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### The role of overprotection by the partner in coping with diabetes: A moderated mediation model

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## The role of overprotection by the partner in coping with diabetes: A moderated mediation model

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This study examined whether diabetes-specific self-efficacy mediates the association between overprotection and distress and whether this mediation depends on glycemic control and gender. The research sample of 215 individuals with diabetes and their partners completed a measure of partners' overprotective behaviours towards the patient. Patients also completed measures of diabetes-specific self-efficacy and diabetes-related distress. Further, HbA1c values were obtained as an indication of glycemic control. Diabetes-specific self-efficacy mediated the association between overprotection by the partner and diabetes-related distress especially when glycemic control was relatively poor. Furthermore, diabetes-specific self-efficacy mediated the association between overprotection and diabetes-related distress more strongly in female than in male patients. The findings underscore the importance of studying both moderators and mediators in the association between partner behaviour and distress in patients.

**Keywords:** support; spouses; perceived control; illness; well-being

Diabetes is a chronic illness that requires a demanding and unending self-care regimen of taking medication, engaging in physical exercise, and maintaining a healthy diet to obtain a good glycemic control. A good glycemic control is needed to lower the risk of developing microvascular complications (neuropathy, retinopathy or nephropathy) and macrovascular complications (Diabetes Control and Complications Trial Research Group, 1993; Lawson, Gerstein, Tsui, & Zinman, 1999; UK Prospective Diabetes Study Group, 1998, 2000). The burden of adhering to the self-care regimen and the threat or actual onset of complications may lead patients to experience diabetes-related distress (Gonder-Frederick, Cox, & Ritterband, 2002; Jacobson, 1996; Polonsky et al., 1995; Rubin & Peyrot, 2001; Welch, Jacobson, & Polonsky, 1997). Besides the influence of disease-related variables and patient characteristics, a growing body of research has demonstrated the influential role of the partner and the family on patients' level of distress

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(Fisher et al., 2004; Hagedoorn et al., 2006; Karlsen, Idsoe, Hanestad, Murberg, & Bru, 2004; Trief, Grant, Elbert, & Weinstock, 1998; Trief, Wade, Britton, & Weinstock, 2002; Wearden, Tarrrier, & Davies, 2000).

Of specific interest is the role of overprotection by the partner, which can be viewed as unhelpful behaviour. Overprotecting the patient means that the partner underestimates the patient's capabilities, resulting in unnecessary help, excessive praise for accomplishments, or attempts to restrict activities. Previous studies concerning other chronic diseases have shown that overprotection by the partner was associated with higher levels of distress in patients (Buunk, Berkhuisen, Sanderman, & Nieuwland 1996; Joeekes, van Elderen, & Schreurs, 2007; Kuijer et al., 2000). Further, diabetes patients participating in a diabetes education programme showed a larger decrease in distress over time if, at the start of the programme, patients perceived their partner to be less overprotective (Hagedoorn et al., 2006). However, these previous studies have not yet identified underlying mechanisms in the association between overprotection and distress, nor conditions under which the associations may be stronger or weaker. This study will address this gap by examining whether diabetes-specific self-efficacy mediates the association between overprotection and distress and whether this mediation depends on glycemic control and gender.

We argue that overprotective behaviour by the partner may convey the message to the patient that the partner has little confidence in the patient's abilities to deal with the diabetes effectively. For example, the partner may try to prevent the patient from eating a piece of pie because the partner doubts whether the patient will be able to keep his or her glycemic control within a normal range in this situation. Such a lack of partner confidence may cause a decrease in patients' diabetes-specific self-efficacy, that is, the confidence that patients have in their own ability to manage the diabetes. Studies concerning other chronic diseases have supported this line of reasoning by showing that overprotection was indeed negatively associated with feelings of self-efficacy with respect to a number of disease management behaviours (Berkhuisen, Nieuwland, Buunk, Sanderman, & Rispen, 1999; Buunk et al., 1996; Coyne & Smith, 1994). In turn, we expected lower levels of self-efficacy to increase levels of distress. This self-efficacy–distress linkage has been abundantly demonstrated in prior research (Eiser, Riazi, Eiser, Hammersley, & Tooke, 2001; Kanbara et al., 2008; Rose, Fliege Hildebrandt, Schirop, & Klapp, 2002; Senecal, Nouwen, & White, 2000; van der Ven et al., 2003). In sum, overprotection was expected to be associated with diabetes-related distress through diabetes-specific self-efficacy.

Further, we propose a moderated mediation model in which the indirect link between overprotection and diabetes-related distress will apply more strongly for patients with worse glycemic control. There are several ways in which an indirect link may be dependent upon a moderator. For example, glycemic control may moderate the association between overprotection, the predictor, and diabetes-specific self-efficacy, the mediator. When glycemic control is poor, overprotection by the partner may be even more strongly associated with self-efficacy than when glycemic control is good. Overprotection conveys little confidence of the partner in the patient's abilities. A poor glycemic control may point out to the patient that the partner is right in having little confidence, thus decreasing patient's self-efficacy to a higher extent.

Another possibility is that glycemic control moderates the association between diabetes-specific self-efficacy, the mediator, and diabetes-related distress, the outcome. This means that overprotection will be associated with less diabetes-specific self-efficacy, and these lower levels of self-efficacy may be more detrimental in patients with a poor glycemic control. A poor glycemic control indicates that patients need to take certain actions to improve their control. Patients with high self-efficacy will be more persistent in the face of obstacles (Bandura, 1977, 1982, 2004), such as a poor glycemic control, and will feel confident that they are able to make improvements. As a consequence, patients who feel self-efficacious are less inclined to feel distressed when confronted with a poor glycemic control. In contrast, patients with low self-efficacy are more likely to feel distressed when confronted with a poor glycemic control because they feel less capable of performing the necessary actions for improvement.

It was also expected that gender may moderate the mediation model. Women have been found to attach more value to relationship-oriented aspects than do men (Cross & Madson, 1997; Strough, Berg, & Sansone 1996; Thoits, 1992). As a consequence, relationship-oriented aspects, such as support from others, may have a stronger impact on women's than on men's level of distress. Although some studies of associations between support and distress did not find gender differences (e.g. Sherman, 2003; Vinokur, Price, & Caplan, 1996), the studies that did were consistent in demonstrating that women are indeed more strongly influenced by partner behaviour and characteristics than are men (e.g. Acitelli & Antonucci, 1994; Hagedoorn et al., 2000; Hagedoorn et al., 2001; Horwitz, McLaughlin, & White, 1998; Mcrae & Brody, 1989). This leads to the formulation of a second moderated mediation model in which the indirect link between overprotection and distress through diabetes-specific self-efficacy will apply more strongly for female than for male patients. More specifically, it can be expected that the association between overprotection and self-efficacy is stronger for women. However, it is also conceivable that the association between self-efficacy and diabetes-related distress is stronger for women. There is evidence suggesting that women and men have different attitudes towards their diabetes. Female patients were more likely than male patients to perceive the diabetes as serious and they also reported a higher impact of the diabetes on daily life than did male patients (Mosnier-Pudar et al., 2009). Furthermore, female patients defined themselves more in terms of their diabetes than male patients did (Helgeson & Novak, 2007). Because female patients seem to perceive their diabetes as more serious and intruding than male patients, female patients may become more distressed than male patients when feeling little self-efficacious in dealing with the disease.

Previous research on the impact of partner support has mainly utilised patients' own perceptions of support provided by the partner. A drawback of assessing only patients' perceptions is that these perceptions may be confounded with patients' level of distress (Story & Bradbury, 2004). That is, patients who experience high levels of distress may interpret their partner's behaviour as overprotective. Therefore, to test the associations, we incorporated both patient and partner ratings of overprotection, in separate analyses. In sum, we formulated the following hypotheses (see also Figure 1):

- (1) The link between overprotection and diabetes-related distress will be mediated by diabetes-specific self-efficacy.

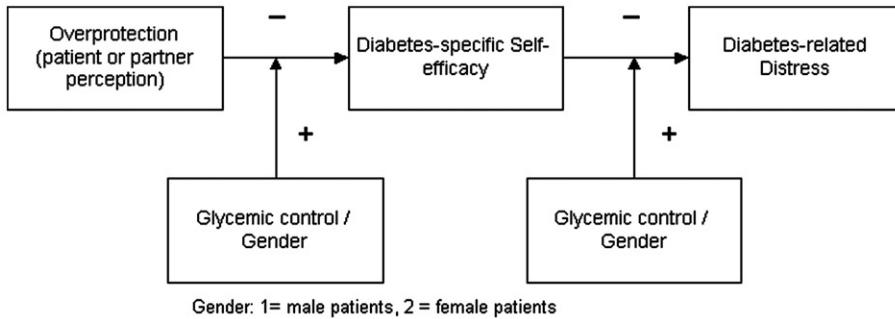


Figure 1. The proposed moderated mediation models.

- (2) The indirect link, that is, the mediation effect, will be larger for those patients who show relatively poor glycemic control, because:
  - (a) Glycemic control strengthens the negative overprotection-self-efficacy linkage
  - (b) Glycemic control strengthens the negative self-efficacy-distress linkage
- (3) The indirect link will be larger for female than for male patients, because:
  - (a) The negative overprotection-self-efficacy linkage is stronger for female patients
  - (b) The negative self-efficacy-distress linkage is stronger for female patients

## Method

### *Participants and procedure*

The research was carried out in accordance with the guidelines of the Medical Ethical Committee of the University Medical Center Groningen. Patients were considered eligible when they satisfied the following inclusion criteria: age 18–70 years, no severe co-morbidity such as a clinical depression or a psychiatric disorder, not pregnant and Dutch speaking. Approximately 690 eligible, consecutive patients with type 1 and 2 diabetes requiring insulin were approached by their physician during a check-up visit to complete a short screening questionnaire.<sup>1</sup> This short questionnaire was filled out and returned by 507 patients. Of these patients, 419 (82.6%) indicated to have an intimate partner. For the purposes of this study, we were interested in the larger questionnaire that was sent to both patients and their partners after patients had filled out the short questionnaire. However, some couples accidentally did not receive this larger questionnaire and of the 413 couples that were sent the questionnaire, 223 couples (54%) completed it.<sup>2</sup> Eight couples were excluded afterwards (reasons: receiving help filling out the questionnaire, missing data on one of the variables, not providing consent to collect measures for glycemic control from their medical charts), which means the final subsample consisted of 215 couples. One hundred and sixteen (54%) patients were men. The mean diabetes duration was 15.6 years ( $SD = 11.4$ ). The mean age of the patients was 53.7 years ( $SD = 11.3$ ) and the mean age of the partners was 53.8 ( $SD = 11.7$ ). The mean duration of respondents' relationship was 28.1 years ( $SD = 12.9$ ). The majority of the respondents (88.8%)

were married, 7.4% reported living together with a partner, and 3.7% reported having a partner, but not living together. We checked whether there were differences between responders and non-responders. For example, HbA1c and diabetes-related distress were known for non-responders since this was measured in the short screening questionnaire. It appeared that patients who dropped out after the short questionnaire had higher HbA1c compared to those patients who did not drop out ( $M=7.00$ ,  $SD=0.88$  vs.  $M=7.21$ ,  $SD=0.98$ ,  $t(341)=-1.97$ ,  $p=0.04$ ), but drop-outs had lower diabetes-related distress levels compared to patients who did not drop out ( $M=15.22$ ,  $SD=15.34$  vs.  $M=18.89$ ,  $SD=16.37$ ,  $t(349)=-2.10$ ,  $p=0.04$ ).

## Measures

### *Overprotection by the partner*

We used a subscale of the Active Engagement, Protective Buffering, and Overprotection (ABO) questionnaire (Buunk et al., 1996) based on work by Coyne and colleagues on relationship-focused coping (Coyne & Smith, 1994; Coyne, Ellard, & Smith, 1990) to assess overprotection by the partner. The overprotection subscale has acceptable test-retest reliability and good construct validity (Buunk et al., 1996). Patients were asked to rate to what extent their partner adopted this support style in reaction to their illness. A parallel measure assessed the partners' perception of their own overprotective behaviour. The scale consists of six items measured on a five-point scale ranging from 1 (*never*) to 5 (*very often*). Examples of the patient subscale are 'My partner treats me like a baby' and 'When it comes down to it, my partner seems to think that I don't know what's right for me'. All items were averaged into a single score where higher scores indicate more overprotection (patients:  $\alpha=0.70$ ; partners:  $\alpha=0.69$ ).

### *Diabetes-specific self-efficacy*

The Confidence in Diabetes Self-care (CIDS) scale (Van Der Ven et al., 2003) was used to assess the patient's perceived self-efficacy specific to diabetes self-care tasks. The CIDS was found to have good validity and high internal consistency in Dutch diabetes patients (van der Ven et al., 2003). All 20 items were measured on a five-point scale ranging from 1 (*no, I am sure I cannot*) to 5 (*yes, I am sure I can*). Examples are '...check my blood glucose at least two times a day' and '...treat a high blood glucose correctly'. Scores were summed and transformed to a 0–100 scale, with higher scores representing higher diabetes-specific self-efficacy ( $\alpha=0.89$ ).

### *Diabetes-related distress*

Diabetes-related distress was assessed with the Problem Areas in Diabetes scale (PAID) (Polonsky et al., 1995; Snoek, Pouwer, Welch, & Polonsky, 2000). Patients were asked to what extent they experienced problems with each of the 20 items. The items were measured on a five-point scale ranging from 0 (*not a problem*) to 4 (*a serious problem*). Item examples are 'Feeling overwhelmed by your diabetes regimen' and 'Worrying about the future and the possibility of serious complications'. The items were transformed into a scale ranging from 0 to 100, with a higher score indicating more diabetes-related distress ( $\alpha=0.95$ ).

### *Glycemic control*

Glycemic control was determined by measuring glycosylated haemoglobin levels (HbA1c), which reflects the average blood glucose over the preceding three months (Biorad HPLC, Munich: 4.3–6.1%). HbA1c values were obtained from the medical charts at the time of the study ( $M = 0.05$  months,  $SD = 0.22$  months). Higher numbers reflect a poorer glycemic control. HbA1c values above 8.0% is defined as poor glycemic control (American Diabetes Association, 2002).

### *Statistical analyses*

Firstly, demographic and disease-related variables were tested for inclusion as control variables. Secondly, mediation and moderated mediation analyses were performed to test the hypotheses.

#### *Tests of simple mediation*

To test the significance of the indirect effect of overprotection on distress through self-efficacy, we ran a macro developed by Preacher and Hayes (2004), which facilitates the implementation of a bootstrapping method. Bootstrapping has the advantage that it does not impose distributional assumptions, since the assumption that the indirect effect is normally distributed is often violated (e.g. Shrout & Bolger, 2002). Bootstrapping is a procedure in which a number of samples (e.g. 5000) is taken from the original data by random sampling with replacement. The indirect effect in each of these bootstrap samples is computed. The macro provides bootstrapped confidence intervals (CIs) around these indirect effects.

#### *Tests of moderated mediation*

We used another SPSS macro provided by Preacher, Rucker, and Hayes (2007) to test whether the strength of the hypothesized indirect (mediation) effect is conditional on the value of the moderator, also known as a conditional indirect effect, or moderated mediation. The output of this macro provides the significance of conditional indirect effects at different values of the moderator variable (HbA1c in Hypothesis 2 and gender in Hypothesis 3). The macro further facilitates the implementation of a bootstrapping method.

## **Results**

### *Descriptives*

Table 1 presents means, SDs and correlations for the variables under study. Overall, diabetes-related distress was weakly positively associated with overprotection as perceived by the partner, but not with overprotection as perceived by the patient. Overprotection (both partner and patient perception) was associated with less diabetes-specific self-efficacy. Paired  $t$  tests showed that patients and partners did not differ in their perception of overprotection,  $t(214) = -0.42$ ,  $p = 0.68$  (not presented in Table 1). The correlation, however, between partner and patient perception of overprotection was only 0.39. Diabetes-specific self-efficacy was negatively associated with diabetes-related distress and HbA1c. Diabetes-related distress was

Table 1. Intercorrelations for the variables under study.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age		0.08	-0.27**	0.75**	0.19**	0.19**	-0.16*	0.22**	0.08	0.14*	0.06	-0.19**	-0.21**
2. Sex			-0.13	0.15*	0.17*	0.01	0.13	0.28**	-0.08	-0.28**	-0.02	0.01	0.10
3. Education <sup>a</sup>				-0.21**	-0.07	0.02	0.12	-0.10	-0.18*	-0.07	0.12	-0.14*	0.02
4. Rel. dur. <sup>a</sup>					0.18*	0.19*	-0.04	0.10	-0.03	-0.01	0.11	-0.12	-0.20**
5. Diab. dur. <sup>a</sup>						0.29**	0.14*	0.18*	-0.00	-0.04	0.15*	0.09	-0.01
6. Diab. compl.							-0.03	0.17*	0.06	0.15*	-0.03	-0.04	0.10
7. Nr. hypo's								-0.03	-0.21**	-0.27**	0.17*	-0.12	0.11
8. Comorb.									0.18**	0.03	-0.04	-0.08	0.20**
9. OP partner										0.39**	-0.28**	0.04	0.19**
10. OP patient											-0.21**	0.06	0.12
11. SE												-0.17*	-0.45**
12. HbA1c													0.27**
13. PAID													
Mean	53.65	-	1.57	28.08	15.57	0.26	2.45	1.46	1.85	1.83	84.02	7.27	18.31
SD	11.34	-	0.74	12.91	11.36	0.55	1.19	1.33	0.53	0.55	12.64	1.03	16.72

Notes: Sex: 1 = male patients, 2 = female patients; Education: 1 = lower educated, 2 = middle educated, 3 = higher educated; Rel. dur. = relationship duration in years; Diab. dur. = diabetes duration in years; Diab. compl. = number of diabetes complications (retinopathy, neuropathy, nephropathy); Nr. hypo's = number of hypoglycaemia in the preceding month; Comorb. = number of co-morbidities; OP partner = Overprotection as perceived by the partner; OP patient = Overprotection as perceived by the patient; SE = Diabetes-specific self-efficacy.

PAID = Problem Areas in Diabetes/diabetes-related distress.

<sup>a</sup>For these variables, *N* varies as a result of missing values.

\**p* < 0.05, \*\**p* < 0.01.

moderately associated with higher HbA1c levels. Mean HbA1c value was 7.3% with a SD of 1.03. Twenty one percent of the patients had relatively poor glycemic control as indicated by HbA1c values  $\geq 8.0\%$  (not in Table 1). Age, number of co-morbidities, relationship duration, number of hypoglycaemia and diabetes duration were associated with either the mediator or the outcome variable and were therefore entered as covariates in the subsequent analyses.

### Testing simple mediation

We first ran the simple mediation macro for overprotection as perceived by the partner. The bootstrapping procedure yielded an estimate of the indirect effect of 3.48, with a 95% CI ranging from 1.65 to 6.11. As this interval does not contain zero, the indirect effect (i.e., mediation effect) is significant at  $\alpha = 0.05$ . This analysis was repeated for overprotection as perceived by the patient. The bootstrapping procedure yielded an estimate of the indirect effect of 2.47, with a 95% CI ranging from 0.48 to 4.94. Altogether, these results provide support for Hypothesis 1, in that overprotection (both patient and partner perception) was associated with diabetes-related distress through diabetes-specific self-efficacy.

### Testing moderated mediation

Hypothesis 2 and 3 state that the indirect effect of overprotection will be stronger for patients with worse glycemic control, reflected in higher HbA1c levels, and that it will be stronger for female than for male patients. The results for overprotection as perceived by the partner are presented in Tables 2–4. The results for overprotection as perceived by the patient were similar to the results for overprotection as perceived by the partner. For reasons of brevity, we do not show the tables and results for overprotection as perceived by the patient, however, these tables are available from the authors upon request. We first tested Hypotheses 2a and 3a, that is, the moderated mediation model in which the path between the predictor and the mediator is moderated (see Table 2). In the first step, the mediator variable is

Table 2. Regression results for conditional indirect effect, with overprotection as perceived by the partner, and HbA1c and gender as a moderator of the association between the predictor and the mediator.

Predictor	Mediator variable (self-efficacy) model (step 1)							
	HbA1c analysis				Gender analysis			
	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Constant	89.05	22.39	3.98	<0.001	89.44	10.08	8.88	<0.001
OP	1.94	11.20	0.17	0.86	-5.60	4.76	-1.18	0.24
MOD	0.15	3.00	0.05	0.96	-1.42	6.24	-0.23	0.82
OP $\times$ MOD	-1.06	1.50	-0.71	0.48	-0.45	3.25	-0.14	0.89

Note: The analyses are controlled for age, number of co-morbidities, relationship duration, number of hypoglycaemia and diabetes duration. OP = overprotection; MOD = moderator (HbA1c or Gender).

Table 3. Regression results for conditional indirect effect, with overprotection as perceived by the partner, and HbA1c as a moderator of the association between the mediator and the outcome.

Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Mediator variable (self-efficacy) model (step 1)				
Constant	87.41	5.86	14.91	<0.001
OP	-6.02	1.62	-3.71	<0.001
Predictor	<i>B</i>	<i>SE</i>	<i>z</i>	<i>p</i>
Dependent variable (distress) model (step 2)				
Constant	-62.85	45.67	-1.38	0.17
OP	2.00	1.88	1.06	0.29
Self-efficacy	0.65	0.53	1.22	0.23
HbA1c	16.64	5.97	2.79	0.01
Self-efficacy × HbA1c	-0.16	0.07	-2.24	0.03
HbA1c	Indirect effect	<i>SE</i>	<i>z</i>	<i>p</i>
Conditional effects assuming normal distribution (step 3)				
6.2379 (-1 SD)	2.13	1.00	2.13	0.03
7.2693 (Mean)	3.13	0.97	3.24	<0.01
8.3007 (+1 SD)	4.12	1.40	2.95	<0.01
Conditional effects with bootstrap method (step 4)				
6.2379 (-1 SD)	2.14	1.02	2.10	0.04
7.2693 (Mean)	3.13	0.97	3.22	<0.01
8.3007 (+1 SD)	4.09	1.41	2.90	<0.01

Note: The analyses are controlled for age, number of co-morbidities, relationship duration, number of hypoglycaemia and diabetes duration. OP = overprotection.

Table 4. Regression results for conditional indirect effect, with overprotection as perceived by the partner as the predictor, and gender as the moderator of the association between the mediator and the outcome.

Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Mediator variable (self-efficacy) model (step 1)				
Constant	87.41	5.86	14.91	<0.001
Overprotection	-6.02	1.62	-3.71	<0.001
Dependent variable (distress) model (step 2)				
Constant	4.64	22.07	0.21	0.83
OP	2.29	1.92	1.19	0.24
Self-efficacy	0.13	0.24	0.54	0.59
Gender	41.45	12.96	3.20	<0.01
Self-efficacy × Gender	-0.48	0.15	-3.14	<0.01
Gender	Indirect effect	<i>SE</i>	<i>z</i>	<i>p</i>
Conditional effects assuming normal distribution (step 3)				
Male	2.14	0.88	2.45	0.01
Female	5.04	1.82	2.77	<0.01
Conditional effects with bootstrap method (step 4)				
Male	2.16	0.89	2.44	0.02
Female	5.08	1.82	2.80	0.01

Note: The analyses are controlled for age, number of co-morbidities, relationship duration, number of hypoglycaemia and diabetes duration. OP = overprotection.

regressed on the independent variable, and the interaction between the independent variable and the moderator. As can be seen, the interaction term with HbA1c and the interaction term with gender were both nonsignificant. Therefore, Hypotheses 2a and 3a were not supported. Second, we tested Hypotheses 2b and 3b, that is, the moderated mediation model in which the path between the mediator and the outcome is moderated (see Tables 3 and 4). Our findings did support these hypotheses. In the first step, the mediator variable (diabetes-specific self-efficacy) is regressed on the independent variable (overprotection). As can be seen, overprotection significantly predicted diabetes-specific self-efficacy. In the second step, a multiple regression is conducted that predicts the dependent variable (diabetes-related distress) from the mediator, the moderator (HbA1c), the independent variable and the interaction between the moderator and the mediator. As shown in Table 3, the interaction between self-efficacy (the mediator) and HbA1c (the moderator) was significant.

In the third step, the conditional indirect effect of overprotection is tested at three values of the moderator variable: the mean, one SD below the mean, and one SD above the mean. The results show that the conditional indirect effect was significant at all three of these values, but the indirect effect was larger for higher values of HbA1c.

Whereas the test in the third step assumes normality of sampling distribution, the test conducted in the fourth step verifies the results of the third step with bootstrapping (5000 bootstrap samples). Setting the moderator at one SD below the mean yielded a bootstrap 95% bias corrected and accelerated confidence interval of 0.70–4.99 (not listed in Table 4). As this interval does not contain zero, the conditional indirect effect at one SD below the mean is significantly different from 0 at  $\alpha=0.05$ . Repeating this procedure for the moderator at the mean and one SD above the mean yielded 95% bias corrected and accelerated confidence intervals of 1.49–5.36 and 1.89–7.67, respectively. Altogether, bootstrapping corroborated the results of the normal-theory tests.

Hypothesis 3b states that the indirect effect of overprotection will be stronger for female patients. The first step in Table 4 shows that overprotection significantly predicted diabetes-specific self-efficacy. The second step yielded a significant interaction between self-efficacy (the mediator) and gender (the moderator). In the third step, the conditional indirect effect of overprotection is tested for males and females separately. The indirect effect of overprotection as perceived by the partner was significant for both female and male patients, but stronger for female patients. In the fourth step, the results are verified with bootstrapping. The indirect effect of overprotection as perceived by the partner yielded a bootstrap corrected and accelerated confidence interval of 0.86–4.43 for male patients, and 2.18–9.55 for female patients (not listed in Table 4). These results supported the results of the normal-theory tests.

## Discussion

The current study examined when and how overprotection of the patient, as perceived by both patient and partner, is associated with diabetes-related distress. The results showed rather weak bivariate correlations between overprotection and distress (see also de Ridder, Schreurs, & Kuijer, 2005). Nonetheless, the simple

mediation analyses did show that these weak associations were mediated by diabetes-specific self-efficacy. Overprotection by the partner was associated with less diabetes-specific self-efficacy of the patient, which in turn was associated with more diabetes-related distress. Furthermore, the results of the moderated mediation analyses showed that under some conditions, the indirect associations were stronger. We established that the indirect association between overprotection and diabetes-related distress through diabetes-specific self-efficacy was moderated by glycemic control and by gender. The findings are consistent with our reasoning that overprotection by the partner undermines diabetes-specific self-efficacy, and that these lower levels of self-efficacy lead to higher levels of diabetes-related distress, especially when glycemic control is poor and when the patient is female.

Our results complement and extend the results of previous studies in several ways. Previous studies have also identified a mediating effect of self-efficacy in the association between partner or family behaviour and distress, for example in students (Saltzman & Holahan, 2002), in women undergoing an abortion (Major et al., 1990), in adults who underwent a knee surgery (Khan et al., 2009), and in women in midlife (Martire, Stephens, & Townsend, 1998). These studies specifically found associations between positive support and psychological outcomes, thereby demonstrating the *enabling* hypothesis (Benight & Bandura, 2004; Schwarzer & Knoll, 2007). The enabling hypothesis states that positive support enables feelings of self-efficacy that in turn foster beneficial psychological outcomes. In contrast, our study specifically focused on the *disabling* effect of overprotection, which is unhelpful support behaviour, on feelings of self-efficacy, which in turn would increase feelings of distress (see also Manne et al., 2003; Manne & Glassman, 2000).

Another way in which our study extends prior research is by demonstrating that the mediation effect of self-efficacy is conditional on other variables, thereby indicating the need to consider not only *how*, but also *when* associations occur. As mentioned in the introduction, there are several ways in which the magnitude of an indirect effect may be dependent upon a moderator. For example, the association between the predictor and the mediator may be moderated, but also the association between the mediator and the outcome may be moderated. In our theoretical rationale outlined in the text, we explained how both possibilities might be plausible. The findings showed that Hypotheses 2a and 3a, in which HbA1c and gender moderate the path between overprotection (predictor) and self-efficacy (mediator; Model 2 in the moderated mediation macro of Preacher, Rucker, and Hayes (2007)) was not supported. We did find support for Hypotheses 2b and 3b, in which HbA1c and gender moderate the path between self-efficacy (mediator) and diabetes-related distress (Model 3 in the moderated mediation macro. Thus our results are in line with the idea that patients who feel less self-efficacious will experience more diabetes-related distress when confronted with a poor glycemic control because these patients do not feel capable to perform the actions that are needed in this situation. Patients who do feel self-efficacious will not be as easily defeated when confronted with a poor glycemic control and will therefore be at a lower risk for developing diabetes-related distress. This argumentation is in accordance with a preponderance of evidence showing that (illusions of) control and a belief in personal efficacy help people to cope effectively with negative events and setbacks (Alloy & Clements, 1992; Henselmans, Sanderman, Baas, Smink, & Ranchor, 2009; for reviews see Bandura, 1982; Taylor & Armor, 1996; Taylor & Brown, 1988). Furthermore, the moderating role of glycemic control is in line with previous studies that showed that negative

support behaviour in combination with more serious disease symptoms or vulnerable personality trait-like characteristics were most detrimental for patients' well-being (Danoff-Burg, Revenson, Trudeau, & Paget, 2004; Hagedoorn et al., 2000; Schokker et al., 2010), albeit in our study through self-efficacy.

The moderating effect of gender that was found is consistent with the hypothesis that diabetes-specific self-efficacy is more strongly associated with distress in female than in male patients, because of the higher salience of diabetes to women compared to men (e.g. Helgeson & Novak, 2007; Mosnier-Pudar et al., 2009). Although the association between overprotection and self-efficacy was not stronger for women, our findings are consistent with previous studies showing that women are more strongly influenced by partner behaviour and characteristics than are men (e.g. Acitelli & Antonucci, 1994; Hagedoorn et al., 2000, 2001; Horwitz et al., 1998; Mcrae & Brody, 1989).

A strength of the current study is that we used both patient and partner ratings of overprotection. The incorporation of both patient and partner ratings provides the opportunity to reach a fuller understanding of patients' level of distress (see also Berg & Upchurch, 2007). The fact that the results based on the partner ratings were significant indicates that it is not common method variance that triggered the associations.

There were also some limitations in the current study that one has to bear in mind when drawing conclusions. First, differences between responders and non-responders could have biased our results. Non-responders had higher HbA1c, but lower diabetes-related distress levels compared to responders. Although differences in mean scores on study variables do not necessarily mean that associations between variables are different for different groups, we should be cautious to generalise the results to the general population of diabetes patients. Second, this was a cross-sectional study, and therefore we cannot make causal inferences. For example, it is assumed in this study that overprotection leads to more distress in patients, but the reverse order, that high levels of distress evoke more overprotective behaviours by the partner is also possible. Further, in our study, we conceptualised glycemic control as a moderator, but it can also be viewed as an outcome or predictor of self-efficacy.

The mediation effect that was found especially in patients with poor glycemic control and female patients indicates that reducing partners' overprotective behaviour may increase patients' diabetes-specific self-efficacy. Nevertheless, there are several alternative methods to increase patients' self-efficacy. For example, interventions that focused on patient education, patient empowerment, self-monitoring of physical activity, cognitive behavioural group training or social learning variables have demonstrated beneficial effects on patients' self-efficacy (Glasgow, Toobert, Hampson, & Strycker, 2002; Gleeson-Kreig, 2006; Howorka et al., 2000; Piette, Weinberger, & Mcphee, 2000; van der Ven et al., 2005). The question is, however, to what extent these interventions will be successful for those patients who are being overprotected by their partner. For example, a previous study of persons with diabetes demonstrated that patients with more overprotective partners benefited less from a diabetes education programme aimed to increase feelings of control than patients with less overprotective partners (Hagedoorn et al., 2006). This implies that beneficial effects of interventions might be counteracted by an overprotective partner. It has been found that psychosocial interventions that included partners had a beneficial effect on adults with a chronic illness (Kuijjer, Buunk, De Jong, Ybema, & Sanderman, 2004; for a review see Martire, Lustig,

Schulz, Miller, & Helgeson, 2004). It is very well possible that interventions specifically focusing on reducing overprotection by the partner, or the perception of this by the patient, may be especially effective in improving patient outcomes (see also Hagedoorn et al., 2006). Future research is necessary to establish causal chains by intervening on overprotection and examining whether this indeed leads to higher levels of self-efficacy and lower levels of distress. Although we have to be cautious in interpreting the results, it seems that partner overprotection may have negative consequences on patients' level of diabetes-specific diabetes-related distress through diabetes-specific self-efficacy, especially in patients who are worse off in terms of poor glycemic control and in female patients. The results highlight the importance of paying attention to both how and when associations between negative partner behaviour and patient distress may occur.

## Notes

1. The purpose of the short questionnaire was to identify patients with high levels of diabetes-related distress. These patients were offered a referral to a diabetes education programme. Before patients were offered this referral they (and their partners) received a larger questionnaire containing the measurement instruments relevant for this study. Also patients with lower levels of diabetes-related distress on the short questionnaire received the larger questionnaire shortly afterwards.
2. The total response rate can only be estimated, because 183 patients of the 690 patients did not fill out the first screening questionnaire, and it is unknown how many of these 183 patients had a partner. Assuming that about 80% had a partner, this number would be 146. Then the total number of patients with a partner would be 559 (146 + 413). The total response rate would then be 40% (223 out of 559).

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