linkage.

From 6 to 18 months post-partum, the linkage did not grow stronger, but there were still evidence for linkage between partners. Parents may have slowly established a routine with their child. They adapt to their role as partners and parents, in the division of childcare and household labour (Curran et al., 2006), and mothers may also be back to work after their maternity leave (Staehelin et al., 2007). Simultaneously, partners are also spending more time together with their child, which may be indicated with the presence of cortisol linkage. Indeed, some studies suggest that time spend together is associated with cortisol linkage (Khaled et al., 2021; Papp et al., 2013; Saxbe & Repetti, 2010).

Stress levels and associations with cortisol linkage

The results also suggest that higher stress levels in men, as reflected by higher cortisol averages, were associated with stronger cortisol linkage, but this was not the case for

women's cortisol averages. It is important to consider that the transition to parenthood may be experienced differently between men and women (Bäckström et al., 2018; Cowan et al., 1985) and this might also be reflected by differential cortisol output. Our results are partially in line with another study, which focused on cortisol linkage between partners expecting their first child (Braren et al., 2020). Stress coregulation was found to be stronger in dyads characterized by fathers with higher cortisol levels. It was argued that during pregnancy but also post-partum, mothers are more attuned or vigilant to environmental cues, in order to protect their child (Braren et al., 2020). As a result, mothers might be more sensitive to and influenced by their partner's stress, because it may represent a threat to their child. Another possible explanation for this finding might be that both parents often experience fatigue, increased psychological stress, negative mood, or feel that they have little control over the situation. They may experience more anxiety and difficulties in communicating constructively, which affect the relationship quality (Saxbe, Rossin-Slater, et al., 2018). Thus, there may be a heightened risk of escalation of conflicts and stress between the partners, which was reflected through stronger cortisol linkage (Levenson & Gottman, 1983).

However, there was no stronger cortisol linkage when women had increased cortisol levels. One possible explanation may be that changes in cortisol levels also reflect physiological modifications due to pregnancy, rather than due to relationship or external factors. Indeed, studies showed that towards the end of pregnancy, women experience an increase, and shortly after the birth, a decrease of cortisol secretion (Berg & Wynne-Edwards, 2002; De Weerth & Buitelaar, 2005; Storey et al., 2000). Other aspects may affect the functioning of the physiological system, such as birth or breastfeeding (Saxbe, Rossin-Slater, et al., 2018).

Perceived partner responsiveness was not associated with stronger cortisol linkage

We did not find any evidence for higher perceived partner responsiveness predicting a lower cortisol linkage. Indeed, other studies on physiological linkage rather suggested associations between linkage and negative relationship outcomes, such as conflict, hostility or heightened marital distress (Laws et al., 2015; Levenson & Gottman, 1983; R. T. Liu et al., 2014; Saxbe & Repetti, 2010), which may reflect reciprocal negative affect exchanges between partners. Regarding transition to parenthood, results are still inconsistent. One study found associations of stronger linkage with higher maternal psychological stress (Braren et al., 2020), while another one found weaker cortisol linkage and higher negative behaviours during conflicts to be associated (Khaled et al., 2021). Responsiveness and its perceptions are deeply rooted into individuals' personalities and in their interactions. It is an interpersonal process that is central to maintaining relationships (Reis & Gable, 2015). In our sample, couples reported high levels of perceived partner responsiveness across the three times of measurement, which may indicate that couples have well-functioning relationships. It may be that given the relatively stable and high levels of perceived responsiveness assessed daily between partners, it is more complicated to capture a striking manifestation with physiological linkage. Moreover, positive relationship processes are a resource that may alleviate the effects of a stressful event (Karney & Bradbury, 1995). If partners report high levels of perceived responsiveness already before the birth, it may be more likely that they experience the transition to parenthood with diminished stress (Ter Kuile et al., 2017), which may be reflected with the presence of cortisol linkage, but not necessarily with stronger or dampened patterns. In their review, Timmons et al., (2015) underlined the importance of physiological linkage in specific contexts, rather than looking at whether linkage is a reflection of adaptive or maladaptive processes in relationships. This may explain why it is difficult to find a consistent pattern in associations between linkage and psychological

processes during the transition to parenthood. Specifically, we measured associations between cortisol linkage and perceived partner responsiveness at pregnancy, 6 months, and 18 months post-partum, which provided longitudinal information on these associations. In this specific period, instead of reflecting closeness and positive, – or negative interactions, physiological linkage may rather reflect a dyadic process partners experience and learn together, and in which they are challenged by a common situation. Thus, partners may mutually be attuned in their cortisol secretion (Khaled et al., 2021).

Our exploratory analysis regarding perceived partner responsiveness as the only moderator of cortisol linkage indicated that men’s high levels of perceived responsiveness dampened cortisol linkage between partners. Interestingly, when including both perceived partner responsiveness and stress levels, linkage was not dampened anymore by perceived responsiveness, while men’s high stress levels strengthened cortisol linkage. In other words, this finding suggests that if men have elevated levels of stress, they may not benefit from perceptions of their partner responsiveness, and it is reflected in the physiological linkage with their partner.

Strengths and limitations

To our knowledge, this study is the first to assess cortisol linkage and cortisol levels in a longitudinal design across transition to parenthood, using three different times of assessment. Expecting a first child involves many changes for partners at the social, psychological, and physiological levels. The longitudinal design we used from pregnancy to 18 months post-partum allowed to frame a broader picture of the biological changes in couples and the interpersonal processes occurring between partners. We also assessed couples across three consecutive days of sampling, which allowed to capture the variability in cortisol changes between partners as well as to model diurnal cortisol rhythms and linkage

between partners. Moreover, our design in salivary data collection is also a strength. This study used two monitoring strategies, with self-reported data in a diary log on the one hand, and a more objective strategy on the other hand, with the containers recording times and providing time stamps at each sampling time.

Nevertheless, important limitations of this study must be taken into consideration when interpreting the results. First, we cannot generalize our data to all couples expecting a first child. Couples included in the current study had higher than average income and education and were relatively highly satisfied with their relationships. Future research could focus on the physiological linkage across transition to parenthood in low-incomes couples. Combining financial strain with the arrival of an infant may considerably heighten distress of couples in their daily life and may be measured at the physiological level. Moreover, because saliva samples were self-collected, we had limited control over the sampling time and adherence to the protocol. Specifically, newly parents may have more difficulties to strictly follow the protocol when they have a new-born. Future research could combine different data sources to assess physiological parameters, such as salivary cortisol sampling and measures of the heart rate variability, over the course of several days, or set multiple daily reminders for participants to collect data. Additionally, it is important to consider that women's hormonal regulation of glucocorticoid steroid hormone is also dependent on the preparation to the birth as well as breastfeeding afterwards (Almanza-Sepulveda et al., 2020), which may affect cortisol secretion and thus, may not provide a precise picture of the role of physiological linkage in relationships.

To conclude, the present study shed more light on cortisol linkage between partners in a challenging, yet normative period of couples and extend the literature on physiological linkage in expectant couples. While cortisol linkage has been defined as a regulatory and

mutual process, in which partners aim at having a relatively stable system, to date it is not yet clear how relationship may be a regulator of physiological activity. However, the results of the present study provide further evidence for cortisol associations between partners and its associations with elevated stress levels, but also suggest that perceived partner responsiveness may not be reflected in physiological linkage in the context of transition to parenthood.

10. Discussion

The main goal of the contributions presented in the current thesis was to broaden the existing literature on the investigation of perceptions of responsiveness and rejection from a romantic partner, and the implications for the individuals and the couples. The following section first presents a summary of the main results and the contributions of the studies as well as a general discussion. Then we discuss some limitations to the studies and offer suggestions for future research. Finally, we elaborate on the practical implications of our findings.

10.1. Study 1

In study 1, we hypothesized that higher levels of rejection sensitivity would be associated with stronger and more persisting emotional responses after daily rejection interactions with the partner. In addition, we expected that dyadic patterns of rejection sensitivity would predict increased negativity after rejection interactions. According to our results, individuals do report negative emotions following rejection interactions, which is in line with other studies (Buckley et al., 2004; Gallegos & Gasper, 2018; Leary, 2010), and adds to the body of literature on rejection and emotional responses. However, rejection sensitivity was not associated with stronger negative emotions or slower recovery after rejection-related interactions with their partners. Not reporting stronger negative emotions or not lingering longer in a negative emotional state does not necessarily mean that individuals do not experience or perceive rejection. Rather, such results may also reflect behaviours aiming at reducing or ignoring the emotional experience, such as suppressing emotions, avoiding and self-silencing the self, which have been correlated with rejection and rejection sensitivity (Ayduk et al., 2003; Berenson et al., 2009; Harper et al., 2006; Inman & London, 2021; Romero-Canyas et al., 2013).

Rejection sensitive individuals may rather consciously or unconsciously accommodate for their partner, assuming that it is the best solution to preserve their relationship (Purdie & Downey, 2000). Applied to the risk regulation model, there is a motivation to balance between self-protection and relationship maintenance. Individuals who feel less positively regarded by a close partner naturally wish to prevent any rejection situations (Murray et al., 2006). Thus, accommodating to the other, self-silencing thoughts or opinions, displaying compliant or avoidant behaviours may indicate a twofold purpose, that is to avoid being further hurt and to reduce dependence with the partner (Murray et al., 2006). However, these behaviours are proved to be ineffective for both partners and to damage the relationship (Harper et al., 2006). Rejected and rejection sensitive individuals are less satisfied, they feel worse about themselves, and their behaviours trigger further rejection from their partner who also reports decreased satisfaction (Downey et al., 1998; Downey & Feldman, 1996; Harper et al., 2006; Murray, 2005). In the long run, reducing dependence with the partner to avoid conflictual or rejection situations bring individuals to miss opportunities of fostering intimacy with the partner, and reinforcing beliefs that the partner does not value and accept them as much as they would like them to (Overall & Hammond, 2013).

Besides, we did not find evidence to support associations between dyadic patterns of rejection sensitivity and stronger negative emotions. Thus, one may assume that rejection sensitivity may not fully impact the relationship through partners' personal traits. However, if both partners are rejection sensitive and tend to display maladaptive behaviours following rejection, the expected patterns of negative feedback loops may be more likely to be observed using naturalistic interactions between partners rather than using a momentary assessment. Interaction tasks allow to elicit spontaneous emotions and emotional responses (Roberts et al., 2007), and may be an adequate method to capture more in depth individuals'

responses to rejection, directly after the occurrence of such interaction. Specifically, it would allow to complement better both partners' behaviours and responses to each other, thus shedding more light on the mechanisms used to regulate each other's behaviours, depending on the patterns of rejection sensitivity. Moreover, the interactions we measured in this study mainly comprised situations bearing potential and clear rejection, as also used in others studies (Downey & Feldman, 1996; Murray et al., 2002; Purdie & Downey, 2000). Cues of rejection may also emerge through more fine-grained situations or manifestations, such as perceptions of disinterest, disapproval, lack of eye contact or distant body language (Leary et al., 2001). These are mostly subtle hints that rejection sensitive individuals may be more likely to perceive and interpret as rejection, without their partner noticing their effects. Specifically rejection sensitive individuals are more likely to attribute their partners' behaviours to negative intent (Downey & Feldman, 1996). As a result, associations between these hints of rejection and biased perceptions or attributions may then more likely be observed in interaction tasks.

Overall, the findings of study 1 provide us with a more specific idea of emotions triggered by rejection in daily romantic interactions. According to us, our findings may suggest the use of maladaptive behaviours and may also help to carve future research with different experimental design to assess more accurately rejection sensitivity and its implications for individuals' emotions and thus for relationship functioning.

10.2. Study 2

Study 2 examined associations between rejection, rejection sensitivity and perceived partner responsiveness in a sample of young couples, using daily diary assessment. We found that perceptions of being rejected undermine perceptions of the partner's responsiveness, for both partners. Rejection sensitivity did not impair perceptions of partner responsiveness. However, rejection sensitive women were less sensitive to daily rejection experiences,

through perceived responsiveness, and simultaneously, their partner reported more rejection from them.

Study 2 particularly emphasizes the dyadic effects of rejection on perceived partner responsiveness of both partners. Experiences of rejection undermine feelings of closeness and acceptance that individuals build with significant others (Baumeister et al., 2007). According to the model of intimacy process, individuals' responses are strongly shaped by their personal needs and goals, and the perceptions and interpretations of their partner's responses (Reis & Clark, 2013). If one perceives his or her partner as not responding with understanding, caring and validating manners, he or she may mirror what they interpreted from the partner. In other words, individuals display less responsive behaviours towards their partner and the positive feedback loop that aims at fostering intimacy may be disrupted. Contrarily, if partners manage to respond constructively, they may avoid possible escalation of conflict and thus restore feelings of intimacy.

Our findings regarding women's rejection sensitivity point to similar evidence in the literature. Even though women are more responsive and adjust more accurately to their partners' needs (Neff & Karney, 2005), when they are rejection sensitive, they provide less emotional support and are more hostile towards their partner (Downey & Feldman, 1996). It may thus come as no surprise that men report more rejection from their rejection sensitive partner. Following experiences of loss, in which individuals perceive less security and closeness from the partner with whom they regulate, they aim at restoring internal homeostasis and recovering from such experiences (Sbarra & Hazan, 2008). Similarly, when rejected, rejection sensitive individuals, particularly, may sense a loss of closeness. They need to focus on themselves, allocating their resources to regulate and protect the self. However, such behaviours may be at the expense of identifying and responding adequately

to emotional experiences of the partner (Meehan et al., 2019). Applied to the risk regulation model, individuals choose to protect themselves by fear of being hurt (Murray, 2005). As a result, because they feel less valued, they treat their partner in rejecting ways afterwards (Murray et al., 2003), which may strongly be felt by their partner. This could particularly apply to our findings regarding rejection sensitive women and their partner.

Individuals need some reassurance that their partner will respond to them with acceptance and warmth, so they can respond constructively to their partner (Murray, 2005). In the long run, experiences and perceptions of repeated rejection in daily interactions may trigger increased hostility or weariness from partners of rejection sensitive individuals, on the one hand (Downey et al., 1998). On the other hand, rejection sensitive individuals may experience considerable amount of stress from such situations. For instance, evidence from other works have demonstrated associations between rejection and physiological stress responses (Gunnar et al., 2003; Stroud et al., 2002) and how relational stressors impact rejection sensitive individuals in their perceptions and behavioural responses (Chango et al., 2012). As a result, expectations and concerns about rejection may become too pervasive, fostering negative attributions and thoughts about rejection from the partner. Besides, if individuals learn that their partner does not respond with care and validation, they may rather stop investing in the relationship than experiencing further relationship dissatisfaction (Downey & Feldman, 1996).

Taken together, Study 2 used a design to measure both actor and partner effects of rejection, which allowed to highlight partner's dependency on each other's responses, and how personal trait may bias and shape their responses. Our findings indicate that perceived responsiveness and rejection are, as expected, closely associated. Perceived partner

responsiveness promotes intimacy and relationship satisfaction. Rejection and rejection sensitivity may undermine these perceptions and thus relationship functioning.

10.3. Study 3

Study 3 provided further information on relationships processes occurring between partners in a challenging context that is transition to parenthood. Specifically, cortisol associations (or cortisol linkage) between partners and the potential role of physiological stress levels and perceived partner responsiveness were investigated. First, our findings corroborate the concept of coregulation between partners, that is, that partners are linked in their cortisol levels, in their daily interactions. Specifically, there is a certain “attunement” in their physiological stress. However, to date, it remains inconsistent whether the linkage is associated with adaptive or maladaptive relationships processes (Timmons et al., 2015). Therefore, we examined stress levels and perceived partner responsiveness, which allowed us to dig further into the underlying mechanisms linking psychological and physiological levels.

On the one hand, when men had higher levels of stress, cortisol linkage between the partners was stronger, but it was not the case for women. One study suggested that women are more physiologically reactive when faced with negative interpersonal events, compared to men (Stroud et al., 2002). If men report higher levels of stress across the transition to parenthood, it may be observed in their behaviours, to which their female partners are more sensitive to. As a result, women are physiologically more activated and thus are closely linked to their partner’s physiological stress. Moreover, potential threats surrounding the new-born may also activate women’s cortisol secretion (Braren et al., 2020), which then translate into stronger associations of cortisol with their partner. These findings highlight the dyadic and interdependent nature of interactions between partners, and even though

inevitable, how stress may easily transmit from one partner to the other (Randall & Bodenmann, 2017).

On the other hand, our findings indicated that perceived partner responsiveness was not associated with dampened cortisol linkage. Perceiving that a partner is validating, understanding and caring contributes to both partners' well-being and to a healthy functioning of the relationship (Reis & Gable, 2015). Moreover, partners that perceive less responsiveness before the birth of their child are more likely to experience decline in relationship satisfaction (Smallen et al., 2021) and to perceive that they adapt less well to the transition (Ter Kuile et al., 2017). Our sample reported relatively high levels of perceived partner responsiveness, and these levels remained high from pregnancy to after the birth of their child. Positive relational processes may help alleviate the impact of potentially stressful events, such as transition to parenthood (Karney & Bradbury, 1995). For these couples who reported high levels of perceived responsiveness, the transition may have been experienced as less stressful, which may explain the absence of associations with cortisol linkage.

Interestingly then, the findings of study 3 suggest that cortisol linkage also depends on the context in which it occurs. There are contrasted results from this study and from the existing literature, indicating associations between stronger linkage and higher stress (Braren et al., 2020) but also with less negative conflict behaviours (Khaled et al., 2021). One may argue that during transition to parenthood, cortisol linkage rather reflects a major life event shared by the two partners are the same moment, in which both are challenged and experience individuals and relationship changes. Such associations between physiological linkage and shared time together have already been highlighted in the literature (Khaled et al., 2021; Papp et al., 2013; Saxbe & Repetti, 2010). Thus, our findings may suggest that high and relatively unchanged levels of perceived partner responsiveness across the

transition translate into stable physiological coregulation between the two partners. Despite this major life event, partners perceiving high responsiveness are still linked, which rather indicate that linkage reflect attunement or closeness (Timmons et al., 2015).

Taken together, study 3 highlights differences in stress coregulation when one partner experiences heightened physiological stress and provide further information on the associations between psychological and physiological processes in a challenging period. Perceptions that the partner is responsive to one's needs and goals is an important ingredient in relationship functioning. In time of stress, perceiving a partner as being responsive enhances relationship maintenance. However, it was not observed in changes of linkage, which points to the possibility that cortisol linkage does not necessarily reflect adaptive, or maladaptive psychological processes in romantic relationships. Rather, it is important to consider the context and thus when linkage occurs. Despite the risk for social allostatic load (Saxbe et al., 2020), couples are still experiencing a similar experience, which may bring them closer to each other and may be observed in their physiological states.

10.4. General discussion

The three contributions of this thesis bring further evidence for how relational processes unfold through interactions between partners. Experiences of rejection in daily interaction impact individuals' emotional responses. Similarly, following rejection, we observed that both partners perceived less responsiveness from each other, which suggests that in their daily interactions, a core aspect of the good functioning of relationships may readily be impaired. Overall, our findings indicate that partners are sensitive to each other, whether they display responsive or rejecting behaviours. Interestingly, in a stressful period like transition to parenthood, perceived partner responsiveness may not be reflected in physiological linkage between partners. Nonetheless, both partners are still strongly

associated in their cortisol secretion in daily life, which also points to a certain attunement towards each other in their physiological regulation.

Taken together, daily interactions with the partner are of interest to capture dynamics in couples, and particularly in this thesis, to assess implications of perceived rejection and responsiveness. Relationships highlight the interdependence nature between partners, in terms of emotions, behaviours and physiology (Butler, 2011). Investigating real-time dynamics between partners in various contexts sheds more light on why and when individuals are triggered, but also on their responses and their psychosocial adjustment (Lougheed & Hollenstein, 2018). The use of different frameworks allowed us to emphasize the dyadic nature of interactions between partners, and the potential threats that may emerge at certain times. For instance, the risk regulation model provides further understanding on individuals' mechanisms. When partners are confronted with a risk of rejection, their choice is to either respond constructively or shield themselves from the relationship to avoid negative emotions or being hurt (Murray et al., 2006; Schoebi & Randall, 2015). However, one may prefer protection and responds with maladaptive behaviours, such as rejection sensitive individuals (Downey & Feldman, 1996). These behaviours may be perceived by the partner as negative, which may trigger less positive responses or rejecting behaviours (Downey et al., 1998). In the long run, there is a risk for negative affect reciprocity and escalation of conflict between the two partners (Levenson & Gottman, 1983), which may be reflected in the synchronisation of their physiological states (Timmons et al., 2015). Cortisol linkage may also indicate that depending on the context, it reflects shared time together (Khaled et al., 2021; Papp et al., 2013), regardless of whether partners are highly responsive towards each other. However, if partners choose to protect themselves in certain situations, they may miss opportunities to foster intimacy (Overall & Hammond, 2013) and it may be felt in their behavioural and physiological responses.

10.5. Limitations and implications for future research

There are several notable limitations to the studies presented in the current thesis. First, the three contributions used samples of individuals that are not representative of the population. Therefore, it is difficult to generalize our results to a larger population. Participants were overall healthy, had above-average income and education and had healthy relationship functioning. Highly satisfied couples adapt relatively seamlessly to stressors, which may render the examination of maladaptive responses and negative relational processes more challenging. Thus, our findings may rather generalize to relatively non-distressed couples, in which partners are well committed in their relationship, have high levels of relationship satisfaction, and have no mental or physical health problems that may alter relationship functioning. For instance, samples of study 1 and 3 encompass couples expecting a first child, which point to a high degree of commitment, to share this experience together. Examining more distressed couples, or couples with lower levels of education and income would increase the generalization of the findings. Additionally, conditions to take part in all studies were to assess couples, therefore both partners had to commit and invest time in participating, which may also have caused selection of a specific type of couples.

Regarding the subjects of both study 1 and study 2, they were low on the rejection sensitivity scale. Specifically screening for rejection sensitivity beforehand the participation would allow to obtain more striking results for the implications of this personal disposition on relationships. Finally, we assessed heterosexual couples, which is also a potential bias and result in decreased generalization of our results. Indeed, lesbian and gay individuals experience more stress, because the social context stigmatizes them, their identity and their romantic involvement in a same-sex relationship (Guschlbauer et al., 2019). This stress related to discrimination may affect both individuals' well-being and their relationship. Further studies may consider assessing both same-sex and different-sex couples, to allow a

broader inclusion, to reflect the actual social context, as well as normalizing research on the topic.

Another limitation concerns the assessment of rejection sensitivity. While the Adult Rejection Sensitivity Questionnaire measures an individual trait that applies to all domains of an individual's life and is developed through childhood (Downey & Feldman, 1996; Feldman & Downey, 1994), the scale does not specifically assess for rejection from a romantic partner. Rejection-related anxious thoughts and expectations may be stronger and more pervasive when associated with a romantic partner. Mainly because individuals show themselves more vulnerable with their partner (Murray et al., 2006), which may render them more sensitive to conceivable rejection. Future studies may benefit from a scale integrating daily situations or perceptions that may point to more specific cues of rejection, such as describing subjective effects of facial expressions while interacting. Some studies indicate that rejection sensitive individuals are more reactive when faced with different facial expression, such as anger or disapproval (Burklund et al., 2007; Romero-Canyas et al., 2010). Moreover, integrating specific questions linking rejection and emotional responses triggered in individuals may help better understand the putative effects of such interpersonal interactions on individuals.

The use of diary studies are also prone to some limitations. First, participants were asked to report on their emotions, perceptions of the partner's behaviours and had to provide regular information on salivary data collection. Diary studies allow to capture psychological experiences and contextual events unfolding spontaneously in individual's daily life (Bolger et al., 2003). However, implementing such method demands a relatively high level of commitment from participants, which may discourage them, depending on the length of the assessments. Importantly, individuals may be undergoing considerable stress or may

experience stressful events. As a result, participants may feel a weariness to answer regularly and to be consistent with their participation or may sometimes withdraw from the assessments. Besides, habituation may also shape individuals' reports on their daily experiences. They may either quickly skim over the questions that do not apply to their experience, or they may become exceedingly aware of some aspects and less sensitive to others (Bolger et al., 2003). Second, the methodology we used did not allow us to make specific causal inferences between our variables (Bolger et al., 2003), mainly because possible causes and consequences are meant to occur naturally, contrarily to experimental design. These methods are best used in complement to other research designs, such as interaction tasks, where partners discuss about different topics. The goal of interaction tasks is to elicit emotional and behavioural responses from each partner (Lougheed & Hollenstein, 2018). This design would be complementary to diary studies because there is a greater control over participants' behaviours in a given context (Lougheed & Hollenstein, 2018). Finally, another consideration of diary studies is the time design. Indeed, the studies used a fixed-schedule design (Bolger et al., 2003), where participants complete ambulatory assessment at specific times of the day. Interactions we assessed with diary studies may not have been specific striking events that individuals remember hours after their occurrence. Rather the phenomenon we assessed may have been more difficult to retrospectively recall. To counteract these potential biases and to capture best interactions unfolding between partners through the day, the time between each assessment could be reduced.

Finally, the three contributions of this thesis comprise data from mostly Caucasian (vs. Asian, for instance) individuals. There may be differences in relationships' dynamics depending on the culture and the environment, such as self-disclosing or beliefs about relationships (Lou & Li, 2017; Tasfiliz et al., 2018). Thus, perceptions of responsiveness and rejection may differ greatly and have consequences for romantic relationships. For

instance, evidence demonstrated that perceived responsiveness is beneficial for both American and Japanese individuals' well-being, but remains a stronger predictor for individuals in the US (Tasfiliz et al., 2018). Future research may benefit from investigating differences in inter-cultural couples. If cultural differences modify perceived partner responsiveness, or shape individuals' differences in perceptions of rejection, partners may be more at risk to experience greater dissatisfaction or maintaining the relationship may be more arduous.

10.6. Implications for clinical practice

Perceptions of rejection and responsiveness have consequences for the partners and for the relationship (Downey & Feldman, 1996; Reis & Gable, 2015). In distressed or dysfunctional relationships, individuals are more prone to develop psychiatric disorders or symptoms (Whisman & Baucom, 2012). Several studies demonstrated the correlates between rejection sensitivity and depressive symptoms (Ayduk et al., 2001; Chango et al., 2012; R. T. Liu et al., 2014) or borderline disorder (Berenson et al., 2011; Poggi et al., 2019; Staebler et al., 2011). Similarly, couples experiencing the transition to parenthood are more vulnerable to also develop mental disorders, such as depression or anxiety (Grant et al., 2008; Mitchell et al., 2019; Paulson et al., 2006; Zaers et al., 2008).

Thus, it is of importance to help individuals to recognize and accept their emotions when they are in distress. Mindfulness, a concept widely developed by researchers and practitioners, has been increasingly assessed both in research and in therapy. Mindfulness enhances self-regulation strategies through recognition and acceptance of the emotions arising in the present moment, without judgment or attempting to react to the situations (Bishop et al., 2004; Carson et al., 2004; Khalifian & Barry, 2016). Dispositional mindfulness has been associated with higher perceived responsiveness (Khalifian & Barry, 2021), greater relationship satisfaction through emotion identification, communication and

empathy (Wachs & Cordova, 2007), and with reduced rumination and anger (Peters et al., 2015). When individuals perceive rejection or diminished responsiveness from their partner, they may tend to respond with avoidance or defensiveness, which contributes to relationship distress (Khalifian & Barry, 2021; Wachs & Cordova, 2007). Thus, mindfulness allows for partners to be heard, accepted and validated in their experience (Khalifian & Barry, 2021). Some studies demonstrated that mindfulness alleviates the negative emotional effects of rejection, for individuals with borderline personality traits (Keng & Tan, 2018; Peters et al., 2016).

Mindfulness has been implemented in cognitive-behavioural therapy (CBT) and other therapeutic interventions, with mindfulness-based interventions (MBIs). The most known is the Mindfulness-Based Stress Reduction (MBSR), an 8-week program of training meditation, that aims at developing self-regulation, stress reduction and emotion management (Kabat-Zinn, 1990). Evidence has highlighted the implications for individuals and relationships. For instance, MBIs contribute to reduce interpersonal distress, rejection sensitivity, enhance forgiveness and empathy (Joss et al., 2020), help individuals approaching potentially stressful events as a challenge rather than a threat (O'Kelly & Collard, 2014), such as transition to parenthood (Bardacke & Duncan, 2014), promote connectedness and closeness, and decrease overall stress (Carson et al., 2004; O'Kelly & Collard, 2014). Importantly, reviews indicate that MBSR is recommended in treatments to alleviate symptoms of stress, anxiety and depression (Fjorback et al., 2011; Hofmann & Gómez, 2017). Further interventions could focus on specific interactions between partners. For instance, with a MBSR intervention, partners may learn to identify and communicate on rejection- or stress-related emotions, and handle them together in a more constructive, empathetic way. Thus, it prevents partners to step in unhealthy interactions, such as self-fulfilling prophecy or feedback loops of negativity, which may jeopardize the good

functioning of relationships. Moreover, individuals' abilities to validate and accept their own experience are enhanced and they may also learn to understand, accept and respond to their partner's emotions and experiences, with less judgment and negative emotions.

11. Conclusion

The present thesis aimed at examining further how perceptions of rejection and responsiveness from a romantic partner shaped individuals' responses and the implications for relationship functioning. Overall, the three contributions highlighted that individuals' perceptions affect behavioural and emotional responses. Moreover, being involved in a romantic relationship implies that personal traits, such as rejection sensitivity, and the context play an important role in the mechanisms underlying the good functioning of relationships. The main findings indicated that perceptions of the partner's behaviours have implications for individuals. Specifically, perceiving rejection from the partner trigger negative emotions in individuals and undermine both partner's perceived responsiveness. Additionally, the findings on rejection sensitivity suggest that mechanisms of emotion regulation in rejection sensitive individuals may be difficult to capture in romantic relationships. Finally, partners are closely linked in their cortisol levels in daily life. These findings generally further support the idea that both partners' emotional, behavioural, and physiological responses are closely linked to each other.

Individuals' perceptions are critical to establish emotional and behavioural responses when interacting with a significant other, especially because both partners are interdependent. They must consider and balance between their own needs and their partner's needs. When partners have adequate personal and relational resources, they may adjust and navigate more comfortably through life events and through daily interactions with each other. Positive relational processes are then instigated in intimate relationships. Both partners may benefit from them, and their relationship may thrive for the better.

References

- Almanza-Sepulveda, M. L., Fleming, A. S., & Wibke, J. (2020). Mothering revisited: A role for cortisol? *Hormones and Behavior*, *121*. <https://www.sciencedirect.com/science/article/pii/S0018506X20300052>
- Ayduk, Ö., Downey, G., & Kim, M. (2001). Rejection sensitivity and depressive symptoms in women. *Personality and Social Psychology Bulletin*, *27*(7), 868–877. <https://doi.org/10.1177/0146167201277009>
- Ayduk, Ö., Downey, G., Testa, A., Yen, Y., & Shoda, Y. (1999). Does rejection elicit hostility in rejection sensitive women? *Social Cognition*, *17*(2), 245–271. <https://doi.org/10.1521/soco.1999.17.2.245>
- Ayduk, Ö., May, D., Downey, G., & Higgins, E. T. (2003). Tactical differences in coping with rejection sensitivity: The role of prevention pride. *Personality and Social Psychology Bulletin*, *29*(4), 435–448. <https://doi.org/10.1177/0146167202250911>
- Bäckström, C., Kåreholt, I., Thorstensson, S., Golsäter, M., & Mårtensson, L. B. (2018). Quality of couple relationship among first-time mothers and partners, during pregnancy and the first six months of parenthood. *Sexual and Reproductive Healthcare*, *17*, 56–64. <https://doi.org/10.1016/j.srhc.2018.07.001>
- Bardacke, N., & Duncan, L. G. (2014). Mindfulness-Based Childbirth and Parenting. In *Mindfulness-Based Treatment Approaches* (pp. 213–237). Academic Press. <https://doi.org/10.1016/b978-0-12-416031-6.00010-4>
- Baumeister, R. F., Brewer, L. E., Tice, D. M., & Twenge, J. M. (2007). Thwarting the Need to Belong: Understanding the Interpersonal and Inner Effects of Social Exclusion. *Social and Personality Psychology Compass*, *1*(1), 506–520. <https://doi.org/10.1111/j.1751-9004.2007.00020.x>
- Baumeister, R. F., & Leary, M. R. (1995). The Need to Belong: Desire for Interpersonal Attachments as a Fundamental Human Motivation. *Psychological Bulletin*, *117*(3), 497–529. <https://doi.org/10.1037/0033-2909.117.3.497>
- Berenson, K. R., Downey, G., Rafaeli, E., Coifman, K. G., & Lenvethal, N. (2011). The rejection–rage contingency in borderline personality disorder. *Journal of Abnormal Psychology*, *120*(3), 681–690. <https://doi.org/10.1037/a0023335>
- Berenson, K. R., Gyurak, A., Ayduk, Ö., Downey, G., Garner, M. J., Mogg, K., Bradley, B. P., & Pine, D. S. (2009). Rejection sensitivity and disruption of attention by social threat cues. *Journal of Research in Personality*, *43*(6), 1064–1072. <https://doi.org/10.1016/j.jrp.2009.07.007>
- Berg, S. J., & Wynne-Edwards, K. E. (2002). Salivary hormone concentrations in mothers and fathers becoming parents are not correlated. *Hormones and Behavior*, *42*(4), 424–436. <https://doi.org/10.1006/hbeh.2002.1841>
- Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Segal, Z. V.,

- Abbey, S., Speca, M., Velting, D., & Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice, 11*(3), 230–241. <https://doi.org/10.1093/CLIPSY.BPH077>
- Blackhart, G. C., Nelson, B. C., Knowles, M. L., & Baumeister, R. F. (2009). Rejection elicits emotional reactions but neither causes immediate distress nor lowers self-esteem: A meta-analytic review of 192 studies on social exclusion. *Personality and Social Psychology Review, 13*(4), 269–309. <https://doi.org/10.1177/1088868309346065>
- Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary Methods: Capturing Life as it is Lived. *Annual Review of Psychology, 54*(1), 579–616. <https://doi.org/10.1146/annurev.psych.54.101601.145030>
- Bolger, N., & Laurenceau, J.-P. (2013). *Intensive longitudinal methods: An introduction to diary and experience sampling research*. The Guildford Press.
- Braren, S. H., Brandes-Aitken, A., Ribner, A., Perry, R. E., & Blair, C. (2020). Maternal psychological stress moderates diurnal cortisol linkage in expectant fathers and mothers during late pregnancy. *Psychoneuroendocrinology, 111*. <https://doi.org/10.1016/j.psyneuen.2019.104474>
- Buckley, K. E., Winkel, R. E., & Leary, M. R. (2004). Reactions to acceptance and rejection: Effects of level and sequence of relational evaluation. *Journal of Experimental Social Psychology, 40*(1), 14–28. [https://doi.org/10.1016/S0022-1031\(03\)00064-7](https://doi.org/10.1016/S0022-1031(03)00064-7)
- Burklund, L. J., Eisenberger, N. I., & Lieberman, M. D. (2007). The face of rejection: Rejection sensitivity moderates dorsal anterior cingulate activity to disapproving facial expressions. *Social Neuroscience, 2*(3–4), 238–253. <https://doi.org/10.1080/17470910701391711>
- Butler, E. A. (2011). Temporal interpersonal emotion systems: The “TIES” that form relationships. *Personality and Social Psychology Review, 15*(4), 367–393. <https://doi.org/10.1177/1088868311411164>
- Butler, E. A., Egloff, B., Wilhelm, F. H., Smith, N. C., Erickson, E. A., & Gross, J. J. (2003). The Social Consequences of Expressive Suppression. *Emotion, 3*(1), 48–67. <https://doi.org/10.1037/1528-3542.3.1.48>
- Butler, E. A., & Randall, A. K. (2013). Emotional coregulation in close relationships. *Emotion Review, 5*(2), 202–210. <https://doi.org/10.1177/1754073912451630>
- Butner, J., Diamond, L. M., & Hicks, A. M. (2007). Attachment style and two forms of affect coregulation between romantic partners. *Personal Relationships, 14*(3), 431–455. <https://doi.org/10.1111/j.1475-6811.2007.00164.x>
- Cacioppo, J. T., & Hawkley, L. C. (2003). Social Isolation and Health, with an Emphasis on Underlying Mechanisms. *Perspectives in Biology and Medicine, 46*(3), S39–S52. <https://doi.org/10.1353/pbm.2003.0063>
- Canevello, A., & Crocker, J. (2010). Creating Good Relationships: Responsiveness,

- Relationship Quality, and Interpersonal Goals. *Journal of Personality and Social Psychology*, 99(1), 78–106. <https://doi.org/10.1037/a0018186>
- Carson, J. W., Carson, K. M., Gil, K. M., & Baucom, D. H. (2004). Mindfulness-based relationship enhancement. *Behavior Therapy*. *Behavior Therapy*, 35(3), 471–494. <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.465.5158>
- Chango, J. M., McElhaney, K. B., Allen, J. P., Schad, M. M., & Marston, E. (2012). Relational stressors and depressive symptoms in late adolescence: Rejection sensitivity as a vulnerability. *Journal of Abnormal Child Psychology*, 40(3), 369–379. <https://doi.org/10.1007/s10802-011-9570-y>
- Cook, W. L., & Kenny, D. A. (2005). The actor-partner interdependence model: A model of bidirectional effects in developmental studies. *International Journal of Behavioral Development*, 29(2), 101–109. <https://doi.org/10.1080/01650250444000405>
- Cowan, C. P., & Cowan, P. A. (1995). Interventions to Ease the Transition to Parenthood: Why They Are Needed and What They Can Do. *Family Relations*, 44(4), 412–423. <https://doi.org/10.2307/584997>
- Cowan, C. P., Cowan, P. A., Heming, G., Garrett, E., Coysh, W. S., Curtis-Boles, H., & Boles, A. J. (1985). Transitions to Parenthood: His, Hers, and Theirs. *Journal of Family Issues*, 6(4), 451–481. <https://doi.org/10.1177/019251385006004004>
- Coyne, J. C., Thompson, R., & Palmer, S. C. (2002). Marital quality, coping with conflict, marital complaints, and affection in couples with a depressed wife. *Journal of Family Psychology*, 16(1), 26–37. <https://doi.org/10.1037/0893-3200.16.1.26>
- Curran, M., Hazen, N., Jacobvitz, D., & Sasaki, T. (2006). How representations of the parental marriage predict marital emotional attunement during the transition to parenthood. *Journal of Family Psychology*, 20(3), 477–484. <https://doi.org/10.1037/0893-3200.20.3.477>
- De Weerth, C., & Buitelaar, J. K. (2005). Cortisol awakening response in pregnant women. *Psychoneuroendocrinology*, 30(9), 902–907. <https://doi.org/10.1016/j.psyneuen.2005.05.003>
- Debrot, A., Cook, W. L., Perrez, M., & Horn, A. B. (2012). Deeds matter: Daily enacted responsiveness and intimacy in couples' daily lives. *Journal of Family Psychology*, 26(4), 617–627. <https://doi.org/10.1037/a0028666>
- Ditzen, B., Germann, J., Meuwly, N., Bradbury, T. N., Bodenmann, G., & Heinrichs, M. (2019). Intimacy as Related to Cortisol Reactivity and Recovery in Couples Undergoing Psychosocial Stress. *Psychosomatic Medicine*, 81(1), 16–25. <https://doi.org/10.1097/PSY.0000000000000633>
- Ditzen, B., Hoppmann, C. A., & Klumb, P. (2008). Positive couple interactions and daily cortisol: On the stress-protecting role of intimacy. *Psychosomatic Medicine*, 70(8), 883–889. <https://doi.org/10.1097/PSY.0b013e318185c4fc>

- Ditzen, B., Schmidt, S., Strauss, B., Nater, U. M., Ehlert, U., & Heinrichs, M. (2008). Adult attachment and social support interact to reduce psychological but not cortisol responses to stress. *Journal of Psychosomatic Research*, *64*(5), 479–486. <https://doi.org/10.1016/j.jpsychores.2007.11.011>
- Dockray, S., Bhattacharyya, M. R., Molloy, G. J., & Steptoe, A. (2008). The cortisol awakening response in relation to objective and subjective measures of waking in the morning. *Psychoneuroendocrinology*, *33*(1), 77–82. <https://doi.org/10.1016/j.psyneuen.2007.10.001>
- Doerr, J. M., Nater, U. M., Ehlert, U., & Ditzen, B. (2018). Co-variation of fatigue and psychobiological stress in couples' everyday life. *Psychoneuroendocrinology*, *92*, 135–141. <https://doi.org/10.1016/j.psyneuen.2018.01.016>
- Domingue, R., & Mollen, D. (2009). Attachment and conflict communication in adult romantic relationships. *Journal of Social and Personal Relationships*, *26*(5), 678–696. <https://doi.org/10.1177/0265407509347932>
- Don, B. P., & Mickelson, K. D. (2014). Relationship satisfaction trajectories across the transition to parenthood among low-risk parents. *Journal of Marriage and Family*, *76*(3), 677–692. <https://doi.org/10.1111/jomf.12111>
- Dooley, M. K., Sweeny, K., Howell, J. L., & Reynolds, C. A. (2018). Perceptions of Romantic Partners' responsiveness during a period of stressful uncertainty. *Journal of Personality and Social Psychology*, *115*(4), 677–687. <https://doi.org/10.1037/pspi0000134>
- Downey, G., Berenson, K. R., & Kang, J. (2006). *Correlates of the adult rejection sensitive questionnaire*. Unpublished data. Columbia University.
- Downey, G., & Feldman, S. I. (1996). Implications of Rejection Sensitivity for Intimate Relationships. *Journal of Personality and Social Psychology*, *70*(6), 1327–1343. <https://doi.org/10.1037/0022-3514.70.6.1327>
- Downey, G., Feldman, S. I., & Ayduk, Ö. (2007). Rejection sensitivity and male violence in romantic relationships. *Personal Relationships*, *7*(1), 45–61. <https://doi.org/10.1111/j.1475-6811.2000.tb00003.x>
- Downey, G., Freitas, A. L., Michaelis, B., & Khouri, H. (1998). The self-fulfilling prophecy in close relationships: Rejection sensitivity and rejection by romantic partners. *Journal of Personality and Social Psychology*, *75*(2), 545–560. <https://doi.org/https://doi.org/10.1037/0022-3514.75.2.545>
- Edelstein, R. S., & Chin, K. (2019). Hormones and close relationship processes: Neuroendocrine bases of partnering and parenting. In O. C. Schultheiss & P. H. Mehta (Eds.), *Routledge International Handbook of Social Neuroendocrinology* (Routledge, pp. 281–297). <https://doi.org/10.4324/9781315200439-17>
- Edelstein, R. S., Wardecker, B. M., Chopik, W. J., Moors, A. C., Shipman, E. L., & Lin, N. J. (2015). Prenatal hormones in first-time expectant parents: Longitudinal changes and

- within-couple correlations. *American Journal of Human Biology*, 27(3), 317–325. <https://doi.org/10.1002/ajhb.22670>
- Feeney, B. C., & Collins, N. L. (2015). A New Look at Social Support: A Theoretical Perspective on Thriving Through Relationships. *Personality and Social Psychology Review*, 19(2), 113–147. <https://doi.org/10.1177/1088868314544222>
- Feeney, J. A. (2004). Hurt feelings in couple relationships: Towards integrative models of the negative effects of hurtful events. *Journal of Social and Personal Relationships*, 21(4), 487–508. <https://doi.org/10.1177/0265407504044844>
- Feeney, J. A. (2005). Hurt feelings in couple relationships: Exploring the role of attachment and perceptions of personal injury. *Personal Relationships*, 21(4), 487–508. <https://doi.org/10.1111/j.1350-4126.2005.00114.x>
- Feldman, S. I., & Downey, G. (1994). Rejection sensitivity as a mediator of the impact of childhood exposure to family violence on adult attachment behavior. *Development and Psychopathology*, 6(1), 231–247. <https://doi.org/10.1017/S0954579400005976>
- Fjorback, L. O., Arendt, M., Ornbol, E., Fink, P., & Walach, H. (2011). Mindfulness-based stress reduction and mindfulness-based cognitive therapy - a systematic review of randomized controlled trials. *Acta Psychiatrica Scandinavica*, 124(2), 102–119. <https://doi.org/10.1111/j.1600-0447.2011.01704.x>
- Gallegos, J. M., & Gasper, K. (2018). Differential effects of rejection and acceptance on feeling shocked, numb, and neutral. *Emotion*, 18(4), 536–550. <https://doi.org/10.1037/emo0000366>
- Galliher, R. V., & Bentley, C. G. (2010). Links between rejection sensitivity and adolescent romantic relationship functioning: The mediating role of problem-solving behaviors. *Journal of Aggression, Maltreatment and Trauma*, 19(6), 603–623. <https://doi.org/10.1080/10926771.2010.502066>
- Gao, S., Assink, M., Cipriani, A., & Lin, K. (2017). Associations between rejection sensitivity and mental health outcomes: A meta-analytic review. *Clinical Psychology Review*, 57, 59–74. <https://doi.org/10.1016/j.cpr.2017.08.007>
- Gerber, J., & Wheeler, L. (2009). On being rejected: A meta-analysis of experimental research on rejection. *Perspectives on Psychological Science*, 4(5), 468–488. <https://doi.org/10.1111/j.1745-6924.2009.01158.x>
- Glade, A. C., Bean, R. A., & Vira, R. (2005). A prime time for marital/relational intervention: A review of the transition to parenthood literature with treatment recommendations. *American Journal of Family Therapy*, 33(4), 319–336. <https://doi.org/10.1080/01926180590962138>
- Grant, K. A., McMahon, C., & Austin, M. P. (2008). Maternal anxiety during the transition to parenthood: A prospective study. *Journal of Affective Disorders*, 108(1–2), 101–111. <https://doi.org/10.1016/j.jad.2007.10.002>

- Gunnar, M. R., Sebanc, A. M., Tout, K., Donzella, B., & Van Dulmen, M. M. H. (2003). Peer Rejection, Temperament, and Cortisol Activity in Preschoolers. *Developmental Psychology, 43*(4), 346–368. <https://doi.org/10.1002/dev.10144>
- Guschlbauer, A., Smith, N. G., DeStefano, J., & Soltis, D. E. (2019). Minority stress and emotional intimacy among individuals in lesbian and gay couples: Implications for relationship satisfaction and health. *Journal of Social and Personal Relationships, 36*(3), 855–878. <https://doi.org/10.1177/0265407517746787>
- Harper, M. S., Dickson, J. W., & Welsh, D. P. (2006). Self-silencing and rejection sensitivity in adolescent romantic relationships. *Journal of Youth and Adolescence, 35*(3), 435–443. <https://doi.org/10.1007/s10964-006-9048-3>
- Hofmann, S. G., & Gómez, A. F. (2017). Mindfulness-Based Interventions for Anxiety and Depression. *Psychiatric Clinics of North America, 40*(4), 739–749. <https://doi.org/10.1016/j.psc.2017.08.008>
- Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine, 7*(7), 94. <https://doi.org/10.1371/journal.pmed.1000316>
- Hruschka, D. J., Kohrt, B. A., & Worthman, C. M. (2005). Estimating between- and within-individual variation in cortisol levels using multilevel models. *Psychoneuroendocrinology, 30*(7), 698–714. <https://doi.org/10.1016/j.psyneuen.2005.03.002>
- Impett, E. A., Kogan, A., English, T., John, O. P., Oveis, C., Gordon, A. M., & Keltner, D. (2012). Suppression Sours Sacrifice: Emotional and Relational Costs of Suppressing Emotions in Romantic Relationships. *Personality and Social Psychology Bulletin, 38*(6), 707–720. <https://doi.org/10.1177/0146167212437249>
- Inman, E. M., & London, B. (2021). Self-silencing Mediates the Relationship Between Rejection Sensitivity and Intimate Partner Violence. *Journal of Interpersonal Violence, 23*(1), 45–48. <https://doi.org/10.1177/0886260521997948>
- Janovsky, T., Rock, A. J., Thorsteinsson, E. B., Clark, G. I., & Murray, C. V. (2020). The relationship between early maladaptive schemas and interpersonal problems: A meta-analytic review. *Clinical Psychology and Psychotherapy, 27*(3), 408–447. <https://doi.org/10.1002/cpp.2439>
- Johnson, M. D., & Bradbury, T. N. (2015). Contributions of Social Learning Theory to the Promotion of Healthy Relationships: Asset or Liability? *Journal of Family Theory & Review, 7*(1), 13–27. <https://doi.org/10.1111/jftr.12057>
- Jones, T. L., & Barnett, M. A. (2022). Anticipated emotional and behavioral responses to ambiguous rejection by a significant other, friend, or acquaintance. *Journal of General Psychology, 149*(1), 57–71. <https://doi.org/10.1080/00221309.2020.1798864>
- Joss, D., Lazar, S. W., & Teicher, M. H. (2020). Nonattachment Predicts Empathy, Rejection Sensitivity, and Symptom Reduction After a Mindfulness-Based Intervention Among

- Young Adults with a History of Childhood Maltreatment. *Mindfulness*, 11(4), 975–990. <https://doi.org/10.1007/s12671-020-01322-9>
- Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain and illness*. Bantam Dell.
- Karney, B. R., & Bradbury, T. N. (1995). The longitudinal course of marital quality and stability: A review of theory, methods, and research. *Psychological Bulletin*, 118(1), 3–34. <https://doi.org/10.1037/0033-2909.118.1.3>
- Karney, B. R., & Neff, L. A. (2013). Couples and stress: How demands outside a relationship affect intimacy within the relationship. In J. A. Simpson & L. Campbell (Eds.), *The Oxford Handbook of Close Relationships* (Oxford Uni, pp. 664–684). <https://doi.org/10.1093/oxfordhb/9780195398694.013.0030>
- Keeton, C. P., Perry-Jenkins, M., & Sayer, A. G. (2008). Sense of Control Predicts Depressive and Anxious Symptoms Across the Transition to Parenthood. *Journal of Family Psychology*, 22(2), 212–221. <https://doi.org/10.1037/0893-3200.22.2.212>
- Kelley, H. H., & Thibaut, J. W. (1978). *Interpersonal relations: A theory of interdependence*. Wiley.
- Keng, S. L., & Tan, H. H. (2018). Effects of brief mindfulness and loving-kindness meditation inductions on emotional and behavioral responses to social rejection among individuals with high borderline personality traits. *Behaviour Research and Therapy*, 100, 44–53. <https://doi.org/10.1016/j.brat.2017.11.005>
- Kenny, D. A., & Cook, W. L. (1999). Partner effects in relationship research: Conceptual issues, analytic difficulties, and illustrations. *Personal Relationships*, 6(4), 433–448. <https://doi.org/10.1111/j.1475-6811.1999.tb00202.x>
- Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic Data Analysis*. The Guildford Press.
- Khaled, M., Corner, G. W., Morris, A., Havaladar, S., Luo, E., & Saxbe, D. E. (2021). Physiological linkage in pregnancy: Couples' cortisol, negative conflict behavior, and postpartum depression. *Biological Psychology*, 161. <https://doi.org/10.1016/j.biopsycho.2021.108075>
- Khalifian, C. E., & Barry, R. A. (2016). Trust, attachment, and mindfulness influence intimacy and disengagement during newlyweds' discussions of relationship transgressions. *Journal of Family Psychology*, 30(5), 592–601. <https://doi.org/10.1037/fam0000194>
- Khalifian, C. E., & Barry, R. A. (2021). The Relation Between Mindfulness and Perceived Partner Responsiveness During Couples' Vulnerability Discussions. *Journal of Family Psychology*, 35(1), 1–10. <https://doi.org/10.1037/fam0000666>
- Kiecolt-Glaser, J. K., Bane, C., Glaser, R., & Malarkey, W. B. (2003). Love, marriage, and divorce: Newlyweds' stress hormones foreshadow relationship changes. *Journal of*

Consulting and Clinical Psychology, 71(1), 176–188. <https://doi.org/10.1037/0022-006X.71.1.176>

- Kohn, J. L., Rholes, W. S., Simpson, J. A., Martin, A. M. L., Tran, S. S., & Wilson, C. L. (2012). Changes in Marital Satisfaction Across the Transition to Parenthood: The Role of Adult Attachment Orientations. *Personality and Social Psychology Bulletin*, 38(11), 1506–1522. <https://doi.org/10.1177/0146167212454548>
- Laurenceau, J.-P., Barrett, L. F., & Pietromonaco, P. R. (1998). Intimacy as an interpersonal process: The importance of self-disclosure, partner disclosure, and perceived partner responsiveness in interpersonal exchanges. *Journal of Personality and Social Psychology*, 74(5), 1238–1251. <https://doi.org/10.1037/0022-3514.74.5.1238>
- Laurenceau, J.-P., & Bolger, N. (2005). Using diary methods to study marital and family processes. *Journal of Family Psychology*, 19(1), 86–97. <https://doi.org/10.1037/0893-3200.19.1.86>
- Laurenceau, J.-P., Feldman Barrett, L., & Rovine, M. (2005). The Interpersonal Process Model of Intimacy in Marriage: A Daily-Diary and Multilevel. *Journal of Family Psychology*, 19(2), 314–323. <https://doi.org/10.1037/0893-3200.19.2.314>
- Lawrence, E., Nylen, K., & Cobb, R. J. (2007). Prenatal Expectations and Marital Satisfaction Over the Transition to Parenthood. *Journal of Family Psychology*, 21(2), 155–164. <https://doi.org/10.1037/0893-3200.21.2.155>
- Laws, H. B., Sayer, A. G., Pietromonaco, P. R., & Powers, S. I. (2015). Longitudinal changes in spouses' HPA responses: Convergence in cortisol patterns during the early years of marriage. *Health Psychology*, 34(11), 1076–1089. <https://doi.org/10.1037/hea0000235>
- Leary, M. R. (2001). Toward a Conceptualization of Interpersonal Rejection. In M. R. Leary (Ed.), *Interpersonal Rejection*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195130157.001.0001>
- Leary, M. R. (2010). Affiliation, Acceptance, and Belonging: The Pursuit of Interpersonal Connection. In S. T. Fiske, D. T. Gilbert, & G. Lindzey (Eds.), *Handbook of Social Psychology* (pp. 864–896). John Wiley & Sons, Inc. <https://doi.org/10.1002/9780470561119.socpsy002024>
- Leary, M. R. (2015). Emotional responses to interpersonal rejection. *Dialogues in Clinical Neuroscience*, 17(4), 435–441. <https://doi.org/10.1093/acprof:oso/9780195130157.003.0006>
- Leary, M. R., Koch, E. J., & Hechenbleikner, N. R. (2001). Emotional Responses to Interpersonal Rejection. In M. R. Leary (Ed.), *Interpersonal Rejection* (Oxford Uni, pp. 145–166). <https://doi.org/10.1093/acprof:oso/9780195130157.003.0006>
- Leary, M. R., Twenge, J. M., & Quinlivan, E. (2006). Interpersonal rejection as a determinant of anger and aggression. *Personality and Social Psychology Review*, 10(2), 111–132. https://doi.org/10.1207/s15327957pspr1002_2

- Ledermann, T., & Kenny, D. A. (2017). Analyzing dyadic data with multilevel modeling versus structural equation modeling: A tale of two methods. *Journal of Family Psychology, 31*(4), 442–452. <https://doi.org/10.1037/fam0000290>
- Levenson, R. W., & Gottman, J. M. (1983). Marital interaction: Physiological linkage and affective exchange. *Journal of Personality and Social Psychology, 45*(3), 587–597. <https://doi.org/10.1037/0022-3514.45.3.587>
- Levy, S. R., Ayduk, Ö., & Downey, G. (2012). The Role of Rejection Sensitivity in People's Relationships with Significant Others and Valued Social Groups. In M. R. Leary (Ed.), *Interpersonal Rejection* (pp. 251–289). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195130157.003.0010>
- Liu, R. T., Kraines, M. A., Massing-Schaffer, M., & Alloy, L. B. (2014). Rejection sensitivity and depression: Mediation by stress generation. *Psychiatry (New York), 77*(1), 86–97. <https://doi.org/10.1521/psyc.2014.77.1.86>
- Liu, S., Rovine, M. J., Klein, L. C., & Almeida, D. M. (2013). Synchrony of diurnal cortisol pattern in couples. *Journal of Family Psychology, 27*(4), 579–588. <https://doi.org/10.1037/a0033735>
- Lou, N. M., & Li, L. M. W. (2017). Interpersonal relationship mindsets and rejection sensitivity across cultures: The role of relational mobility. *Personality and Individual Differences, 108*, 200–206. <https://doi.org/10.1016/j.paid.2016.12.004>
- Lougheed, J. P., & Hollenstein, T. (2018). Methodological approaches to studying interpersonal emotion dynamics. In A. K. Randall & D. Schoebi (Eds.), *Interpersonal Emotion Dynamics in Close Relationships* (pp. 75–92). Cambridge University Press.
- Luetke, M., Hensel, D., Herbenick, D., & Rosenberg, M. (2020). Romantic Relationship Conflict Due to the COVID-19 Pandemic and Changes in Intimate and Sexual Behaviors in a Nationally Representative Sample of American Adults. *Journal of Sex and Marital Therapy, 46*(8), 747–762. <https://doi.org/10.1080/0092623X.2020.1810185>
- Luginbuehl, T., & Schoebi, D. (2018). Emotional Dynamics and Emotion Regulation in Intimate Relationships. In P. M. Cole & T. Hollenstein (Eds.), *Emotion Regulation: A matter of time* (pp. 208–225). Routledge. <https://doi.org/10.4324/9781351001328-10>
- Luginbuehl, T., & Schoebi, D. (2020). Emotion Dynamics and Responsiveness in Intimate Relationships. *Emotion, 20*(2), 133–148. <https://doi.org/10.1037/emo0000540>
- MacDonald, G., & Leary, M. R. (2005). Why does social exclusion hurt? The relationship between social and physical pain. *Psychological Bulletin, 131*(2), 202–233. <https://doi.org/10.1037/0033-2909.131.2.202>
- Maisel, N. C., & Gable, S. L. (2009). The paradox of received social support: The importance of responsiveness. *Psychological Science, 20*(8), 928–932. <https://doi.org/10.1111/j.1467-9280.2009.02388.x>

- Manne, S., Rini, C., Goldstein, L., Ostroff, J., Fox, K., & Grana, G. (2004). The interpersonal process model of intimacy: The role of self-disclosure, partner disclosure, and partner responsiveness in interactions between breast cancer patients and their partners. *Journal of Family Psychology, 18*(4), 589–599. <https://doi.org/10.1037/0893-3200.18.4.589>
- McRae, K., & Gross, J. J. (2020). Emotion regulation. *Emotion, 20*(1), 1–9. <https://doi.org/10.1037/emo0000703>
- Medina, A. M., Lederhos, C. L., & Lillis, T. A. (2009). Sleep Disruption and Decline in Marital Satisfaction Across the Transition to Parenthood. *Families, Systems and Health, 27*(2), 153–160. <https://doi.org/10.1037/a0015762>
- Meehan, K. B., Cain, N. M., Roche, M. J., Clarkin, J. F., & De Panfilis, C. (2018). Rejection sensitivity and interpersonal behavior in daily life. *Personality and Individual Differences, 126*, 109–115. <https://doi.org/10.1016/j.paid.2018.01.029>
- Meehan, K. B., Cain, N. M., Roche, M. J., Clarkin, J. F., & De Panfilis, C. (2019). Rejection Sensitivity and Self-Regulation of Daily Interpersonal Events. *Journal of Contemporary Psychotherapy, 49*(4), 223–233. <https://doi.org/10.1007/s10879-019-09424-9>
- Meuwly, N., & Schoebi, D. (2017). Social psychological and related theories on long-term committed romantic relationships. *Evolutionary Behavioral Sciences, 11*(2), 106–120. <https://doi.org/10.1037/ebs0000088>
- Meyer, D., & Sledge, R. (2020). The potential role of cortisol as a biomarker of physiological interdependence in romantic couples: A systematic review. *Psychoneuroendocrinology, 121*. <https://doi.org/10.1016/j.psyneuen.2020.104834>
- Mikulincer, M., & Shaver, P. (2005). Attachment theory and emotions in close relationships: Exploring the attachment-related dynamics of emotional reactions to relational events. *Personal Relationships, 12*(2), 149–168. <https://doi.org/10.1111/j.1350-4126.2005.00108.x>
- Mitchell, E. A., Nuttall, A. K., & Wittenborn, A. (2019). Maternal Depressive Symptoms and Warm Responsiveness Across the Transition to Parenthood. *Journal of Child and Family Studies, 28*(6), 1604–1612. <https://doi.org/10.1007/S10826-019-01392-X>
- Moreira, D. N., & Pinto da Costa, M. (2020). The impact of the Covid-19 pandemic in the precipitation of intimate partner violence. *International Journal of Law and Psychiatry, 71*. <https://doi.org/10.1016/j.ijlp.2020.101606>
- Murray, S. L. (2005). Regulating the risks of closeness a relationship-specific sense of felt security. *Current Directions in Psychological Science, 14*(2), 74–78. <https://doi.org/10.1111/j.0963-7214.2005.00338.x>
- Murray, S. L., Bellavia, G., Feeney, B. C., Holmes, J. G., & Rose, P. (2001). The contingencies of interpersonal acceptance: When romantic relationships function as a self-affirmational resource. *Motivation and Emotion, 25*(2), 163–189.

<https://doi.org/10.1023/A:1010618010115>

- Murray, S. L., Bellavia, G. M., Rose, P., & Griffin, D. W. (2003). Once Hurt, Twice Hurtful: How Perceived Regard Regulates Daily Marital Interactions. *Journal of Personality and Social Psychology*, *84*(1), 126–147. <https://doi.org/10.1037/0022-3514.84.1.126>
- Murray, S. L., Holmes, J. G., & Collins, N. L. (2006). Optimizing assurance: The risk regulation system in relationships. *Psychological Bulletin*, *132*(5), 641–666. <https://doi.org/10.1037/0033-2909.132.5.641>
- Murray, S. L., Holmes, J. G., MacDonald, G., & Ellsworth, P. C. (1998). Through the looking glass darkly? When self-doubts turn into relationship insecurities. *Journal of Personality and Social Psychology*, *75*(6), 1459–1480. <https://doi.org/10.1037/0022-3514.75.6.1459>
- Murray, S. L., Rose, P., Bellavia, G. M., Holmes, J. G., & Garrett Kusche, A. (2002). When rejection stings: how self-esteem constrains relationship-enhancement processes. *Journal of Personality and Social Psychology*, *83*(3), 556–573. <https://psycnet.apa.org/journals/psp/83/3/556.html?uid=2002-17813-005>
- Neff, L. A., & Broady, E. F. (2011). Stress resilience in early marriage: Can practice make perfect? *Journal of Personality and Social Psychology*, *101*(5), 1050–1067. <https://doi.org/10.1037/a0023809>
- Neff, L. A., & Karney, B. R. (2005). Gender differences in social support: A question of skill or responsiveness? *Journal of Personality and Social Psychology*, *88*(1), 79–90. <https://doi.org/10.1037/0022-3514.88.1.79>
- Nicolson, N. A. (2008). Measurement of cortisol. In L. J. Luecken & L. C. Gallo (Eds.), *Handbook of Physiological Research Methods in Health Psychology* (pp. 37–74). SAGE Publications Inc. <https://doi.org/10.4135/9781412976244.n3>
- Norona, J. C., & Welsh, D. P. (2016). Rejection sensitivity and relationship satisfaction in dating relationships: The mediating role of differentiation of self. *Couple and Family Psychology: Research and Practice*, *5*(2), 124–135. <https://doi.org/10.1037/cfp0000056>
- O’Kelly, M., & Collard, J. (2014). Using mindfulness with couples: Theory and practice. In A. Vernon (Ed.), *Cognitive and Rational-Emotive Behavior Therapy with Couples: Theory and Practice* (pp. 17–31). Springer New York. https://doi.org/10.1007/978-1-4614-5137-2_2
- Overall, N. C., & Hammond, M. D. (2013). Biased and Accurate: Depressive Symptoms and Daily Perceptions Within Intimate Relationships. *Personality and Social Psychology Bulletin*, *39*(5), 636–650. <https://doi.org/10.1177/0146167213480188>
- Overall, N. C., & Simpson, J. A. (2013). Regulation Processes in Close Relationships. In J. Simpson & L. Campbell (Eds.), *The Oxford Handbook of Close Relationships*. Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780195398694.013.0019>

- Pagani, A. F., Donato, S., Parise, M., Bertoni, A., Iafrate, R., & Schoebi, D. (2019). Explicit stress communication facilitates perceived responsiveness in dyadic coping. *Frontiers in Psychology, 10*, 401. <https://doi.org/10.3389/fpsyg.2019.00401>
- Papp, L. M., Pendry, P., Simon, C. D., & Adam, E. K. (2013). Spouses' cortisol associations and moderators: Testing physiological synchrony and connectedness in everyday life. *Family Process, 52*(2), 284–298. <https://doi.org/10.1111/j.1545-5300.2012.01413.x>
- Paulson, J. F., Dauber, S., & Leiferman, J. A. (2006). Individual and combined effects of postpartum depression in mothers and fathers on parenting behavior. *Pediatrics, 118*(2), 659–668. <https://doi.org/10.1542/peds.2005-2948>
- Pauly, T., Gerstorff, D., Ashe, M. C., Madden, K. M., & Hoppmann, C. A. (2020). You're under my skin: Long-term relationship and health correlates of cortisol synchrony in older couples. *Journal of Family Psychology*. <https://doi.org/10.1037/fam0000809>
- Pauly, T., Michalowski, V. I., Drewelies, J., Gerstorff, D., Ashe, M. C., Madden, K. M., & Hoppmann, C. A. (2020). Cortisol Synchrony in Older Couples: Daily Socioemotional Correlates and Interpersonal Differences. *Psychosomatic Medicine, 82*(7), 669–677. <https://doi.org/10.1097/PSY.0000000000000838>
- Pearson, K. A., Watkins, E. R., & Mullan, E. G. (2011). Rejection sensitivity prospectively predicts increased rumination. *Behaviour Research and Therapy, 49*(10), 597–605. <https://doi.org/10.1016/j.brat.2011.06.004>
- Peters, J. R., Eisenlohr-Moul, T. A., & Smart, L. M. (2016). Dispositional mindfulness and rejection sensitivity: The critical role of nonjudgment. *Personality and Individual Differences, 93*, 125–129. <https://doi.org/10.1016/j.paid.2015.06.029>
- Peters, J. R., Smart, L. M., Eisenlohr-Moul, T. A., Geiger, P. J., Smith, G. T., & Baer, R. A. (2015). Anger Rumination as a Mediator of the Relationship Between Mindfulness and Aggression: The Utility of a Multidimensional Mindfulness Model. *Journal of Clinical Psychology, 71*(9), 871–884. <https://doi.org/10.1002/jclp.22189>
- Pietromonaco, P., & Greenwood, D. (2004). Conflict in adult close relationships: An attachment perspective. In W. S. Rholes & J. A. Simpson (Eds.), *Adult attachment: New directions and emerging issues* (Guildford, pp. 267–299).
- Pinheiro, J., Bates, D., DebRoy, S., Sarkar, D., & Team, R. C. (2018). *nlme: Linear and Nonlinear Mixed Effects Models* (R Package version 3.1-137). <https://cran.r-project.org/package=nlme>
- Poggi, A., Richetin, J., & Preti, E. (2019). Trust and Rejection Sensitivity in Personality Disorders. *Current Psychiatry Reports, 21*(8), 1–9. <https://doi.org/10.1007/s11920-019-1059-3>
- Proulx, C. M., Helms, H. M., & Buehler, C. (2007). Marital quality and personal well-being: A meta-analysis. *Journal of Marriage and Family, 69*(3), 576–593. <https://doi.org/10.1111/j.1741-3737.2007.00393.x>

- Pruessner, J. C., Kirschbaum, C., Meinlschmid, G., & Hellhammer, D. H. (2003). Two formulas for computation of the area under the curve represent measures of total hormone concentration versus time-dependent change (multiple letters). *Psychoneuroendocrinology*, *28*(7), 916–931. <https://doi.org/10.1016/j.psyneuen.2003.10.002>
- Purdie, V., & Downey, G. (2000). Rejection sensitivity and adolescent girls' vulnerability to relationship-centered difficulties. *Child Maltreatment*, *5*(4), 338–349. <https://doi.org/10.1177/1077559500005004005>
- R Studio Team. (2015). R Studio. In R.S. ed. <http://www.rstudio.com/>. <https://doi.org/http://www.rstudio.com/>.
- Rajchert, J., Zóltak, T., Szulawski, M., & Jasielska, D. (2019). Effects of rejection by a friend for someone else on emotions and behavior. *Frontiers in Psychology*, *10*, 764. <https://doi.org/10.3389/fpsyg.2019.00764>
- Randall, A. K., & Bodenmann, G. (2009). The role of stress on close relationships and marital satisfaction. *Clinical Psychology Review*, *29*(2), 105–115. <https://doi.org/10.1016/j.cpr.2008.10.004>
- Randall, A. K., & Bodenmann, G. (2017). Stress and its associations with relationship satisfaction. *Current Opinion in Psychology*, *13*, 96–106. <https://doi.org/10.1016/j.copsyc.2016.05.010>
- Randall, A. K., & Schoebi, D. (2018). Conceptual approaches to studying interpersonal emotion dynamics. In A. K. Randall & D. Schoebi (Eds.), *Interpersonal Emotion Dynamics in Close Relationships* (pp. 7–26). Cambridge University Press. <https://doi.org/10.1017/9781316822944.003>
- Reis, H. T. (2020). Relational motives. In P. A. M. Van Lange, E. T. Higgins, & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (3rd ed., pp. 240–262). The Guildford Press.
- Reis, H. T., & Clark, M. S. (2013). Responsiveness. In J. Simpson & L. Campbell (Eds.), *The Oxford Handbook of Close Relationships* (pp. 400–423). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780195398694.013.0018>
- Reis, H. T., Clark, M. S., & Holmes, J. G. (2004). Perceived partner responsiveness as an organizing construct in the study of intimacy and closeness. In Deborah J. Mashek & Arthur Aron (Eds.), *Handbook of Closeness and Intimacy* (pp. 201–224).
- Reis, H. T., & Gable, S. L. (2015). Responsiveness. *Current Opinion in Psychology*, *1*, 67–71. <https://doi.org/10.1016/j.copsyc.2015.01.001>
- Reis, H. T., & Shaver, P. (1988). Intimacy as an interpersonal process. In S. W. Duck (Ed.), *Handbook of personal relationships* (pp. 367–389). Chichester: Wiley. [https://doi.org/10.1016/0045-7825\(81\)90049-9](https://doi.org/10.1016/0045-7825(81)90049-9)
- Roberts, N., Tsai, J. L., & Coan, J. A. (2007). Emotion elicitation using dyadic interaction

- task. In J. A. Coan & J. B. Allen (Eds.), *Handbook of Emotion Elicitation and Assessment* (pp. 106–123). Oxford University Press.
- Robles, T. F., Slatcher, R. B., Trombello, J. M., & McGinn, M. M. (2014). Marital quality and health: A meta-analytic review. *Psychological Bulletin*, *140*(1), 140–187. <https://doi.org/10.1037/a0031859>
- Romero-Canyas, R., Downey, G., Berenson, K., Ayduk, Ö., & Kang, N. J. (2010). Rejection sensitivity and the rejection-hostility link in romantic relationships. *Journal of Personality*, *78*(1), 119–148. <https://doi.org/10.1111/j.1467-6494.2009.00611.x>
- Romero-canyas, R., Downey, G., Reddy, K. S., Rodriguez, S., Timothy, J., & Pelayo, R. (2011). Paying To Belong: When Does Rejection Trigger Ingratiation? Rainer. *Journal of Personality and Social Psychology*, *99*(5), 802–823. <https://doi.org/10.1037/a0020013>.Paying
- Romero-Canyas, R., Reddy, K. S., Rodriguez, S., & Downey, G. (2013). After all I have done for you: Self-silencing accommodations fuel women’s post-rejection hostility. *Journal of Experimental Social Psychology*, *49*(4), 732–740. <https://doi.org/10.1016/j.jesp.2013.03.009>
- Rusbult, C. E., Kumashiro, M., Coolsen, M. K., & Kirchner, J. L. (2008). Interdependence, closeness, and relationships. In D. J. Mashek & A. Aron (Eds.), *Handbook of Closeness and Intimacy* (pp. 137–161). Lawrence Erlbaum Associates.
- Rusbult, C. E., & Van Lange, P. A. M. (2008). Why We Need Interdependence Theory. *Social and Personality Psychology Compass*, *2*(5), 2049–2070. <https://doi.org/10.1111/j.1751-9004.2008.00147.x>
- Saridjan, N. S., Velders, F. P., Jaddoe, V. W. V., Hofman, A., Verhulst, F. C., & Tiemeier, H. (2014). The longitudinal association of the diurnal cortisol rhythm with internalizing and externalizing problems in pre-schoolers. The Generation R Study. *Psychoneuroendocrinology*, *50*, 118–129. <https://doi.org/10.1016/j.psyneuen.2014.08.008>
- Saxbe, D. E., Adam, E. K., Schetter, C. D., Guardino, C. M., Simon, C. D., McKinney, C. O., & Shalowitz, M. U. (2015). Cortisol covariation within parents of young children: Moderation by relationship aggression. *Psychoneuroendocrinology*, *62*, 121–128. <https://doi.org/10.1016/j.psyneuen.2015.08.006>
- Saxbe, D. E., Beckes, L., Stoycos, S. A., & Coan, J. A. (2020). Social Allostatic Load: A New Model for Research in Social Dynamics, Stress, and Health. *Perspectives on Psychological Science*, *15*(2), 469–482. <https://doi.org/10.1177/1745691619876528>
- Saxbe, D. E., Khoddam, H., Corner, G. W., Stoycos, S. A., & Khaled, M. (2018). Physiological correlates associated with interpersonal emotion dynamics. In A. K. Randall & D. Schoebi (Eds.), *Interpersonal Emotion Dynamics in Close Relationships* (pp. 110–128). Cambridge University Press. <https://doi.org/10.1017/9781316822944.008>

- Saxbe, D. E., & Repetti, R. L. (2010). For Better or Worse? Coregulation of Couples' Cortisol Levels and Mood States. *Journal of Personality and Social Psychology*, 98(1), 92–103. <https://doi.org/10.1037/a0016959>
- Saxbe, D. E., Repetti, R. L., & Nishina, A. (2008). Marital Satisfaction, Recovery From Work, and Diurnal Cortisol Among Men and Women. *Health Psychology*, 27(1), 15–25. <https://doi.org/10.1037/0278-6133.27.1.15>
- Saxbe, D. E., Rossin-Slater, M., & Goldenberg, D. (2018). The transition to parenthood as a critical window for adult health. *American Psychologist*, 73(9), 1190–1200. <https://doi.org/10.1037/amp0000376>
- Sbarra, D. A., & Hazan, C. (2008). Coregulation, dysregulation, self-regulation: An integrative analysis and empirical agenda for understanding adult attachment, separation, loss, and recovery. *Personality and Social Psychology Review*, 12(2), 141–167. <https://doi.org/10.1177/1088868308315702>
- Schneiderman, I., Kanat-Maymon, Y., Zagoory-Sharon, O., & Feldman, R. (2014). Mutual influences between partners' hormones shape conflict dialog and relationship duration at the initiation of romantic love. *Social Neuroscience*, 9(4), 337–351. <https://doi.org/10.1080/17470919.2014.893925>
- Schoebi, D. (2008). The Coregulation of Daily Affect in Marital Relationships. *Journal of Family Psychology*, 22(4), 595–604. <https://doi.org/10.1037/0893-3200.22.3.595>
- Schoebi, D., Perrez, M., & Bradbury, T. N. (2012). Expectancy effects on marital interaction: Rejection sensitivity as a critical moderator. *Journal of Family Psychology*, 26(5), 709–718. <https://doi.org/https://doi.org/10.1037/a0029444>
- Schoebi, D., & Randall, A. K. (2015). Emotional Dynamics in Intimate Relationships. *Emotion Review*, 7(4), 342–348. <https://doi.org/10.1177/1754073915590620>
- Selcuk, E., Stanton, S. C. E., Slatcher, R. B., & Ong, A. D. (2017). Perceived Partner Responsiveness Predicts Better Sleep Quality Through Lower Anxiety. *Social Psychological and Personality Science*, 8(1), 83–92. <https://doi.org/10.1177/1948550616662128>
- Silvers, J. A., McRae, K., Gabrieli, J. D. E., Gross, J. J., Remy, K. A., & Ochsner, K. N. (2012). Age-related differences in emotional reactivity, regulation, and rejection sensitivity in adolescence. *Emotion*, 12(6), 1235–1247. <https://doi.org/10.1037/a0028297>
- Simpson, J. A., & Rholes, W. S. (2019). Adult attachment orientations and well-being during the transition to parenthood. *Current Opinion in Psychology*, 25, 47–52. <https://doi.org/10.1016/j.copsyc.2018.02.019>
- Slatcher, R. B., & Schoebi, D. (2017). Protective processes underlying the links between marital quality and physical health. *Current Opinion in Psychology*, 13, 148–152. <https://doi.org/10.1016/j.copsyc.2016.09.002>

- Slatcher, R. B., & Selcuk, E. (2017). A Social Psychological Perspective on the Links Between Close Relationships and Health. *Current Directions in Psychological Science*, 26(1), 16–21. <https://doi.org/10.1177/0963721416667444>
- Slatcher, R. B., Selcuk, E., & Ong, A. D. (2015). Perceived Partner Responsiveness Predicts Diurnal Cortisol Profiles 10 Years Later. *Psychological Science*, 26(7), 972–982. <https://doi.org/10.1177/0956797615575022>
- Smallen, D., Eller, J., Rholes, W. S., & Simpson, J. A. (2021). Perceptions of partner responsiveness across the transition to parenthood. *Journal of Family Psychology*. <https://doi.org/10.1037/fam0000907>
- Staebler, K., Helbing, E., Rosenbach, C., & Renneberg, B. (2011). Rejection sensitivity and borderline personality disorder. *Clinical Psychology and Psychotherapy*, 18(4), 275–283. <https://doi.org/10.1002/cpp.705>
- Staelin, K., Berteau, P. C., & Stutz, E. Z. (2007). Length of maternity leave and health of mother and child - A review. *International Journal of Public Health*, 52(4), 202–209. <https://doi.org/10.1007/s00038-007-5122-1>
- Stalder, T., Kirschbaum, C., Kudielka, B. M., Adam, E. K., Pruessner, J. C., Wüst, S., Dockray, S., Smyth, N., Evans, P., Hellhammer, D. H., Miller, R., Wetherell, M. A., Lupien, S. J., & Clow, A. (2015). Assessment of the cortisol awakening response: Expert consensus guidelines. *Psychoneuroendocrinology*, 63, 414–432. <https://doi.org/10.1016/j.psyneuen.2015.10.010>
- Stanton, S. C. E., Slatcher, R. B., & Reis, H. T. (2019). Relationships, health and well-being: the role of responsiveness. In D. Schoebi & B. Campos (Eds.), *New Directions in the Psychology of Close Relationships* (pp. 118–135). Routledge.
- Storey, A. E., Walsh, C. J., Quinton, R. L., & Wynne-Edwards, K. E. (2000). Hormonal correlates of paternal responsiveness in new and expectant fathers. *Evolution and Human Behavior*, 21(2), 79–95. [https://doi.org/10.1016/S1090-5138\(99\)00042-2](https://doi.org/10.1016/S1090-5138(99)00042-2)
- Stroud, L. R., Salovey, P., & Epel, E. S. (2002). Sex differences in stress responses: Social rejection versus achievement stress. *Biological Psychiatry*, 52(4), 318–327. [https://doi.org/10.1016/S0006-3223\(02\)01333-1](https://doi.org/10.1016/S0006-3223(02)01333-1)
- Szasz, P. L., Szentagotai, A., & Hofmann, S. G. (2011). The effect of emotion regulation strategies on anger. *Behaviour Research and Therapy*, 49(2), 114–119. <https://doi.org/10.1016/j.brat.2010.11.011>
- Tasfiliz, D., Selcuk, E., Gunaydin, G., Slatcher, R. B., Corriero, E. F., & Ong, A. D. (2018). Patterns of perceived partner responsiveness and well-being in Japan and the United States. *Journal of Family Psychology*, 32(3), 355–365. <https://doi.org/10.1037/fam0000378>
- Ter Kuile, H., Kluwer, E. S., Finkenauer, C., & Van Der Lippe, T. (2017). Predicting adaptation to parenthood: The role of responsiveness, gratitude, and trust. *Personal Relationships*, 24(3), 663–682. <https://doi.org/10.1111/pere.12202>

- Thomas, P. A., Liu, H., & Umberson, D. (2017). Family Relationships and Well-Being. *Innovation in Aging, 1*(3), 1–11. <https://doi.org/10.1093/geroni/igx025>
- Timmons, A. C., Margolin, G., & Saxbe, D. E. (2015). Physiological linkage in couples and its implications for individual and interpersonal functioning: A literature review. *Journal of Family Psychology, 29*(5), 720–731. <https://doi.org/10.1037/fam0000115>
- Wachs, K., & Cordova, J. V. (2007). Mindful relating: Exploring mindfulness and emotion repertoires in intimate relationships. *Journal of Marital and Family Therapy, 33*(4), 464–481. <https://doi.org/10.1111/j.1752-0606.2007.00032.x>
- Whisman, M. A. (2007). Marital Distress and DSM-IV Psychiatric Disorders in a Population-Based National Survey. *Journal of Abnormal Psychology, 116*(3), 638–643. <https://doi.org/10.1037/0021-843X.116.3.638>
- Whisman, M. A., & Baucom, D. H. (2012). Intimate Relationships and Psychopathology. *Clinical Child and Family Psychology Review, 15*(1), 4–13. <https://doi.org/10.1007/s10567-011-0107-2>
- Williamson, H. C. (2020). Early Effects of the COVID-19 Pandemic on Relationship Satisfaction and Attributions. *Psychological Science, 31*(12), 1479–1487. <https://doi.org/10.1177/0956797620972688>
- Zaers, S., Waschke, M., & Ehlert, U. (2008). Depressive symptoms and symptoms of post-traumatic stress disorder in women after childbirth. *Journal of Psychosomatic Obstetrics and Gynecology, 29*(1), 61–71. <https://doi.org/10.1080/01674820701804324>
- Zahavi, T., Bar-Kalifa, E., Sened, H., & Rafaeli, E. (2018). Partners' Support During Good Times: Associations With Fears of Positive and Negative Evaluation. *Journal of Social and Clinical Psychology, 37*(8), 559–581. <https://doi.org/10.1521/jscp.2018.37.8.559>
- Zimmer-Gembeck, M. J. (2015). Emotional sensitivity before and after coping with rejection: A longitudinal study. *Journal of Applied Developmental Psychology, 41*, 28–37. <https://doi.org/10.1016/j.appdev.2015.05.001>

Appendix

A. Supplemental Material - Study 1

Results for the associations between daily rejection experiences and perceived partner responsiveness

In our hypotheses, we examined whether rejection experiences predict perceived partner responsiveness. In this supplement, we also investigated the other direction, i.e., whether perceived partner responsiveness predicts rejection experiences, and we investigated the prediction for both actor and partner effects. We controlled for rejection sensitivity actor and partner effects.

Data analysis: Models were run with RStudio and the package nlme (Pinheiro et al., 2018; R Studio Team, 2015).

Table A.1.

Associations between perceived partner responsiveness, rejection experiences and rejection sensitivity

Variable	Rejection Experience		
	<i>b</i>	<i>SE</i>	<i>p</i>
Perceived Partner Responsiveness F	-.058	.024	.015*
Perceived Partner Responsiveness M	-.036	.02	.071
Perceived Partner Responsiveness F Partner	-.022	.025	.381
Perceived Partner Responsiveness M Partner	-.021	.019	.254
Rejection sensitivity F	.009	.259	.722
Rejection sensitivity M	-.014	.241	.567
Rejection Sensitivity F Partner	-.009	.030	.768
Rejection Sensitivity M Partner	-.001	.020	.960
Rejection Experience F	.017	.030	<.001***
Rejection Experience M	.139	.024	.248
Rejection Experience F Partner	.046	.035	.184
Rejection Experience M Partner	-.027	.024	.248

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. F = female; M = male; $N = 150$ (75 couples).

Results showed that women's perceived partner responsiveness predicts lower estimates of rejection ($b = -.058, p = .015$), and that women's experience of rejection predicts further rejection ($b = .017, p < .001$).

B. Supplemental material for Study 3

In addition to the models that were ran with cortisol levels across the transition to parenthood, we also ran the models with three composite variables: the diurnal cortisol slopes (DCS) and area under the curve (AUCg) and the cortisol awakening response (CAR). These three variables reflect different aspects of the HPA axis activity (Saridjan et al., 2014).

The diurnal cortisol slopes represent the decline of cortisol across each day. The slopes were computed by using the highest values between saliva samples 1 and 2, and the two others cortisol times point of the day. We controlled for the maximum values between both samples 1 and 2.

The AUCg reflects the total cortisol secretion of the day, from awakening until the evening. In other words, the difference between each measurement and the distance between each of them from the ground, that is the level at which the time changes occur (Pruessner et al., 2003). Following Pruessner et al. (2003) and Saridjan et al. (2014), the AUCg was computed using the cortisol measurements and the time between the measurements. To correct for differences in length of total sampling interval time, we divided the AUC by the number of hours between the first measurement and the last one.

The cortisol awakening response represents the changes of cortisol secretion that occurs at awakening and following waking in the morning, which normally show an increase around 30 minutes after waking (Dockray et al., 2008). Thus, we calculated the difference between the cortisol value at awakening and the value 30 minutes after.

All the cortisol values were log-transformed prior to data analysis. We used multilevel modelling to test our hypotheses. The models were similar to the one used in Study 3. Results for diurnal slopes are presented in Table B.1 (all hypotheses) and Table B.2 (post hoc analyses). Results for AUCg are displayed in Table B.3 (all hypotheses) and Table B.4 (post hoc analyses) and results for CAR in Table B.5 and Table B.6.

Table B.1.

Associations of partners' cortisol diurnal slopes with time measurements, cortisol levels, and perceived partner responsiveness

		Diurnal Slope Women		
		<i>b</i>	<i>SE</i>	<i>p</i>
<i>Model 0</i>				
	Intercept Women	.26	.02	<.001***
	Day	.01	.01	.54
	Diurnal Slope Men	.02	.07	.79
<i>Model 1</i>				
	Pr-6pp	-.54	.03	<.001***
	6pp-18pp	.09	.03	.001**
	Diurnal Slope Men x Pr-6pp	-.23	.15	.12
	Diurnal Slope Men x 6pp-18pp	.22	.13	.09
<i>Model 2</i>				
	Pr-6pp	-.18	.03	<.001***
	6pp-18pp	.04	.02	.12
	Diurnal Slope Men x Pr-6pp	-.23	.17	.18
	Diurnal Slope Men x 6pp-18pp	.25	.12	.04*
	Men Cortisol Level	-.12	.08	.10
	Women Cortisol Level	.88	.06	<.001***
	Diurnal Slope Men x Men Cortisol Level	-.45	.38	.23
	Diurnal Slope Men x Women Cortisol Level	.04	.29	.90
	Perceived Partner Responsiveness M	-.01	.02	.68
	Perceived Partner Responsiveness W	.01	.01	.38
	Diurnal Slope Men x Perceived Partner Responsiveness M	-.07	.08	.36
	Diurnal Slope Men x Perceived Partner Responsiveness W	.16	.09	.08

Note. *** $p < .001$, ** $p < .01$, * $p < .05$. M = men; W = women; Pr-6pp = time indicator for pregnancy (-1) and 6 months post-partum (1); pr-18pp = time indicator for 6 months postpartum (0) and 18 months post-partum (1); N = 134.

Table B.2.

Associations of cortisol diurnal slopes and perceived partner responsiveness

	Diurnal Slope Women		
	<i>b</i>	<i>SE</i>	<i>p</i>
Intercept Women	.27	.02	<.001***
Diurnal Slope Men	.02	.07	.77
Perceived Partner Responsiveness M	.09	.04	.002**
Perceived Partner Responsiveness W	.10	.03	<.001***
Diurnal Slope Men x Perceived Partner Responsiveness M	-.10	.11	.37
Diurnal Slope Men x Perceived Partner Responsiveness W	.15	.12	.22

Note. *** $p < .001$, ** $p < .01$, * $p < .05$. M = men; W = women; N = 134.

Table B.3.

Associations of AUCg with time measurements, cortisol levels, and perceived partner responsiveness

		AUCg Women		
		<i>b</i>	<i>SE</i>	<i>p</i>
<i>Model 0</i>				
	Intercept Women	.47	.02	<.001***
	Day	.01	.01	.68
	AUCg Men	.07	.08	.37
<i>Model 1</i>				
	Pr-6pp	-.48	.03	<.001***
	6pp-18pp	.08	.03	.01**
	AUCg Men x Pr-6pp	-.33	.16	.04*
	AUCg Men x 6pp-18pp	.38	.15	.01*
<i>Model 2</i>				
	Pr-6pp	-.10	.03	<.001***
	6pp-18pp	.03	.02	.22
	AUCg Men x Pr-6pp	-.32	.15	.03*
	AUCg Men x 6pp-18pp	.43	.11	<.001***
	Men Cortisol Level	-.01	.07	.94
	Women Cortisol Level	.93	.05	<.001***
	AUCg Men x Men Cortisol Level	.56	.37	.13
	AUCg Men x Women Cortisol Level	-.18	.31	.56
	Perceived Partner Responsiveness M	.01	.01	.70
	Perceived Partner Responsiveness W	.00	.01	.99
	AUCg Men x Perceived Partner Responsiveness M	.09	.09	.32
	AUCg Men x Perceived Partner Responsiveness W	-.01	.08	.85

Note. *** $p < .001$, ** $p < .01$, * $p < .05$. AUCg: Area under the curve to the ground; M = men; W = women; Pr-6pp = time indicator for pregnancy (-1) and 6 months post-partum (1); pr-18pp = time indicator for 6 months postpartum (0) and 18 months post-partum (1); N = 134.

Table B.4.

Associations of AUCg and perceived partner responsiveness

	AUCg Women		
	<i>b</i>	<i>SE</i>	<i>p</i>
Intercept Women	.48	.02	<.001***
AUCg Men	.04	.08	.57
Perceived Partner Responsiveness M	.10	.03	<.001***
Perceived Partner Responsiveness W	.07	.02	.004**
AUCg Men x Perceived Partner Responsiveness M	-.01	.14	.99
AUCg Men x Perceived Partner Responsiveness W	.09	.12	.42

Note. *** $p < .001$, ** $p < .01$, * $p < .05$. AUCg = Area under the curve to the ground; M = men; W = women; N = 134.

Table B.5.

Associations of partners' cortisol awakening responses with time measurements, cortisol levels, and perceived partner responsiveness

	CAR Women		
	<i>b</i>	<i>SE</i>	<i>p</i>
<i>Model 0</i>			
Intercept Women	.04	.03	.16
Day	.01	.02	.64
CAR Men	.03	.06	.58
<i>Model 1</i>			
Pr-6pp	-.15	.04	<.001***
6pp-18pp	.02	.04	.59
CAR Men x Pr-6pp	-.24	.14	.09
CAR Men x 6pp-18pp	.21	.14	.12
<i>Model 2</i>			
Pr-6pp	.01	.06	.99
6pp-18pp	.02	.04	.66
CAR Men x Pr-6pp	-.25	.18	.16
CAR Men x 6pp-18pp	.03	.14	.80
Men Cortisol Level	-.04	.14	.80
Women Cortisol Level	.49	.11	<.001***
CAR Men x Men Cortisol Level	2.44	.44	<.001***
CAR Men x Women Cortisol Level	-.66	.39	.09
Perceived Partner Responsiveness M	-.04	.03	.15
Perceived Partner Responsiveness W	-.01	.03	.84
CAR Men x Perceived Partner Responsiveness M	.20	.11	.06
CAR Men x Perceived Partner Responsiveness W	-.07	.08	.40

Note. *** $p < .001$, ** $p < .01$, * $p < .05$. CAR: cortisol awakening response; M = men; W = women; Pr-6pp = time indicator for pregnancy (-1) and 6 months post-partum (1); pr-18pp = time indicator for 6 months postpartum (0) and 18 months post-partum (1); N = 134.

Table B.6.

Associations of cortisol awakening responses and perceived partner responsiveness

	CAR Women		
	<i>b</i>	<i>SE</i>	<i>p</i>
Intercept Women	.04	.02	.07
CAR Men	.06	.06	.36
Perceived Partner Responsiveness M	-.02	.03	.58
Perceived Partner Responsiveness W	.03	.03	.24
CAR Men x Perceived Partner Responsiveness M	.05	.11	.64
CAR Men x Perceived Partner Responsiveness W	-.01	.08	.94

Note. *** $p < .001$, ** $p < .01$, * $p < .05$. CAR: cortisol awakening response; M = men; W = women; N = 134.

C. Supplemental material for Study 3

Control for possible confounders of cortisol secretion

We controlled for pregnancy at T1 and T4, breastfeeding at T2 and T4, whether they were assessed during the lockdown (due to the Covid-19 pandemic) at T1 and T2. We also controlled for whether participants reported nightshifts and had regular medicine intakes, at all times of assessments.

Finally, we controlled for covariates every day, and more specifically whether participants reported brushing their teeth, doing sport, or having food or/and drink intakes one hour prior to the saliva sampling. Results are presented in S-Table 1. Results showed that none of the confounders had an influence on the results.

Table C.1.
Associations of cortisol linkage between partners and control for confounders

	Cortisol Women		
	<i>b</i>	<i>SE</i>	<i>p</i>
Intercept Women	.81	.02	<.001***
Cortisol Men	.16	.02	<.001***
Time	-.22	.01	<.001***
Pregnant	.37	.02	<.001***
Breastfeeding	-.04	.02	.12
Nightshift	.04	.07	.59
Lockdown	-.04	.03	.21
Medicine intake	.01	.03	.76
Covariates	.06	.02	.002**
Cortisol Men * Covariates	.07	.04	.08

Note. *** $p < .001$, ** $p < .01$, * $p < .05$. M = men; W = women; Time represents the 4 times of cortisol collection in a day.

Je déclare sur mon honneur que ma thèse est une œuvre personnelle, composée sans concours extérieur non autorisé, et qu'elle n'a pas été présentée devant une autre faculté.

Marianne Richter