



**Utrecht University**

**Actor and partner effects of COVID-19-related stress on  
relationship satisfaction, taking common dyadic coping  
into account: An APIM approach**

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### **Abstract**

Due to COVID-19 measures such as isolation and working from home, daily routines and work-life balances were disrupted, generating COVID-19-related stress. It was predicted that this stress would spillover from one partner to the other, influencing couple interactions. Stress can have a detrimental effect on marital communication, increasing the risk of relationship problems and decreasing relationship satisfaction. This lowered relationship satisfaction could lead to relationship dissolution or divorce. The present research therefore investigated the association between COVID-19-related stress and relationship satisfaction, taking common dyadic coping into account. Seven hypotheses were established and tested in two studies that both made use of existing data. Study 1 ( $N = 275$ ) used individual data; Study 2 ( $N = 186$ ) used dyadic data and the Actor-Partner Interdependence Model. Based on both studies, it could be concluded that men's relationship satisfaction was not affected by COVID-19-related stress. Women's relationship satisfaction was only affected by their own COVID-19-related stress. Moreover, the results emphasize the importance of dyadic coping in a romantic relationship; when couples engaged in better common dyadic coping, they were more satisfied with their relationship. In Study 1, high levels of common dyadic coping even weakened the negative association between COVID-19-related stress and relationship satisfaction. Couples should therefore be provided with tools and information to enhance their dyadic coping skills, so that they can protect their relationship from the detrimental effects of stress. Follow-up research could examine the role of different individual coping styles, and the influence of positive and negative attributions about one's partner's behavior.

**Keywords:** COVID-19-related stress, relationship satisfaction, common dyadic coping, Actor-Partner Interdependence Model, dyadic data

## Introduction

The COVID-19 crisis has caused a lot of stress (e.g., Tambling et al., 2020; Torales et al., 2020). Individuals were worried about losing their jobs or getting infected, which decreased psychological well-being (Taylor et al., 2020). Due to COVID-19 measures, such as isolation and working from home, daily routines and work-life balances were disrupted (Putri & Amran, 2021). As a result, it was predicted that one's individual stress would influence couple interactions (Genç et al., 2021). Stress because of financial and emotional loss during COVID-19, for example, could lead to tension and conflict among couples (Parkinson, 2019). COVID-19-related stress thus created new challenges for cohabiting romantic partners. Research has shown that dealing with the COVID-19 crisis was particularly stressful for parents, as they had to balance work, personal life and raising children (Spinelli et al., 2020). The present research therefore focused on the impact of COVID-19-related stress on (un)married cohabiting couples with children living at home.

Couple interactions can be affected by stress in several ways. Neff and Karney (2017), for example, indicated two different routes through which external stressors can shape relationship dynamics. First, stressful contexts may undermine marital well-being by reducing opportunities for activities that enhance intimacy between partners. For instance, when partners experience greater levels of stress, they report being less responsive and more distracted in the interaction with their partner. Second, external stressors can decrease couples' energy and resources necessary for dealing with marital problems. This means that stressful contexts impede constructive responses to challenges that arise within a marriage (Neff & Karney, 2017). Westman and colleagues (2013), additionally suggested that stress can spillover from one partner to the other, as a result of empathic reactions. This occurs when one partner imagines how they would feel in the other partner's situation, leading them to experience and share the same feelings.

Stress can thus have a detrimental effect on marital communication and the interaction between romantic partners (Merz et al., 2014). This, in turn, not only increases the risk of relationship problems, it can also decrease relationship satisfaction (Randall & Bodenmann, 2017). Relationship satisfaction refers to the "interpersonal evaluation of the positivity of feelings for one's partner and attraction to the relationship" (Aziz et al., 2021, p. 110). When individuals are satisfied with their relationship, it enhances their mental and physical health (Guerrero et al., 2020). Lowered relationship satisfaction, however, could eventually lead to dissolution of romantic relationships or divorce (Parkinson, 2019). This not only has a negative impact on the partners who are separating, but also reduces the well-being of (if any)

children (e.g., Zartler, 2021). Given the detrimental effects of relationship dissatisfaction, as mentioned above, it is important to investigate whether COVID-19-related stress also reduced individuals' relationship satisfaction. In the present research, it was expected that when individuals experienced more COVID-19-related stress, they would be less satisfied with their relationship.

Since experiencing stress in a relationship is inevitable (Merz et al., 2014), couples must find ways to face these challenges. Bodenmann (2005) has conducted ample research on how romantic partners deal with stress, also called dyadic coping. Dyadic coping is defined as "a process in which the stress signals of one partner, and the coping reactions of the other partner to these signals (both verbal and nonverbal) are taken in consideration" (Bodenmann, 1997, p. 138). Several factors are involved here: the communication of stress by Partner A, Partner B's perception and interpretation of these stress signs, Partner B's reaction to Partner A and Partner A's perception of this reaction (Bodenmann, 2005). Dyadic coping can thus be seen as a communication process that triggers the coping responses of both partners.

There are multiple forms of dyadic coping (e.g., delegated dyadic coping, hostile dyadic coping and ambivalent dyadic coping; Bodenmann, 2005), and the present research focused on common dyadic coping. In common dyadic coping "both partners are experiencing stress (often because of the same stressor) and try to manage the situation by coping jointly" (Bodenmann, 2005, p. 38). Previous research has shown that common dyadic coping has the strongest impact on relationship satisfaction, in comparison with other forms of dyadic coping (Traa et al., 2015). In addition, common dyadic coping is expected to be particularly important when both partners are similarly affected by the same stressor (Rusu et al., 2020), as is the case with the COVID-19 crisis (Genç et al., 2021).

Bodenmann (1997) has indicated that deterioration of marital quality, caused by stress, can be moderated by effective dyadic coping. Besides, research from Merz and colleagues (2014) has demonstrated that couples who engaged in successful dyadic coping were more protected from the detrimental effects of chronic stress. In other words, when couples try to manage a situation together, this buffers the association between stress and relationship satisfaction (Falconier et al., 2013). This means that common dyadic coping may potentially also act as a protective factor in the association between COVID-19-related stress and relationship satisfaction. In the present research, it was expected that when couples engaged in better common dyadic coping, this would decrease the negative impact of COVID-19-related stress on their relationship satisfaction.

Thus, it can be concluded that chronic external stress can affect both the partners on an individual level, as well as spillover into the relationship itself (Falconier, Nussbeck, et al., 2015). In addition, romantic partners mutually influence each other's thoughts, emotions and behaviors (Randall & Bodenmann, 2017). Moreover, an individual's reaction to their partner's behavior depends on their perception and interpretation of this behavior (Bodenmann, 2005). This interpretation however, may vary by context. The Actor-Observer bias, for example, is "the notion that people's explanations for their own behavior differ from their explanations for the behavior of others" (Robins et al., 1996, p. 375). According to this bias, actors tend to attribute their own behavior to situational causes, while observers tend to attribute the behavior of others to personal causes (Malle, 2006). For example, suppose Partner A snaps at Partner B: Partner A may explain their own behavior by the stress they are experiencing, but Partner B may think that Partner A actually has an unpleasant personality.

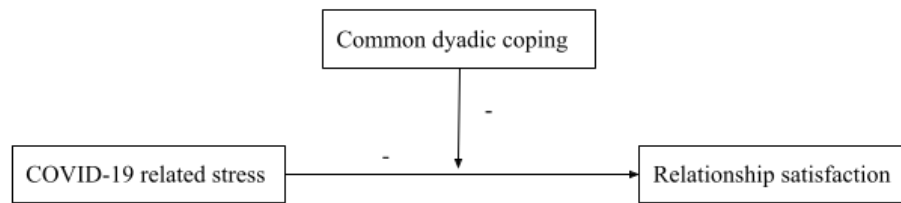
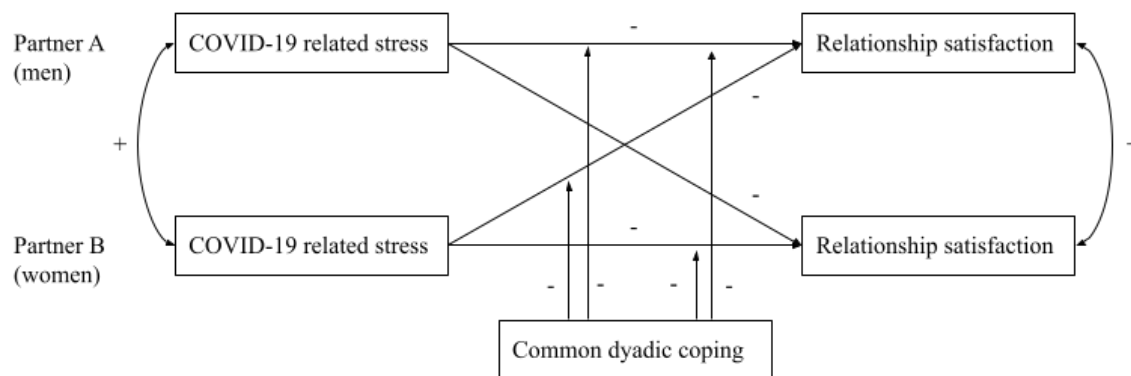
Research, however, has shown that the external validity of the Actor-Observer bias is questionable (e.g. Malle, 2006). The bias has proved to be much more complex than described above, even including multiple actor-observer asymmetries that differ by context (Malle et al., 2007). Nevertheless, this bias demonstrates that the same behavior can be interpreted in more than one way. As this interpretation determines an individual's reaction to their partner, this could subsequently influence couple interactions (Robins et al., 1996). Furthermore, it could thus be possible that an individual evaluates their own behavior differently than their partner's behavior. Hence, an individual's own stress and coping cannot be understood without considering their partner's stress and coping experience (Falconier, Nussbeck, et al., 2015). Stress should therefore be examined as a dyadic phenomenon (Randall & Bodenmann, 2017).

A framework that takes the influences of both partners of the dyad into account is the Actor-Partner Interdependence Model (APIM; Cook & Kenny, 2005). The APIM is "a model of dyadic relationships that integrates a conceptual view of interdependence in two-person relationships" (Cook & Kenny, 2005, p. 101). This model assumes that an individual's own outcome is a function of their own predictor and their partner's predictor (Kenny et al., 2006). The effect of an individual's own predictor (e.g., COVID-19-related stress) on their own outcome (e.g., relationship satisfaction), is called the actor effect. The influence of an individual's partner's COVID-19-related stress on their own relationship satisfaction, is called the partner effect. It is also possible to compare these actor and partner effects so that a statement can be made about which COVID-19-related stress (an individual's own or their partner's) has the strongest impact on an individual's own relationship satisfaction (Kenny et

al., 2006). Examining this will generate more knowledge about couples' relationship dynamics and can be used to design interventions to improve partners' relationship satisfaction during stressful times.

The aim of the present research was twofold. First, in Study 1, the association between COVID-19-related stress and relationship satisfaction was investigated, with the moderating role of common dyadic coping. This was tested using individual data, meaning that only one partner completed the questionnaire. However, this does not take into account that these interactions take place in a dyadic relationship and that partners mutually influence each other's behaviors (Randall & Bodenmann, 2017). Therefore, the focus of the present research was to, in Study 2, examine the association between COVID-19-related stress and relationship satisfaction using the APIM and dyadic data. Here, the data of both partners was collected. Common dyadic coping was again included as a moderator. Due to the aforementioned complexity of the Actor-Observer bias and the way individuals explain the behavior of others (Malle et al., 2007), no specific hypothesis was formulated regarding the strength of the actor versus partner effects; they were investigated exploratively.

The present research focused on the following research question: *Which COVID-19-related stress has the most impact on an individual's own relationship satisfaction: an individual's own COVID-19-related stress, or their partner's COVID-19-related stress? In addition, does dyadic coping have a moderating role in these associations?* Based on the literature, seven hypotheses were established. First of all, it was expected that COVID-19-related stress would be negatively associated with relationship satisfaction (H1). Second, the association between COVID-19-related stress and relationship satisfaction would be weaker as common dyadic coping increased (H2). These two hypotheses were investigated in Study 1 (Figure 1). Third, an individual's own COVID-19-related stress would be negatively associated with their own relationship satisfaction (actor effects; H3). Fourth, an individual's own COVID-19-related stress would also be negatively associated with their partner's relationship satisfaction (partner effects; H4). Fifth, these four associations between COVID-19-related stress and relationship satisfaction would be moderated by common dyadic coping (H5). Sixth, it was expected that there would be a positive association between an individual's own COVID-19-related stress and their partner's COVID-19-related stress (H6). Lastly, there would also be a positive association between an individual's own relationship satisfaction and their partner's relationship satisfaction (H7). These last five hypotheses were examined in Study 2 (Figure 2).

**Figure 1***Model for Study 1***Figure 2***Model for Study 2***Study 1****Method*****Design and procedure***

The present research used secondary data from the *Gender in times of COVID-19 study*, conducted by researchers at Utrecht University. Data collection took place during the first year of the COVID-19 crisis in the Netherlands. The survey was executed online via Qualtrics and was administered in Dutch. Participants were recruited through a convenience sample, where the survey was shared through social media and the researchers' personal network.

First, participants read an information letter and provided informed consent. This emphasized voluntary participation and confidentiality. Participants had to be at least 18 years old, Dutch speaking, in a romantic relationship, and cohabiting with their partner for six months or more. After giving consent, participants completed multiple questionnaires on different themes (romantic relationships, work and family, professional identification, gender stereotypes, and experienced stress). At the end of the survey, participants were debriefed and thanked for their participation. Completing the full survey took 15-20 minutes in total.

The present analysis included participants' demographics (Appendix A) and data of three questionnaires concerning COVID-19-related stress, relationship satisfaction and common dyadic coping (Appendix B). The usage of this data has been approved by the ethics committee of the Faculty of Social and Behavioral Sciences at Utrecht University.

### ***Participants***

Participants had to meet three criteria to be included in the present research. First, they had to have filled out the three required questionnaires completely. Second, they had to be in a heterosexual relationship (either married or unmarried), so that the samples of both studies would be similar in this aspect and third, they had to have at least one child living at home.

Ultimately, the present research analyzed a subset of 275 participants (69.1% women). Their ages ranged from 28 to 64 years old (men:  $M = 41.69$ ,  $SD = 7.29$ ; women:  $M = 40.92$ ,  $SD = 6.83$ ). The average length of their relationship was 17.44 ( $SD = 7.17$ ) years. Most participants (74.2%) were married. Participants had one to five children living at home ( $M = 2.05$ ,  $SD = .78$ ) and 81.1% of the participants had at least one child under the age of 13. In terms of education, 67.6% of the participants completed a university degree (WO), 26.5% finished a higher vocational education (HBO) and 5.9% have obtained a secondary vocational degree (MBO) or lower.

### ***Measures***

**Demographics.** These included: gender, age, relationship status, relationship length, number of children living at home, ages of children living at home and educational level.

**COVID-19-related stress.** COVID-19-related stress was measured with a questionnaire consisting of six items, developed by Utrecht University (without publication). Participants indicated, on a 7-point Likert scale from 1 (not at all) to 7 (a lot), how much stress and strain they had experienced since the beginning of the COVID-19 crisis. This concerned their romantic relationship, living situation, work, health problems, financial situation and the future. The item relating to participants' romantic relationship was not included in the analysis, due to overlap with the outcome variable and to ensure that only external stress would be measured. Hence, the COVID-19-related stress score was calculated by taking the average of items 2 to 6. Higher scores implied more stress. In the present research, reliability was questionable (Cronbach's  $\alpha = .62$ ; George & Mallery, 2019).

**Relationship satisfaction.** Relationship satisfaction was measured using one item: "Click the point that best represents how happy you are in your relationship right now since



the corona crisis began, all things considered." Answers were given on a 7-point Likert scale from 1 (very unhappy) to 7 (it is perfect). Higher scores reflected higher relationship satisfaction.

**Common dyadic coping.** Common dyadic coping was measured by the Dutch version of the Dyadic Coping Inventory (DCI; Bodenmann, 2008). This questionnaire is composed of multiple subscales; in the present research only the five items of the subscale common dyadic coping were used. One item was: "We try to cope with the problem together and search for ascertained solutions." Answers were given on a 7-point Likert scale from 1 (hardly ever) to 7 (almost always). The common dyadic coping score was calculated by averaging the items 1 to 5. Higher scores indicated more common dyadic coping. In the present research, reliability was good (Cronbach's  $\alpha = .83$ ; George & Mallery, 2019).

### ***Data analysis***

Prior to data analysis, the data were prepared in Excel (version 2203) and IBM SPSS Statistics (version 28). This involved extracting the required data from the provided dataset and selecting the participants who met the three inclusion criteria. Next, the average scores for COVID-19-related stress and common dyadic coping were calculated.

First, the descriptive statistics were explored. Next, through a Pearson correlation analysis, it was determined if the factors COVID-19-related stress, relationship satisfaction and common dyadic coping correlated with each other. Using the SPSS tool PROCESS v.3.5, Andrew F. Hayes, it was examined whether there was a positive association between COVID-19-related stress and relationship satisfaction (H1) and if common dyadic coping had a moderating effect on the association between COVID-19-related stress and relationship satisfaction (H2).

## **Results**

### ***Descriptive statistics and correlations***

Participants generally experienced a little bit of stress, were overall (very) happy with their relationship, and often engaged in common dyadic coping with their partners (Table 1).

Based on Pearson correlations (Table 1), COVID-19-related stress was weakly and negatively related to relationship satisfaction and common dyadic coping. Moreover, there was a moderate, positive association between relationship satisfaction and common dyadic coping.

**Table 1***Descriptive Statistics and Correlations*

	<i>M</i>	<i>SD</i>	1.	2.	3.
1. COVID-19-related stress	3.07	.97	-		
2. Relationship satisfaction	4.57	1.01	-.218***	-	
3. Common dyadic coping	4.91	.95	-.181**	.478***	-

*Note.* \*\*  $p < .01$ , \*\*\*  $p < .001$

**Moderation analysis**

A moderation analysis was used to examine whether COVID-19-related stress was negatively associated with relationship satisfaction (H1) and to test if common dyadic coping moderated the negative association between COVID-19-related stress and relationship satisfaction (H2). The overall model was significant ( $F(3, 271) = 32.83, p < .001, R^2 = .267$ ). As expected, there was a main effect of COVID-19-related stress on relationship satisfaction ( $b = -.139, t = -2.54, p = .012$ ). In addition, there was a main effect of common dyadic coping on relationship satisfaction ( $b = .476, t = 8.46, p < .001$ ). Moreover, there was a significant interaction effect between COVID-19-related stress and common dyadic coping ( $F(1, 271) = 7.55, p = .006, \Delta R^2 = .020, b = .155, t = 2.75, p = .006$ ).

At low levels of common dyadic coping, there was a negative effect of COVID-19-related stress on relationship satisfaction ( $b = -.285, t = -3.75, p < .001$ ). However, this effect was not significant at high levels of common dyadic coping ( $b = .008, t = .11, p = .916$ ). Thus, as expected, common dyadic coping was a moderator of the association between COVID-19-related stress and relationship satisfaction; the association weakened as common dyadic coping increased.

**Study 2****Method*****Design and procedure***

Study 2 of the present research used an existing dataset from a study that examined relationship and family problems throughout the COVID-19 pandemic. The study was conducted by researchers at Utrecht University and Radboud University. Data collection took place at two measurement moments: after the first wave and during the second wave of COVID-19 in the Netherlands.

Participants were recruited through the ISO certified panel of research firm *Flycatcher* (Flycatcher, 2022). The study's target group consisted of Dutch individuals over the age of 18, who lived together with their partner. A selection study was carried out among the Flycatcher panel to determine the research group. Based on this, a sample of 750 panelists and their partners, who fell within the target group and wanted to participate in the study, was drawn. This was a stratified sample by gender, education and province.

The survey was executed online and was administered in Dutch. Panelists received an email with a hyperlink to the online survey; their partners received a separate invitation to fill out the survey. After providing informed consent, panelists and their partners completed multiple questionnaires on different themes (resources and risk factors, well-being, changes since COVID-19, perceived stress, work, romantic relationship, need for couples/family therapy and parenting). At the end of the survey, participants were debriefed and thanked for their participation. Completing the full survey took 20-25 minutes in total.

The present analysis used the data collected at the first measurement moment (i.e., after the first wave of COVID-19 in the Netherlands). This included participants' demographics (Appendix C) and three questionnaires concerning COVID-19-related stress, relationship satisfaction and common dyadic coping (Appendix D). The usage of this data has been approved by the ethics committee of the Faculty of Social and Behavioral Sciences at Utrecht University.

### ***Participants***

Participants had to meet three criteria to be included in the present research. First, both panelists, and their partners had to have filled out the three required questionnaires completely. Second, panelists and their partners had to be in a heterosexual relationship (either married or unmarried) and third, they had to have at least one child living at home.

Ultimately, the present research analyzed a subset of 186 heterosexual dyads. Participants' ages ranged from 18 to 64 years old (men:  $M = 45.20$ ,  $SD = 9.14$ ; women:  $M = 42.35$ ,  $SD = 9.06$ ). Couples' average relationship length was 19.43 ( $SD = 9.87$ ) years. Most couples (81.7%) were married. Panelists and their partners had one to six children living at home ( $M = 1.81$ ,  $SD = .83$ ), with an average age of 12.56 ( $SD = 8.36$ ) years old. For men, the education level was distributed as follows: 18.8% low, 39.8% middle and 41.4% high. For women, this division was: 25.3% low, 45.2% middle and 29.5% high.

## **Measures**

**Demographics.** These included: gender, age, relationship status, relationship length, number of children living at home, ages of children living at home and educational level.

**COVID-19-related stress.** COVID-19-related stress was measured with a questionnaire almost identical to the one used in Study 1, only with one additional item, related to family situation. Besides, there was an extra response option: *not applicable*. The COVID-19-related stress score was calculated by averaging the items relevant to the participant, whereby items answered with not applicable were not included in the average score for that participant. The item concerning participants' romantic relationship was, as in Study 1, eliminated from the analysis. In the present research, reliability was good for both men (Cronbach's  $\alpha = .83$ ) and women (Cronbach's  $\alpha = .78$ ; George & Mallery, 2019).

**Relationship satisfaction.** Relationship satisfaction was measured using the Revised Dyadic Adjustment Scale (RDAS; Busby et al., 1995), consisting of 14 items. Answers were given on a 6-point Likert scale with varying response options (e.g., 1 (always disagree) to 6 (always agree); 1 (never) to 6 (always)). One item was: "Do you ever regret that you married (or lived together)?" The total score was calculated by summing all the item scores. Higher scores indicated more relationship satisfaction. In the present research, reliability was good for both men (Cronbach's  $\alpha = .81$ ) and women (Cronbach's  $\alpha = .81$ ; George & Mallery, 2019).

**Common dyadic coping.** Common dyadic coping was measured with the same questionnaire as in Study 1 (DCI; Bodenmann, 2008). In the present research, reliability was good for both men (Cronbach's  $\alpha = .86$ ) and women (Cronbach's  $\alpha = .86$ ; George & Mallery, 2019).

## **Data analysis**

Prior to data analysis, the data were prepared in Excel (version 2203) and IBM SPSS Statistics (version 28). This involved extracting the required data from the provided dataset and selecting the dyads who met the three inclusion criteria. Next, the average scores for COVID-19-related stress and common dyadic coping, and the total score for relationship satisfaction, were calculated. The dyadic dataset was originally categorized into *panelists* and *partners*. This dataset was restructured to the categories of *men* and *women*, so that any gender differences in the APIM could be identified.

First, the descriptive statistics were examined. Next, Pearson correlations between the factors COVID-19-related stress, relationship satisfaction and common dyadic coping, for both men and women, were explored. To analyze the APIM and test hypotheses 3 to 7, a web

application, called *APIM\_SEM* (Stas et al., 2018), was used. The data were uploaded into this app; within it the statistical analyses (i.e., Structural Equation Modeling with Maximum Likelihood Estimation) were performed.

## Results

### *Descriptive statistics and correlations*

Men and women both generally experienced little stress, had relatively high scores for relationship satisfaction, and both often engaged in common dyadic coping (Table 2).

**Table 2**

*Descriptive Statistics and Correlations for Men and Women*

	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.
1. M_stress	2.42	1.07	-					
2. F_stress	2.58	1.05	.553***	-				
3. M_RS	50.46	6.99	-.207**	-.176*	-			
4. F_RS	50.23	6.94	-.196**	-.254***	.674***	-		
5. M_CDC	4.88	1.08	-.108	-.031	.612***	.529***	-	
6. F_CDC	4.99	1.08	-.027	-.047	.471***	.600***	.577***	-

*Note.* \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

M = men; F = women; stress = COVID-19-related stress; RS = relationship satisfaction; CDC = common dyadic coping

Pearson correlations showed weak, negative associations between COVID-19-related stress and relationship satisfaction (Table 2). These occurred between each gender's own COVID-19-related stress and relationship satisfaction (i.e., men-men or women-women), as well as between the COVID-19-related stress of one gender and the relationship satisfaction of the opposite gender (i.e., men-women or women-men). There were no significant associations between COVID-19-related stress and common dyadic coping (Table 2); not within one's own gender, nor across genders.

Moreover, there were moderate, positive associations between relationship satisfaction and common dyadic coping (Table 2). Both between each gender's own relationship satisfaction and common dyadic coping, as well as between the relationship satisfaction of one gender and the common dyadic coping of the opposite gender.

Lastly, there were moderate, positive associations between the COVID-19-related stress of one gender and the COVID-19-related stress of the opposite gender. These across

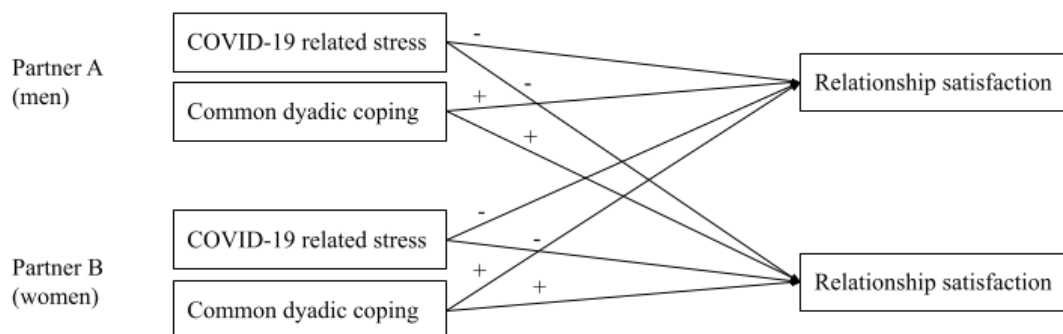
gender associations also occurred for relationship satisfaction and common dyadic coping (Table 2).

### ***Actor-Partner Interdependence Model***

The APIM\_SEM web application (Stas et al., 2018), that was used to analyze the APIM, did not allow the option to add a moderator. Moreover, there was no correlation between COVID-19-related stress and common dyadic coping, but COVID-19-related stress and common dyadic coping were related to relationship satisfaction. Therefore, it was decided to include common dyadic coping in the APIM as a second predictor variable, instead of a moderator (Figure 3). In addition, Study 1 showed that there was a significant main effect of common dyadic coping on relationship satisfaction, which provided additional reason to investigate the effect of common dyadic coping on relationship satisfaction in Study-2.

### **Figure 3**

#### *Adapted Model for Study 2*



*Note.* For simplicity, only the actor and partner effects (i.e., no correlations) of COVID-19-related stress and common dyadic coping on relationship satisfaction are shown in this figure

The analysis to test the model in Figure 3 was performed with 186 dyads and ended normally after 98 iterations. Members of the dyad were distinguished by the variable *gender*, with the roles of *men* and *women*. The intercept (i.e., the predicted score on relationship satisfaction when the variables COVID-19-related stress and common dyadic coping equal zero) was, for both men and women, significantly different from zero (Table 3). There were no statistical differences between the two intercepts ( $p = .359$ , 95% CI [-0.42, 1.15]), meaning that there was no main effect of gender. In addition, when men scored high (low) on relationship satisfaction, women also had a tendency to have high (low) relationship

satisfaction scores, after controlling for COVID-19-related stress and common dyadic coping ( $r = .468, p < .001, 95\% \text{ CI } [0.29, 0.59]$ ).

**COVID-19-related stress.** While the actor effect of COVID-19-related stress on relationship satisfaction was not significant for men, it was for women (Table 3). There were no statistical differences between the two actor effects ( $p = .263, 95\% \text{ CI } [-0.58, 2.11]$ ). The overall actor effect was  $-.982$  and significant ( $p < .001, 95\% \text{ CI } [-1.50, -0.47]$ ).

The partner effects from men to women, and from women to men, were not significant (Table 3). There were no statistical differences between the two partner effects ( $p = .664, 95\% \text{ CI } [-1.64, 1.05]$ ). The overall partner effect was  $-.523$ , which was significant ( $p = .047, 95\% \text{ CI } [-1.04, -0.01]$ ).

The abovementioned actor and partner effects were used to identify a dyadic pattern (i.e., couple pattern, contrast pattern, actor-only pattern and partner-only pattern; Fitzpatrick et al., 2016). These different patterns provide insight into the different processes in dyadic relationships, and demonstrate how romantic partners are influenced by each other (Kenny & Ledermann, 2010). For men, both the actor and partner effect were not significant, meaning that there was no dyadic pattern. For women, only the actor effect was significant, which implies an actor-only pattern. This suggests that women's relationship satisfaction was influenced only by their own COVID-19-related stress and not by their partner's COVID-19-related stress.

**Common dyadic coping.** The actor effects of common dyadic coping on relationship satisfaction, for both men and women, were significant (Table 3). There were no statistical differences between the two actor effects ( $p = .586, 95\% \text{ CI } [-0.97, 1.72]$ ). The overall actor effect was  $3.033$  and significant ( $p < .001, 95\% \text{ CI } [2.52, 3.54]$ ).

The partner effects from men to women, and from women to men, were both significant (Table 3). There were no statistical differences between the two partner effects ( $p = .482, 95\% \text{ CI } [-1.83, 0.87]$ ). The overall partner effect was  $1.402$  and significant ( $p < .001, 95\% \text{ CI } [0.89, 1.91]$ ).

Again, the dyadic patterns were identified. For men and women, both the actor and partner effect were significant, implying a couple-pattern (Fitzpatrick et al., 2016). This suggests that, for both men and women, an individual's own relationship satisfaction was equally influenced by both their own common dyadic coping and their partner's common dyadic coping.

**Covariate.** To account for the influence of the number of stress items that were relevant to participants, an additional variable was created: *number of stress items* (men:  $M =$

5.78,  $SD = .73$ ; women:  $M = 5.70$ ,  $SD = .74$ ). This variable was included in the APIM as a within dyad covariate. The effect of the covariate was estimated separately for men and women. For men, the effect of the number of stress items on relationship satisfaction was .237 and not significant ( $\beta(o) = .025$ ,  $p = .620$ , 95% CI [-0.70, 1.18]). For women, the effect was -1.082, which was significant ( $\beta(o) = -.115$ ,  $p = .015$ , 95% CI [-1.96, -0.21]).

**Table 3**

*Actor-Partner Interdependence Model*

Effect	Role	Estimate	95% CI	$p$	$\beta(o)$	$r$
Intercept	Men	50.563	[49.79, 51.34]	< .001		
	Women	50.197	[49.46, 50.93]	< .001		
COVID-19-related stress						
Actor	Men	-.600	[-1.46, 0.26]	.172	-.091	-.134
	Partner	-.672	[-1.55, 0.20]	.132	-.102	-.076
Actor	Women	-1.365	[-2.19, -0.54]	< .001	-.027	-.178
	Partner	-.375	[-1.19, 0.44]	.369	-.057	-.069
Common dyadic coping						
Actor	Men	3.220	[2.35, 4.09]	< .001	.499	.473
	Partner	1.160	[0.29, 2.03]	.009	.179	.182
Actor	Women	2.846	[2.03, 3.67]	< .001	.441	.425
	Partner	1.644	[0.82, 2.47]	< .001	.255	.279

*Note.* APIM results assuming different actor and partner effects, for both roles, on relationship satisfaction

**Distinguishability.** A comparison between a model with distinguishable members and a model with indistinguishable members was conducted, to examine whether gender made a meaningful difference in the present analysis. This test of distinguishability was not significant ( $\chi^2(20) = 20.352$ ,  $p = .373$ ), indicating that there was no difference in fit between both models. Therefore, it could not be concluded whether members of the dyad could be distinguished based on gender.

### Discussion

The present research focused on the impact of COVID-19-related stress on the relationship satisfaction of heterosexual, (un)married cohabiting couples with children living at home. The aim of the present research was twofold. In Study 1, individual data was used to



investigate the association between COVID-19-related stress and relationship satisfaction, with the moderating role of common dyadic coping. Study 2 explored how partners in a romantic relationship mutually influence each other's COVID-19-related stress, relationship satisfaction and common dyadic coping, using the Actor-Partner Interdependence Model (APIM; Cook & Kenny, 2005) and dyadic data. The following research question was examined: *Which COVID-19-related stress has the most impact on an individual's own relationship satisfaction: an individual's own COVID-19-related stress, or their partner's COVID-19-related stress? In addition, does dyadic coping have a moderating role in these associations?*

The results of Study 1 indicated a negative effect of COVID-19-related stress on relationship satisfaction (H1), meaning that when individuals experienced more COVID-19-related stress, they were less satisfied with their relationship. This association is consistent with previous research from Genç and colleagues (2021) on relationship satisfaction during the COVID-19 crisis. The analysis of the APIM in Study 2, however, showed that, for men, there was no association between COVID-19-related stress and relationship satisfaction. Men's relationship satisfaction was not affected by either their own or their partner's COVID-19-related stress (H3; H4). Women's relationship satisfaction was affected by COVID-19-related stress, but only by their own and not their partner's COVID-19-related stress (H3; H4). These gender differences are in line with previous research from Falconier and colleagues (2013), who only detected an association between stress and relationship satisfaction for women. In addition, they found that, as in the present research, women's relationship satisfaction was related solely to their own stress and not to their partner's stress (Falconier et al., 2013).

Study 2 also showed that an individual's own relationship satisfaction was positively associated with their partner's relationship satisfaction (H7). Besides, there was a positive association between an individual's own COVID-19-related stress and their partner's COVID-19-related stress, for both men and women (H6). Thus, as expected, when an individual experienced more COVID-19-related stress, their partner also experienced more COVID-19-related stress, and vice versa. This COVID-19-related stress from one's partner, however, did, as mentioned above, not affect an individual's own relationship satisfaction. This might be explained by the way individuals attribute their partners' behavior. Research has shown that happy couples, compared to unhappy couples, tend to attribute their partners' positive behavior to internal causes, and negative behavior to situational causes (positive attributions). For unhappy couples, this pattern is reversed (negative attributions; Fletcher et

al., 1990). Positive attributions about each other's behavior can cause partners to be more satisfied with their relationship, while negative attributions can lead to relationship conflict (Hrapczynski et al., 2012). In the present research, both men and women had relatively high scores of relationship satisfaction. This might mean that individuals used positive attributions to explain their partner's behavior and that any negative behavior was attributed to, for example, COVID-19-related stress, and not to internal causes. It could be that, because of this, an individual's own relationship satisfaction was not negatively influenced by their partner's COVID-19-related stress.

The finding that men's relationship satisfaction was also not affected by their own COVID-19-related stress, might be explained by the differences in how men and women deal with stress. Men tend to exhibit problem-oriented coping, which may be more adaptive than women's emotion-oriented coping (Tamres et al., 2002). For example, women are more likely, compared to men, to use avoidance and to ruminate, and this could interfere with problem solving (Nolen-Hoeksema, 1991). This could also clarify why the covariate number of stress items was significant for women and not for men; when women engage in less effective problem solving, more stressors accumulate, causing women to be more affected by stress. Previous research from Neff and Karney (2007) has additionally shown that women's stress may be more important in a romantic dyadic relationship, than men's stress.

Based on both Study 1 and Study 2, it can be concluded that women's relationship satisfaction decreases when they experience more COVID-19-related stress. Men's relationship satisfaction, on the other hand, is not affected by either their own or their partner's COVID-19-related stress. It is important to further investigate these gender differences in the association between stress and relationship satisfaction. Specific attention should be paid to the role of problem-oriented coping compared to emotion-oriented coping and whether these different coping styles can explain why women's relationship satisfaction is affected by stress and men's relationship satisfaction is not. Moreover, follow-up research could examine whether positive and negative attributions about one's partner's behavior influence how couples deal with stress.

Given the detrimental effects of relationship dissatisfaction, such as dissolution of romantic relationships or divorce (Parkinson, 2019), partners must find ways to deal with stress together. Study 1 indicated that when couples engaged in better common dyadic coping, the negative association between COVID-19-related stress and relationship satisfaction weakened (H2). This is in line with the notion that couples can protect themselves from the negative effects of stress through successful dyadic coping (e.g.,

Bodenmann 1997; Merz et al., 2014). Research has shown that romantic partners can enhance their dyadic coping skills by improving couple communication and by strengthening individual and dyadic coping resources (Bodenmann & Randall, 2012; Bodenmann & Shantinath, 2004). It might be beneficial to provide couples with tools to improve their dyadic coping skills during, for example, a pandemic. Besides, campaigns could make partners aware that they can protect their romantic relationship and personal well-being from the negative effects of stress through dyadic coping.

The present research could not investigate whether common dyadic coping had a moderating role in the APIM (H5), since the web application APIM\_SEM (Stas et al., 2018) did not allow the option to include a moderator. Therefore, the interaction between COVID-19-related stress and common dyadic coping was not examined in Study 2. The absence of an association between COVID-19-related stress and common dyadic coping, however, seemed to indicate that moderation would not be very plausible anyway. The results did show that common dyadic coping functioned as a significant second predictor of relationship satisfaction, for both men and women. An individual's own relationship satisfaction was positively affected by both their own, and their partners' common dyadic coping. In other words, when individuals and their partners engaged in better common dyadic coping, they were both more satisfied with their relationship. This mutual influence is consistent with the assumption that dyadic coping can be seen as a communication process that triggers the coping responses of both partners (Bodenmann, 2005). It thus requires both partners' joint effort and participation to deal with stress. Moreover, the results correspond with the findings of a meta-analysis from Falconier, Jackson and colleagues (2015), who found that dyadic coping was a significant positive predictor of relationship satisfaction. Likewise, Traa and colleagues (2015) have indicated that successful dyadic coping can improve relationship functioning, such as increasing relationship satisfaction.

Furthermore, in the present research, common dyadic coping was a stronger predictor of relationship satisfaction than COVID-19-related stress. Dyadic coping, however, is not just about managing COVID-19-related stress. Couples have to cope with a variety of stressors every day, such as financial stress, stress at work, and stress related to children (Randall & Bodenmann, 2009). Besides, couples have to deal with conflicts and tensions that arise within the romantic relationship and between both partners (Randall & Bodenmann, 2017). Thus, since couples must deal with stress in multiple aspects of their relationship, this could explain why common dyadic coping had more influence on relationship satisfaction than COVID-19-related stress.

There are several limitations of the present research that should be acknowledged. First, the statistical analyses of the APIM were automatically performed within the APIM\_SEM app, but with the warning that there may be bugs and errors present, and that results should be checked carefully (Stas et al., 2018). In subsequent research, it is therefore recommended to perform Structural Equation Modeling (SEM) without this app, to increase the reliability of the results. Second, in Study 1 and Study 2 different datasets were used, whereby the sample from Study 1 consisted predominantly of women and higher educated individuals. Moreover, the data collection of both studies each took place at different time periods throughout the COVID-19 pandemic, which may have affected participants' responses. Therefore, the results of both studies cannot be compared one-on-one.

In conclusion, men's relationship satisfaction was not affected by COVID-19-related stress. Women's relationship satisfaction was only affected by their own COVID-19-related stress, meaning that when women experienced more COVID-19-related stress, they were less satisfied with their relationship. Moreover, the results emphasize the importance of dyadic coping in a romantic relationship; when couples engaged in better common dyadic coping, they were more satisfied with their relationship. In Study 1, high levels of common dyadic coping even weakened the negative association between COVID-19-related stress and relationship satisfaction. Besides, common dyadic coping was a stronger predictor of relationship satisfaction than COVID-19-related stress. Couples should therefore be provided with tools and information to enhance their dyadic coping skills, so that they can protect their relationship from the detrimental effects of stress. Follow-up research is needed to further investigate the gender differences in the association between stress and relationship satisfaction. Specific attention should be paid to the role of different individual coping styles, and whether positive and negative attributions about one's partner's behavior influence how couples deal with stress. This way more can be clarified about couples' relationship dynamics during stressful times.

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**Appendix A: Demographics Study 1**

1. Wat is uw geslacht?
  - Man
  - Vrouw
  - Anders, namelijk...
  
2. Wat is uw leeftijd (in jaren)?
  
3. Heeft u op dit moment een relatie?
  - Nee
  - Ja, ik ben gehuwd en samenwonend
  - Ja, ik ben ongehuwd en samenwonend
  - Ja, ik ben gehuwd en niet samenwonend
  - Ja, ik ben ongehuwd en niet samenwonend
  
4. Hoe lang zijn u en uw partner al samen (in jaren)?
  
5. Heeft (hebben) u en/of uw partner kinderen?
  - Ja
  - Nee
  
6. Hoeveel van uw en/of uw partners kinderen wonen in uw huis (parttime of fulltime)?
  
7. Hou oud zijn de kinderen die thuis wonen?
  
8. Wat is uw hoogst afgeronde opleiding? Als uw opleiding er niet bij staat, kruis dan de opleiding aan die het meest op de door u gevolgde opleiding lijkt.
  - Geen onderwijs / basisonderwijs / cursus inburgering of cursus Nederlandse taal
  - LBO / VBO / VMBO / MBO 1
  - MAVO / HAVO / ULO / MULO
  - MBO 2, 3, 4
  - VWO / gymnasium
  - HBO
  - WO / universiteit

## Appendix B: Questionnaires Study 1

### *COVID-19 related stress*

Hoeveel stress en spanning heeft u ervaren, sinds de coronacrisis begon, als het gaat om...

1. De relatie met uw partner?
2. Uw thuissituatie (huishouden, kinderopvang/onderwijs, woonomgeving)?
3. Uw werk (verlies van baan, werkdruk, thuiswerken, werk-privé balans)?
4. Gezondheidsproblemen of ziekte (van uzelf of mensen in uw naaste omgeving)?
5. Uw financiële situatie?
6. Zorgen over de toekomst?

*Antwoordschaal: 1 = helemaal niet; 2 = nauwelijks; 3 = een klein beetje; 4 = enigszins; 5 = redelijk veel; 6 = veel; 7 = heel veel*

### *Relationship satisfaction*

Klik het punt aan dat het beste weergeeft hoe gelukkig u op dit moment sinds de coronacrisis begon bent in uw relatie, alles in beschouwing genomen.

*Antwoordschaal: 1 = heel erg ongelukkig; 2 = behoorlijk ongelukkig; 3 = een beetje ongelukkig; 4 = gelukkig; 5 = heel gelukkig; 6 = extreem gelukkig; 7 = het is perfect*

### *Common dyadic coping (Dyadic Coping Inventory; Bodenmann, 2008)*

De volgende vragen gaan over hoe u en uw partner samen omgaan met stress in de afgelopen weken. Klik bij elke uitspraak aan welk antwoord het meest passend is voor uw persoonlijke situatie op dit moment.

1. We proberen samen met het probleem om te gaan en naar concrete oplossingen te zoeken
2. We gaan een gesprek aan over het probleem en denken erover na wat er gedaan moet worden
3. We helpen elkaar om het probleem in perspectief te plaatsen en het van een andere kant te bekijken
4. We helpen elkaar te ontspannen met dingen zoals een massage, een bad nemen of naar muziek luisteren
5. We zijn lief tegen elkaar, vrijen en proberen op die manier om te gaan met stress

*Antwoordschaal: 1 = (vrijwel) nooit; 2 = zeer zelden; 3 = zelden; 4 = soms; 5 = vaak; 6 = zeer vaak; 7 = (vrijwel) altijd*

## Appendix C: Demographics Study 2

1. Wat is uw geslacht?
  - o Man
  - o Vrouw
  
2. Wat is uw leeftijd (in jaren)?
  
3. Wat is uw burgerlijke staat?
  - o Gehuwd
  - o Ongehuwd
  - o Geregistreerd partnerschap
  - o Ongehuwd met samenlevingscontract
  - o Anders namelijk...
  
4. Hoelang heeft u al een relatie met uw huidige partner (in hele en halve jaren)?
  
5. Heeft u thuiswonende kinderen?
  - o Nee
  - o Ja, kinderen met mijn huidige partner
  - o Ja, kinderen uit een eerdere relatie van mij
  - o Ja, kinderen uit een eerdere relatie van mijn partner
  - o Ja, kinderen uit een eerdere relatie van mij en kinderen uit een eerdere relatie van mijn partner (samengesteld gezin)
  
6. Wat is de leeftijd van de kinderen die thuis wonen?
  
7. Wat is uw hoogst afgeronde opleiding?
  - o Geen / basisonderwijs
  - o LBO / VMBO (kader- of beroepsgericht) / MBO 1 / VBO
  - o MAVO / HAVO / VWO (overgegaan naar 4e klas) / VMBO (theoretisch of gemengd) / (M)ULO
  - o MBO 2, 3, 4 / MBO voor 1998
  - o HAVO / VWO (met diploma afgerond) / HBS / MMS
  - o HBO propedeuse
  - o HBO bachelor
  - o HBO master
  - o Universitaire propedeuse
  - o Universitaire bachelor / kandidaats
  - o Universitaire master / doctoraal / post doctoraal

## Appendix D: Questionnaires Study 2

### *COVID-19 related stress*

Hoeveel stress, spanning of zorgen ervaart u, sinds de afgelopen drie maanden, als het gaat om...

1. Uw woonsituatie (bijv. behuizing, huishouden, woonomgeving)?
2. Uw gezinssituatie (bijv. opvoeding, zorg voor kinderen)?
3. Uw werk (bijv. werkdruk, thuiswerken, werk-privé balans, verlies van baan)?
4. Uw relatie
5. Gezondheidsproblemen of ziekte (bijv. van uzelf of mensen in uw naaste omgeving)?
6. Uw thuissituatie (huishouden, kinderopvang/onderwijs, woonomgeving)?
7. Uw financiële situatie (bijv. lagere inkomsten, hogere uitgaven)?

*Antwoordschaal: 1 = helemaal niet; 2 = nauwelijks; 3 = een klein beetje; 4 = enigszins; 5 = redelijk veel; 6 = veel; 7 = heel veel; 8 = niet van toepassing*

### *Relationship satisfaction (Revised Dyadic Adjustment Scale; Busby et al., 1995)*

De meeste mensen hebben wel eens onenigheid in hun relatie. Wilt u voor de onderstaande onderwerpen aangeven in hoeverre u en uw partner het over deze onderwerpen eens of oneens zijn?

1. Tonen van liefde
2. Seksualiteit
3. 'Hoe het hoort' / omgangsnormen
4. Geloofskwesties
5. Grote beslissingen
6. Carrièrebeslissingen

*Antwoordschaal: 1 = altijd oneens; 2 = meestal oneens; 3 = soms oneens; 4 = soms eens; 5 = meestal eens; 6 = altijd eens*

7. Hoe vaak zegt u tegen uw partner dat u de relatie wilt beëindigen of denkt u erover na?
8. Heeft u er ooit spijt van dat u een relatie bent aangegaan met uw partner?
9. Hoe vaak ruziet u ergens over?
10. Hoe vaak werken u en uw partner elkaar op de zenuwen?

*Antwoordschaal: 1 = nooit; 2 = zelden; 3 = soms; 4 = vaker wel dan niet; 5 = vaak; 6 = altijd*

11. Hoeveel bezigheden worden door u en uw partner gezamenlijk ondernomen?

*Antwoordschaal: 1 = geen; 2 = enkele; 3 = sommige; 4 = de meeste; 5 = allemaal*  
 Als u en uw partner samen zijn, hoe vaak...

12. Heeft u een interessante gedachtewisseling?
13. Voert u een rustige discussie?
14. Werkt u samen ergens aan?

*Antwoordschaal: 1 = nooit; 2 = minder dan 1x per maand; 3 = 1 of 2x per maand; 4 = 1 tot 3x per week; 5 = 4 tot 7x per week; 6 = vaker*

***Common dyadic coping (Dyadic Coping Inventory; Bodenmann, 2008)***

De volgende vragen gaan over hoe u en uw partner samen omgaan met stress in de afgelopen weken. Klik bij elke uitspraak aan welk antwoord het meest passend is voor uw persoonlijke situatie op dit moment.

1. We proberen samen met het probleem om te gaan en naar concrete oplossingen te zoeken
2. We gaan een gesprek aan over het probleem en denken erover na wat er gedaan moet worden
3. We helpen elkaar om het probleem in perspectief te plaatsen en het van een andere kant te bekijken
4. We helpen elkaar te ontspannen met dingen zoals een massage, een bad nemen of naar muziek luisteren
5. We zijn lief tegen elkaar, vrijen en proberen op die manier om te gaan met stress

*Antwoordschaal: 1 = (vrijwel) nooit; 2 = zeer zelden; 3 = zelden; 4 = soms; 5 = vaak; 6 = zeer vaak; 7 = (vrijwel) altijd*