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Depressive Symptoms Mediate the Relationship between Emotional Cutoff and Type 2 Diabetes Mellitus

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Abstract

Background Differentiation of self is a family systems construct defined as the ability to balance intimacy and autonomy and to separate instinctually driven emotional reactions and thoughtfully considered goal-directed functioning. In theory, low differentiation of self is reflected by four components: a low tendency to take an I-position in relationships (i.e., to own one's thoughts and feelings); emotional cutoff from others; a greater tendency to fuse with others; and a tendency towards emotional reactivity. Low differentiation of self is associated with anxiety and depression, which are risk factors for type 2 diabetes mellitus. The current study examines the relationship between differentiation of self and type 2 diabetes mellitus.

Method Individuals with type 2 diabetes mellitus ($N = 107$) and healthy individuals ($N = 145$) completed the Differentiation of Self Inventory-Revised (DSI-R), the State-Trait Anxiety Inventory (STAI), and the Beck Depression Inventory (BDI-II).

Results Compared with healthy individuals, participants with type 2 diabetes had more severe depressive symptoms, higher levels of emotional cutoff, and a lower tendency to take an I-position, but had similar levels of trait anxiety, emotional reactivity, and fusion with others (factor analysis revealed these factors were not separable in the current sample and thus were merged into a single construct). Importantly, the severity of depressive symptoms mediated the relationship between emotional cutoff and being in the type 2 diabetes study group rather than the healthy group.

Conclusion These findings suggest a new perspective on the role of psychological patterns in type 2 diabetes mellitus development and progression.

Keywords Type 2 diabetes · Differentiation of self · Emotional cutoff · I-position · Depression · Trait anxiety

Ami Cohen and Ora Peleg contributed equally to this work.

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Introduction

Type 2 diabetes mellitus, a metabolic disorder characterized by high blood glucose, insulin resistance, and a relative lack of insulin [1], is considered a global epidemic, and its prevalence is constantly on the rise [2]. Type 2 diabetes mellitus has been found to be associated with a number of factors: obesity, physical inactivity, processed food consumption, and smoking [3].

Notably, recent studies demonstrated that certain psychological factors might also contribute to the development and severity of type 2 diabetes mellitus. As the association between high blood glucose levels and emotional stress, anxiety, and depressive symptoms is well-documented [4–6], personal psychological tendencies that influence the ability to cope with stressors and emotionally charged circumstances seem particularly important with respect to susceptibility to high blood glucose levels and type 2 diabetes mellitus. In particular, differentiation of self, a family systems construct shaped by family-of-origin patterns [7], appears to be an important regulating factor of anxiety and psychological distress [8–12].

Differentiation of self is a concept that refers to the degree to which one is able to balance (a) emotional and intellectual functioning and (b) intimacy and autonomy in relationships [7]. On an intrapsychic level, differentiation taps the ability to make a distinction between thoughts and feelings and to decide on being directed by one's intellect or one's feelings [7, 13]. Greater differentiation allows one to experience strong affect or shift to tranquil, rational thinking when situations dictate. More differentiated individuals function well on both emotional and rational levels while maintaining a measure of autonomy within their intimate relationships.

In theory, four factors are related to the individual's level of differentiation of self: emotional reactivity, I-position, emotional cutoff, and fusion with others [7, 14, 15]. That is, poorly differentiated people are likely to be more emotionally reactive and have difficulties maintaining a clearly defined sense of self and thoughtfully adhere to their personal convictions (i.e., take an I-position) when pressured by others to do otherwise. Moreover, they tend to isolate themselves (i.e., "cut off") from others as well as from their emotions when faced with intense interpersonal experiences, and/or are likely to show over-involvement or "fusion" with others in most of their close relationships, rather than maintaining well-defined relationships [14, 16]. Consequently, individuals with poor differentiation of self are expected to have less ability to cope effectively with stressful situations and personal and interpersonal circumstances that may lead to emotional distress.

Indeed, poor differentiation of self (i.e., low I-position and high levels of emotional reactivity, emotional cutoff, and fusion with others) has been found to be associated with higher levels of emotional distress [9, 12], depressive symptomology [8, 17], and trait anxiety [11, 18]. Moreover, individuals with poor differentiation of self experience more adverse stress-associated physical symptoms [14]. For example, low differentiation of self has been shown to correlate with severity of psychosomatic complaints (e.g., headaches) [19] and with the severity of symptoms of fibromyalgia syndrome [20]. Importantly, in the latter study, emotional reactivity and emotional cutoff were found to moderate the relationship between perceived stress and symptom severity.

Taken together, these findings suggest that low differentiation of self may increase vulnerability to certain physiological pathologies by increasing susceptibility to psychological distress. Thus, and given the evidence of associations between high blood glucose levels and conditions of anxiety [5] and depressive symptoms [5, 6], it is reasonable to hypothesize that higher levels of anxiety and depressive symptoms due to low differentiation of self may lead to heightened blood glucose levels and increased risk of type 2 diabetes mellitus.

Following this proposition, the current study had two main goals. First, we examined whether type 2 diabetes mellitus diagnosis is associated with poor differentiation of self, high levels of trait anxiety, and more severe depressive symptomology. Specifically, we tested the hypothesis that individuals with type 2 diabetes mellitus would have poorer differentiation of self (lower I-position and higher levels of emotional reactivity, emotional cutoff, and fusion with others) and more severe trait anxiety and depressive symptomology than healthy individuals. The second goal of the study was to examine the hypothesis that trait anxiety and depressive symptomology mediate the association between the exogenous variable of poor differentiation of self and the endogenous variable of type 2 diabetes mellitus (see Fig. 1).

Given evidence of gender differences in differentiation of self (i.e., higher levels of emotional reactivity and fusion with others among women vs. higher levels of emotional cutoff among men [21]) and in the patterns of association between depressive symptoms, trait anxiety, and type 2 diabetes mellitus [22], we also examined possible gender differences in the associations between type 2 diabetes mellitus and differentiation of self.

Methods

Participants

The study included 261 participants (mean age 42.9, range 26–71; see Table 1). Based on accepted medical diagnostic criteria [1], participants were divided into two study groups: individuals with type 2 diabetes mellitus (blood glucose ≥ 125 mg/dL; n = 107) and healthy individuals (normal blood glucose levels, 70–100 mg/dL; n = 154). Blood glucose level was measured after 10 h of fasting, with the testing conducted by the clinic each participant was regularly attending, between a few days and 3 months prior to completion of the questionnaires. In addition, to be included in the type 2 diabetes mellitus group, participants were required to present medical documentation verifying their diagnosis. Sample size considerations: Given that our model includes 2 latent variables and 6 observed variables, a sample size of 250 is necessary, assuming a small-to-medium effect size (0.19) at 80% power and $p < 0.05$.

Instruments

Background Questionnaire The questionnaire included items on smoking habits, ethnicity, age, gender, religion, marital status, residence, education, and socioeconomic status.

The Differentiation of Self Inventory-Revised The Differentiation of Self Inventory-Revised (DSI-R) was translated to Hebrew and adapted to Israel by Peleg [21], and validated for the purpose of the current study. In its original version [11], it is a 46-item self-report inventory, in which responses to each item are on a 6-point Likert scale ranging from 1 (not at all true of me) to 6 (very true of me). The DSI-R

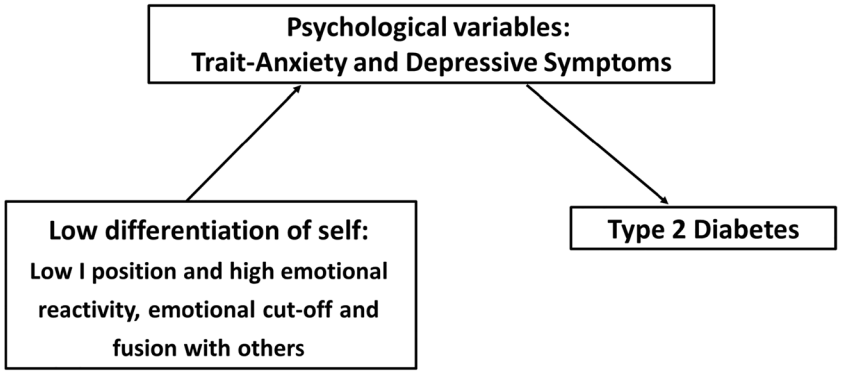

Fig. 1 Hypothetical model of the psychological factors mediating the association between differentiation of self and diabetes

includes four subscales assessing emotional reactivity, I-position, emotional cutoff, and fusion with others. The emotional reactivity subscale includes statements that reflect the extent to which one responds to potentially anxiogenic circumstances with heightened emotion (e.g., "People have remarked that I am overemotional"). The I-position subscale includes statements that refers to one's capability to express and stick to their views (e.g., "No matter what happens in my life I know that I will never lose my sense of who I am"). The emotional cutoff subscale includes statements that indicate the degree to which one avoids or fears intimacy (e.g., "I tend to distance myself when people get too close to me"). The fusion with others subscale includes statements that measure the degree to which one is overly involved with or identifies with others (e.g., "When my spouse or partner is away for too long, I feel like I am missing a part of me"). As validation of the DSI subscale structure was conducted on a sample from the USA [11], whereas the current sample includes Jewish and Arab Israeli participants, we performed an exploratory principal components factor analysis (see Supplementary Material 1). Three factors emerged: emotional cutoff (12 items); I-position (9 items); and a third factor including items relating to emotional reactivity and fusion with others, with no separation between the two (19 items). Consequently, we calculated a score for each participant on each of the following subscales: I-position, emotional cutoff, and emotional reactivity + fusion with others. Internal consistency (Cronbach's α) of the DSI-R in its adapted version was as follows: 0.92 for the total score,

Table 1 Distribution of demographic variables

	All ($N = 261$)		Healthy ($N = 154$)		Diabetes ($N = 107$)			
	N	%	*N*	%	*N*	%	χ^2	*p*
Gender							27.5	< 0.001
Female	166	63.6	118	76.6	48	44.9		
Male	95	36.4	36	23.4	59	55.1		
Ethnic group							28.9	< 0.001
Jewish	156	59.8	113	73.4	43	40.2		
Arab	105	40.2	41	26.6	64	59.8		
Marital status							14.6	< 0.001
Married	209	80.1	120	77.9	89	84.2		
Single	35	13.4	29	18.8	6	5.6		
Divorced/widowed	17	6.5	5	3.2	12	11.2		
Smoker							0.15	0.69
Yes	65	24.9	37	24.0	28	26.2		
No	196	75.1	117	76.0	79	73.8		
Socioeconomic status							6.12	0.047
High	39	14.9	24	15.6	15	14.0		
Middle	199	76.2	122	79.2	77	72.0		
Low	23	8.8	8	5.2	15	14.0		
	Mean (SD)	Range	Mean (SD)	Range	Mean (SD)	Range	*T*	*p*
Age (years)	42.9 (11.0)	26–71	36.7 (6.9)	26–60	51.7 (9.6)	28–71	13.9	< 0.001
Education (years)	14.2 (3.5)	6–24	15.5 (2.7)	9–24	12.3 (3.8)	6–23	7.9	< 0.001

0.73 for I-position, 0.85 for emotional cutoff, and 0.88 for emotional reactivity + fusion with others.

The State-Trait Anxiety Inventory The State-Trait Anxiety Inventory (STAI) [23], validated and translated into Hebrew by Teichman and Melnick [24], includes a section that measures trait anxiety. This section is composed of 20 statements that relate to the participant's tendency to experience anxiety. Participants indicate agreement with each statement on a 4-point scale. Internal consistency (Cronbach's α) of the STAI in the current study was 0.92.

The Beck Depression Inventory The Beck Depression Inventory (BDI-II) [25] is composed of 21 statements that relate to the participant's severity of depressive symptoms over the past week. The inventory was translated into Hebrew by Solomon-Ziner [26]. Internal consistency (Cronbach's α) of the BDI-II in the current study was 0.93.

Procedure

The complete study protocol was approved by the Max Stern Yezreel Valley College Institutional Review Board. Some participants were reached in medical centers and health clinics. Others were recruited by the snowball sampling method. That is, we recruited a small number of people we knew, who then referred their friends to us, and so on. At the study session, all participants signed an informed consent form. Blood glucose data was based on the last blood test taken over the past 6 months, the results of which participants were asked to bring to the intake meeting. Completion of the questionnaires was voluntary, and respondents were told that they could stop their participation at any point. All participants were assured of anonymity and discretion.

Data Analysis

Differences in the three factors of differentiation of self were examined using two-way analyses of covariance (ANCOVA) with study group and gender (group × gender) as independent measures, and with age and ethnicity as the covariates. Similarly, trait anxiety and depressive symptomology scores were examined via group × gender ANCOVA with age and ethnicity as covariates. Pearson correlations were used to examine associations between subscales of differentiation of self, trait anxiety, and severity of depressive symptoms. To test the hypothesized model of trait anxiety and depressive symptomology as mediators between the components of differentiation of self (the predictor variables) and the study group (diabetes vs. healthy; the outcome variable), we conducted a mediation analysis using SPSS 24 (IBM, Chicago, IL, USA) with the PROCESS macro (Model 4) [27]. Age, gender, and ethnic group served as covariates. PROCESS produces bias-corrected bootstrap samples (5000 samples) to generate 95% confidence intervals (CI) for the indirect effect of each mediator. A significant indirect effect is found when the confidence intervals do not include zero. The significance threshold was set at 0.05. Data in the text are presented as means ± standard deviations (SD).

Results

Table 1 presents the demographic data of the study group. There was a statistically significant difference in distribution of gender between groups ($\chi^2 = 27.52$, $p < 0.001$), with a significantly greater percentage of female participants in the healthy group (76.6%) than the group with diabetes mellitus (44.9%, $p < 0.001$). In addition, the healthy participants were statistically significantly younger than the participants with diabetes ($T = 13.9$, $p < 0.001$) and had more years of education ($T = 7.9$, $p < 0.001$). Finally, the percentage of Arab participants was significantly lower in the healthy group (26.6%) than that in the diabetes group (59.8%).

Group Differences in Differentiation of Self, Trait Anxiety, and Depressive Symptoms

Table 2 presents means, standard deviations (SD), ranges, skewness, and kurtosis of all study variables. The scores approximated a bell-shaped distribution (i.e., small amount of skewness and kurtosis), enabling the use of parametric statistical methods.

To test the first hypothesis regarding differences between healthy individuals and those with type 2 diabetes mellitus in each of the three factors of differentiation of self (see Table 2), we conducted two-way ANCOVA, with study group and gender (group × gender) being the independent measures and age and ethnicity being the covariates.

Regarding I-position, the diabetes group received significantly higher scores than the healthy group ($F(1, 254) = 4.56$, $p < 0.05$, partial eta = 0.02), with no effect for gender ($F(1, 254) = 0.68$, $p > 0.05$, partial eta = 0.00). However, there was a significant group × gender interaction ($F(1, 254) = 5.28$, $p < 0.05$, partial eta = 0.02), indicating that among participants with type 2 diabetes mellitus, scores on the I-position index did not significantly differ between men ($M = 3.95$, $SD = 1.1$) and women ($M = 4.09$, $SD = 0.89$) ($F(1, 103) = 0.76$, $p > 0.05$), while among healthy participants, scores were higher for men ($M = 4.55$, $SD = 0.6$) than those for women ($M = 4.20$, $SD = 0.7$) ($F(1, 149) = 7.28$, $p < 0.01$).

With respect to the emotional cutoff index, the group with diabetes received significantly higher scores ($F(1, 254) = 4.49$, $p < 0.05$, partial eta = 0.02) than the healthy group, with no effect for gender ($F(1, 254) = 0.53$, $p > 0.05$, partial eta = 0.00) and no group × gender interaction ($F(1, 254) = 0.00$, $p > 0.05$, partial eta = 0.00).

Table 2 Differentiation of self and psychological variables by study group

			All ($N = 261$)		Healthy ($N = 154$)		Diabetes ($N = 107$)	
	Sk[1]	K^2	Mean (SD)	Range	Mean (SD)	Range	Mean (SD)	Range
Differentiation of self								
I-position	− 0.52	0.39	4.18 (0.84)	1.00–6.00	4.29 (0.70)	2.22–5.89	4.01 (0.99)	1.00–6.00
Emotional cutoff	0.53	− 0.15	2.76 (1.00)	1.00–5.58	2.47 (0.80)	1.00–4.25	3.19 (1.10)	1.25–5.58
Emotional reactivity + fusion with others	− 0.01	− 0.52	3.50 (0.91)	1.37–5.67	3.45 (0.89)	1.37–5.67	3.58 (0.93)	1.42–5.58
Psychological variables								
Trait anxiety	0.90	0.50	1.93 (0.59)	1.00–3.40	1.80 (0.44)	1.00–3.35	2.11 (0.71)	1.00–3.85
Depressive symptoms	1.42	1.43	1.45 (0.52)	0.95–3.32	1.20 (0.22)	0.95–2.00	1.82 (0.60)	0.95–3.32

[1] Skewness

[2] Kurtosis

In relation to the index for emotional reactivity + fusion with others, no difference was found between healthy participants and those with type 2 diabetes ($F(1, 254) = 2.32$, $p > 0.05$, partial eta = 0.01) and there was no group × gender interaction ($F(1, 254) = 0.93$, $p > 0.05$, partial eta = 0.00). However, a significant effect of gender was found ($F(1, 254) = 11.05$, $p < 0.01$, partial eta = 0.04), with men ($M = 3.30$, $SD = 0.91$) scoring lower than women ($M = 3.63$, $SD = 0.89$).

To test differences in the psychological dimensions of emotional distress (depressive symptomology and trait anxiety), two-way ANCOVA was conducted, with study group and gender (group × gender) being the independent measures and age and ethnicity being the covariates. In relation to depressive symptomology, the analysis revealed that compared with the healthy group, the group with diabetes received significantly higher scores on the BDI-II ($F(1, 254) = 45.37$, $p < 0.001$, partial eta = 0.15), with no significant effect for gender ($F(1, 254) = 2.84$, $p > 0.05$, partial eta = 0.01) and no group × gender interaction ($F(1, 254) = 0.17$, $p > 0.05$, partial eta = 0.00). Regarding trait anxiety as measured by the STAI, there was no effect for study group ($F(1, 254) = 1.44$, $p > 0.05$, partial eta = .01), nor was there a main effect of gender ($F(1, 254) = 2.95$, $p > 0.05$, partial eta = 0.01) or a group × gender interaction ($F(1, 254) = 1.11$, $p > 0.05$, partial eta = 0.00).

Relationship between Trait Anxiety and Depressive Symptoms, Differentiation of Self, and Diabetes

Among the entire study sample, severity of depressive symptoms (BDI-II scores) and trait anxiety (STAI scores) was positively correlated with emotional cutoff (depressive symptoms: $r = 0.508$, $p < 0.001$; anxiety: $r = 0.603$, $p < 0.001$) and with emotional reactivity + fusion with others (depressive symptoms: $r = 0.342$, $p < 0.001$; anxiety: $r = 0.613$, $p < 0.001$). In addition, they were negatively correlated with I-position (depressive symptoms: $r = -0.391$, $p < 0.001$; anxiety: $r = -0.590$, $p < 0.001$).

As depressive symptoms (but not trait anxiety), emotional cutoff, and I-position (but not emotional reactivity + fusion with others) significantly differed between the healthy and diabetes groups, an analysis was performed to examine whether severity of depressive symptoms mediates the relationship between emotional cutoff, I-position, and study group (diabetes vs. healthy). First, logistic regression analysis revealed that, after correcting for age, gender, and ethnicity, emotional cutoff was significantly associated with study group, with the odds of having diabetes increasing by 36% for every unit increase in emotional cutoff (odds ratio, 0.643; 95% CI, 0.417–0.991; $p < .05$; path c (see Fig. 2)). In contrast, a similar analysis did not reveal a significant association between I-position and study group. Thus, the mediation analysis was continued only with emotional cutoff as a predictor.

Emotional cutoff was found to be associated with the severity of depressive symptoms (the mediator) ($b = 0.208$, se = 0.027, $t(255) = 7.72$, $p < 0.001$, path a (Fig. 2)). With the addition of depressive symptomology in the model, emotional cutoff was not significantly associated with study group (the outcome measure) (odds ratio, 0.155; 95% CI, − 0382–0.692; $Z = 0.566$; $p = 0.57$; path c' (Fig. 2)). Finally, severity of depressive symptoms was significantly associated with study group (odds ratio, 0.026; 95% CI, 0.007–0.102; $Z = -5.21$; $p < 0.001$; path b (Fig. 2)) and was a significant mediator of emotional cutoff (indirect effect, − 0.7617; 95% CI, − 1.2160 to − 0.4834), since 0 is not in the 95% CI. Full mediation occurred as emotional cutoff was no longer significantly associated with study group. A mediation model in which severity of depressive symptoms served as the independent variable and emotional cutoff as the mediating variable did not produce a significant effect.

Discussion

This study investigated whether type 2 diabetes mellitus is associated with poor differentiation of self (low I-position

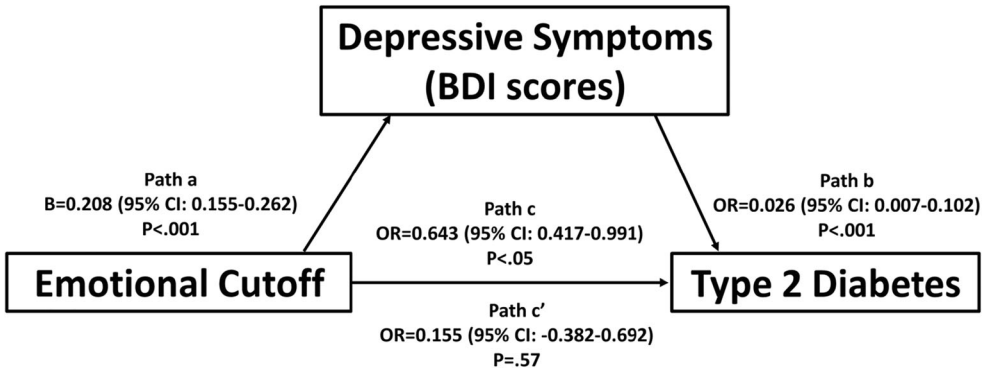

Fig. 2 Severity of depressive symptoms as a mediator between emotional cutoff and type 2 diabetes mellitus. Linear regression coefficient and 95% CI presented for the relationship between emotional cutoff and depressive symptoms. Odds ratios (OR) and 95% CI from logistic regression are presented for the relationships with diabetes group. Emotional cutoff, as measured by the DSI-R, was a statistically significant predictor of diabetes group (path c) and of severity of depressive symptoms as measured by the BDI-II (path a). With the addition of depressive symptoms in the model, emotional cutoff did not predict diabetes group (path c'). Severity of depressive symptoms was a significant predictor of diabetes group and a significant mediator of emotional cutoff

and high levels of emotional reactivity, emotional cutoff, and fusion with others), and whether psychological variables of emotional distress (trait anxiety and depressive symptoms) mediate the association between poor differentiation of self (the predictor) and type 2 diabetes (the outcome). Compared with the healthy individuals, participants with type 2 diabetes mellitus indeed demonstrated lower I-position, higher emotional cutoff, and more severe depressive symptomology. However, the groups did not differ in their levels of emotional reactivity and fusion with others. Importantly, severity of depressive symptoms, as well as high levels of emotional cutoff, was associated with a diagnosis of type 2 diabetes mellitus. Finally, the analysis demonstrated that the relationship between emotional cutoff and type 2 diabetes mellitus is mediated by the severity of depressive symptoms.

Type 2 Diabetes and Emotional Distress

A growing body of research suggests that depressive symptoms and anxiety play an important role in the risk of type 2 diabetes mellitus and in the poor glycemic control observed among individuals with type 2 diabetes [28, 29]. Accordingly, in the current study, individuals with diabetes demonstrated more severe depressive symptoms than healthy individuals, but the groups did not differ in their levels of trait anxiety. This lack of difference is somewhat surprising given past findings, although it has been suggested that type 2 diabetes mellitus is more strongly associated with depressive symptoms than with anxiety [28]. It should be noted that gender differences in depressive symptomology, as measured by the BDI-II, were not observed in the current study, a finding consistent with previous reports [30, 31].

Although the exact mechanisms that mediate the revealed association between depressive symptoms and type 2 diabetes mellitus [32, 33] are not well understood, it has been suggested that the link between the two may be attributed to the dysfunction of the hypothalamic-pituitary-adrenal (HPA) axis, which is activated in response to stress [34]. Specifically, depressive symptoms are associated with increased secretion of cortisol, the end product of HPA axis stimulation [35–37]. Cortisol elevates circulating glucose levels, and chronic exposure to high levels of cortisol increases insulin resistance [38, 39] and is predictive of type 2 diabetes mellitus [40, 41]. Thus, emotional distress may increase the risk of type 2 diabetes mellitus via the hyperactivation of cortisol and other components of the physiological stress response.

Type 2 Diabetes and Differentiation of Self

Individual differences in vulnerability to depressive symptoms, and thus (presumably) to type 2 diabetes mellitus, when faced by potentially stressful events are likely to be dependent on personal psychological tendencies, such as differentiation of self [10, 18]. Shaped by familial patterns during development, differentiation of self entails one's ability to successfully balance between emotional and intellectual functioning and between intimacy and autonomy [7]. Thus, high differentiation of self allows one to maintain a solid sense of self when in uncertain circumstances and intense emotional relationships, and to use calm, rational thinking when faced with stressful or emotionally charged events.

The four factors of differentiation of self (emotional reactivity, I-position, emotional cutoff, and fusion with others [7]) are commonly examined via the DSI-R [11], which is a 46-item self-report inventory. As the structure of the DSI-R has not been validated on a population of Israeli Arab and Jewish individuals, we conducted a factor analysis that yielded a three-factor structure. Two factors corresponded to emotional cutoff and I-position, and a third factor related to emotional reactivity and fusion with others, without separating the two. This result is consistent with previous studies that raised concerns about the internal consistency and construct validity of

the fusion with others subscale, particularly for ethnically/racially diverse samples [42]. Specifically, in several studies, Cronbach's alpha scores for fusion with others have been shown to be low relative to the other subscales, and lack of discriminant validity between the fusion with others and emotional reactivity subscales was also noted [42]. Supporting the validity of the three factors of differentiation of self obtained in the current study, severity of depressive symptoms and trait anxiety were positively correlated with the emotional cutoff subscale and the combined emotional reactivity + fusion with others subscale, and negatively correlated with the I-position subscale.

The findings of this study partially support the hypothesis that individuals with type 2 diabetes mellitus will be characterized by low differentiation of self. Participants with diabetes had lower I-position and higher emotional cutoff than healthy participants, although the groups did not differ in the combined index of emotional reactivity + fusion with others. These results suggest that individuals with type 2 diabetes mellitus tend to have greater difficulties maintaining a clearly defined sense of self and adhering to their personal convictions instead of following others' expectations. Moreover, they have a stronger tendency to isolate themselves from others as well as from their emotions when faced with intense interpersonal experiences.

Depressive Symptoms as Mediating Emotional Cutoff and Type 2 Diabetes

A major tenet of the current study was that low differentiation of self might increase the likelihood of type 2 diabetes mellitus by augmenting vulnerability to anxiety and depressive symptoms. Indeed, not only was the severity of depressive symptomology higher among participants with type 2 diabetes mellitus but it was also associated with low I-position and high emotional cutoff. Moreover, the analysis revealed that the severity of depressive symptoms mediated the relationship between type 2 diabetes and the level of emotional cutoff.

Based on the current findings and the aforementioned studies on the association between depressive symptoms and type 2 diabetes mellitus, it can be speculated that people who find it difficult to maintain their identity and beliefs will feel frustrated, disappointed, and even fear the reactions of significant others. Due to a high intensity of emotions in response to stressful situations, such people might cope with these situations through emotional detachment and distance. While this strategy may provide temporary relief, in the long run, it can create great emotional burden, depressive symptoms, and heightened stress response, which in turn may lead to increased circulating glucose levels, insulin resistance [40, 41], and, ultimately, to the development of type 2 diabetes mellitus.

Gender Differences

In line with previous reports of gender differences in the ways that differentiation problems are expressed [11], men in the current study scored lower than women on the combined subscale of emotional reactivity + fusion with others, while there were no overall gender differences on the emotional cutoff subscale. In addition, among healthy participants, men scored higher than women on the I-position subscale. This pattern of results is consistent with previous studies [11, 18]. Interestingly, among participants with diabetes, men did not differ from women on the I-position subscale. This may suggest that men who suffer from type 2 diabetes tend to have lower I-position than men without this condition. The interaction between gender and group in the current study may explain why, in the logistic regression analysis, I-position was not a significant predictor of type 2 diabetes when gender served as a covariate. Examining whether the pattern of relationships between components of differentiation of self, depressive symptomology, and type 2 diabetes mellitus differs between men and women was not possible in the current study due to the relatively small sample size and will be addressed in future studies.

Summary and Limitations

The present findings support a model in which higher emotional cutoff—which is considered an aspect of low differentiation of self—raises the risk of type 2 diabetes mellitus and does so, at least partially, by increasing depressive responses. However, these results should be taken with caution in light of a few study limitations. Most importantly, given the correlational nature of the research, causality cannot be determined. That is, diagnosis of type 2 diabetes mellitus in itself could increase depressive symptoms. The possibility that diabetes leads to low I-position and high emotional cutoff is less likely, as these are assumed to be traits that develop before reaching adulthood and remain stable throughout life [14]. Nevertheless, longitudinal studies are needed to provide a more substantial basis for the suggested relationships between differentiation of self, depressive symptoms, and type 2 diabetes mellitus.

In addition, the current study did not examine the possibility that poor differentiation of self, as well as anxiety and depressive symptomology, might be related to diabetes in terms of an increased tendency for unhealthy behaviors, such as smoking, improper diet, and avoidance of physical activity. These factors are the subject of a follow-up study.

Conclusions

The current study sheds new light on risk factors for type 2 diabetes mellitus and the possibility of familial and

psychological patterns being involved in the etiology of physiological disorders. The results significantly add to the understanding of specific psychological processes that may contribute to the risk of type 2 diabetes mellitus. Specifically, while the relationship between severity of depressive symptoms and type 2 diabetes is well-documented, the current study is the first to point to high emotional cutoff (an aspect of poor differentiation of self) as a psychological construct that may increase vulnerability to depressive symptoms and, hence, to type 2 diabetes mellitus.

This has important clinical significance, as psychological interventions for the treatment and prevention of type 2 diabetes mellitus could be specifically tailored to address the difficulties associated with low differentiation of self. Such intervention programs may be particularly relevant to subpopulations characterized by both high rates of type 2 diabetes mellitus and low differentiation of self. Given that emotional cutoff may increase depression, which in turn may increase the risk of diabetes, psychological interventions aimed at promoting the willingness to express one's needs and feelings may be useful in the prevention and management of type 2 diabetes. Specifically, when diabetic patients are more inclined to share their difficulties and feelings, they may feel calmer, less depressed, and thus cope more appropriately with their condition. Moreover, sharing can advance family support, which in turn is known to promote regimen adherence [43] and subsequently prevent further deterioration.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethics Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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