A brief psychological intervention to improve adherence in type 2 diabetes

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Abstract

Objective. – Diabetes perceptions, acceptance and treatment motivation are changeable factors of adherence. This study aimed to test the effects of brief psychological interventions based on diabetes threat and mastery perceptions in terms of adherence, acceptance and motivation. Physicians may find such interventions useful during a 15-minute consultation with diabetes patients.

Research design and methods. – This randomized controlled study included 80 patients with type 2 diabetes, recruited from the hospital diabetes department, who were randomly assigned to four intervention groups based on autobiographical recall. Those in the two intervention groups were asked to recall diabetic events based on mastery and threat perceptions, respectively, whereas those in the two control groups recalled non-diabetic events based on positive and negative emotions, respectively. Following this, all participants completed validated self-questionnaires assessing diabetes perceptions, acceptance, treatment motivation and adherence.

Results. – Patients in the threat group reported less adherence (P < 0.01) and less avoidance (P < 0.05), and perceived diabetes as less threatening (P < 0.05) than those in the mastery group. Similar results were obtained when the threat group was compared with its matched negative-emotion control group (P < 0.05, P < 0.05 and P = 0.087, respectively). Patients in the mastery group reported feeling a stronger sense of mastery (P < 0.05) than those in their positive-emotion control group and greater treatment acceptance than those in the threat group (P < 0.01).

Conclusion. – Contrary to conventional medical belief, discussing threatening personal events with patients can yield positive results. Health professionals should take threat and mastery perceptions of diabetes into account during regular consultations with a view to improving treatment acceptance and adherence. With this brief intervention of type 2 diabetes patients, it was also more effective to alleviate their emotional difficulties than to enhance their perception of mastery.

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Keywords: Autobiographical induction; Diabetes perceptions; Adherence; Acceptance; Motivation

Résumé

Une intervention psychologique de courte durée pour améliorer l’adhésion dans le diabète de type 2.


Méthodes. – Il s’agit d’une étude expérimentale randomisée. Quatre-vingt patients atteints de diabète de type 2 ont été recrutés dans le service de diabétologie du CHU et répartis aléatoirement dans quatre groupes d’induction. Les participants ont d’abord reçu une induction basée sur le rappel autobiographique. Les deux groupes expérimentaux rappelaient un événement lié au diabète et associé soit à une perception de menace soit à une perception de contrôle. Les deux groupes témoins rappelaient un événement non lié au diabète et associé soit à une émotion positive soit à une émotion négative. Chaque participant remplissait ensuite des questionnaires validés évaluant les représentations liées au diabète, l’acceptation de la maladie, les motivations vis-à-vis du traitement et l’adhésion.

Résultats. – Les patients dans le « groupe menace » ont rapporté une plus faible adhésion (P < 0,01), moins d’événement (P < 0,05) et ont perçu le diabète comme moins menaçant (P < 0,05) que les patients du « groupe contrôle ». Ces résultats étaient également observés lorsque le « groupe
 menace » était comparé au groupe « émotion négative » (\( P < 0,05 ; P < 0,05 ; P = 0,087 \)). De plus, les patients du « groupe contrôle » ont rapporté une plus forte perception de contrôle que ceux du groupe « émotion positive » (\( P < 0,05 \)), ainsi qu’une meilleure acceptation de leur traitement que ceux du « groupe menace » (\( P < 0,01 \)).

Conclusion. — Contrairement à la croyance médicale habituelle, aborder les événements autobiographiques menaçants avec les patients peut avoir des effets positifs. Les professionnels de santé devraient prendre en compte les perceptions de menace et de contrôle liées au diabète lors des consultations pour améliorer l’acceptation et l’adhésion de leurs patients. Il est plus efficace d’atténuer les difficultés émotionnelles que d’augmenter la perception de contrôle de patients diabétiques lors d’une intervention de courte durée.

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Mots clés : Induction autobiographique ; Représentations sur le diabète ; Adhésion ; Acceptation ; Motivation

1. Introduction

Type 2 diabetes is recognized as a major public-health problem because of its frequency and severity of complications [1]. Patients can improve their glycaemic control and avoid complications by means of self-care activities, such as physical exercise, diet and self-monitoring of glucose levels, and by taking medication [2]. There is evidence, however, that low adherence rates are problematic among type 2 diabetes patients [3,4].

As suggested in a previous review, strategies to foster behavioural change can be implemented by physicians during diabetes care visits [5]. Cognitive behavioural therapy (CBT) has also been recommended in chronic diseases to improve self-management [6–8], but the treatment is time-consuming and requires specific psychological training. Thus, to better fit in with clinical practices, it would be of interest to develop a brief intervention for use by physicians during a 15-minute consultation. What is proposed here is a brief intervention that relies on autobiographical recall and is based on principles of cognitive therapy [9] and emotional studies [10,11]. The technique is particularly effective for dealing with negative past events [9].

Several psychological health models have been proposed with a view to identifying variables that impact adherence [12,13]. Acceptance of type 2 diabetes and its associated concepts [14] have been positively associated with self-care [15]. Autonomous motivation means that patients take their medication because they are convinced it is good for their health rather than because of external or internal pressures (such as to follow the doctor’s orders, to please their partner or avoid feeling guilty). Autonomous motivation has been linked to adherence in type 2 diabetes [16,17]. Personal perceptions of illness are also key predictors of adherence [12]. More specifically, perceived mastery of diabetes (self-efficacy and outcome expectations) has been positively associated with adherence [18–20]. As for perception of diabetes as a threatening illness, some studies have suggested that this perception has a positive impact on adherence [20,21], whereas others have found a negative link between threat perception and adherence [18,22,23]. This diversity of results has already been highlighted in a review and is partly due to the fact that the regression analyses used in cross-sectional studies do not clearly indicate the cause-and-effect relationships between variables [24]. Experimental studies are therefore needed to gain a better understanding of how threat perception impacts adherence.

The aim of the present study was to experimentally test the effect of brief psychological interventions based on threat and mastery in terms of diabetes adherence, acceptance and motivation. Based on the literature for CBT [9], it can be argued that working with patients on their past behaviour as diabetics would be of benefit regardless of the type of event recalled. However, it was expected that the threat-based intervention would be more beneficial than the mastery-based intervention, as emotional difficulties are often more problematic in diabetes than a lack of control [25].

2. Research design and methods

2.1. Participants and recruitment

The study was approved by the French data-protection authority (Commission nationale de l’informatique et des libertés). Eligible hospital outpatients and inpatients were screened in the diabetes department over a 4-month period. Subjects were volunteers who were currently managing their type 2 diabetes with oral medications or insulin. Exclusion criteria were having difficulties with the French language and personality disorders. A total of 85 potential participants were approached, but five declined to participate. Thus, the sample included 80 Caucasian type 2 diabetics. Their demographic and clinical data, such as age, gender, diabetes duration, treatment type, body mass index (BMI) and glycated haemoglobin (HbA1c), are presented in Table 1.

2.2. Randomized interventions

The study had a randomized controlled design with induced autobiographical recall. After giving their informed consent, participants were randomly assigned to four induction groups, with 20 participants per group. Patients in the two experimental groups underwent either mastery or threat perception. Those in the mastery group were asked to recall a personal event during which they felt able to effectively control their diabetes (such as by adjusting insulin doses), whereas those in the threat group were asked to remember a personal event when they perceived diabetes as a threat (such as at the time of diagnosis). Patients in the two control groups underwent either positive or negative emotional recall, and were included to check whether the results were due to specific activation of diabetes perceptions rather than general emotional induction. In the positive-emotion group, which served as the control for the mastery group, patients were asked to recall a positive personal event (for example,
Table 1
Demographic and clinical data for type 2 diabetes patients according to randomized induction group.

<table>
<thead>
<tr>
<th></th>
<th>Mastery group (n = 20)</th>
<th>Threat group (n = 20)</th>
<th>Positive-emotion group (n = 20)</th>
<th>Negative-emotion group (n = 20)</th>
<th>Group differences(\alpha (P))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>63.40 ± 11.42</td>
<td>60.30 ± 9.11</td>
<td>59.85 ± 12.22</td>
<td>62.10 ± 11.70</td>
<td>0.770</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>34.39 ± 6.38</td>
<td>31.71 ± 8.45</td>
<td>30.93 ± 9.83</td>
<td>30.89 ± 6.44</td>
<td>0.467</td>
</tr>
<tr>
<td>Disease duration (years)</td>
<td>16.85 ± 10.05</td>
<td>11.35 ± 7.89</td>
<td>16.65 ± 11.29</td>
<td>13.20 ± 9.72</td>
<td>0.220</td>
</tr>
<tr>
<td>HbA1c (%)</td>
<td>8.04 ± 1.35</td>
<td>8.19 ± 1.76</td>
<td>7.66 ± 1.43</td>
<td>8.02 ± 1.77</td>
<td>0.753</td>
</tr>
<tr>
<td>Gender (% male)</td>
<td>35</td>
<td>55</td>
<td>55</td>
<td>40</td>
<td>0.464</td>
</tr>
<tr>
<td>Treatment type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tablets</td>
<td>3 (3.75)</td>
<td>10 (12.5)</td>
<td>6 (7.5)</td>
<td>6 (7.5)</td>
<td>0.364</td>
</tr>
<tr>
<td>Tablets + insulin</td>
<td>4 (5)</td>
<td>3 (3.75)</td>
<td>2 (2.5)</td>
<td>3 (3.75)</td>
<td>0.283</td>
</tr>
<tr>
<td>Insulin</td>
<td>13 (16.25)</td>
<td>7 (8.75)</td>
<td>12 (15)</td>
<td>11 (13.75)</td>
<td></td>
</tr>
<tr>
<td>Recruitment type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inpatients</td>
<td>10 (50)</td>
<td>10 (50)</td>
<td>6 (30)</td>
<td>12 (60)</td>
<td></td>
</tr>
<tr>
<td>Outpatients</td>
<td>10 (50)</td>
<td>10 (50)</td>
<td>14 (70)</td>
<td>8 (40)</td>
<td></td>
</tr>
</tbody>
</table>

Data are presented as means ± SD or as n (%).

\(\alpha\) ANOVA for continuous variables, chi-square tests for categorical variables.

childbirth) whereas, in the negative-emotion group, the control for the threat group, they were asked to recall a negative personal event (for example, conflict at their workplace).

After undergoing one of the four inductions, each participant completed a battery of self-questionnaires according to a counterbalancing order.

2.3. Intervention effectiveness with cognitive and emotional variables

The French version of the Brief Mood Introspection Scale (BMIS) [26] was used to check that each intervention group had the same emotional valence as its control group. The BMIS uses 16 adjectives to describe emotions on a four-point scale. The final score is obtained by adding the pleasant-adjective score to the reversed unpleasant-adjective score. A high score corresponds to a pleasant emotional state.

Intervention effectiveness was measured by assessing emotional and cognitive variables based on the Common-Sense Model [12] and Self-Determined Model [13].

Diabetes perceptions were measured by the validated French version of the Brief Illness Perception Questionnaire (B-IPQ) [27], a self-questionnaire comprising an 11-point scale, including eight items measuring cognitive and emotional illness perceptions (consequences, timeline, personal control, treatment control, symptoms, coherence, illness concern and negative emotions). This has been used successfully as a tool for identifying the link between adherence and illness perceptions in type 2 diabetes patients [23]. The total score was calculated by averaging all items except timeline, which did not vary among our participants, and illness concern, which was ambiguous. A high score meant that diabetes was perceived as a threat. A score representing a continuum between emotion and mastery was also computed by averaging negative emotions (‘How much does your diabetes affect you emotionally?’) with the reversed personal control (‘How much control do you feel you have over your diabetes?’). A low score represents a perception of solid mastery, whereas a high score denotes a strong emotional impact.

Adherence was assessed by the Medication Adherence Questionnaire (MAQ) [28], which evaluates a patient’s self-reported adherence based on four items, including ‘Do you sometimes forget your medication?’. All four items were answered on a five-point scale, ranging from 1 (never) to 5 (very often). A total score was then calculated, with a high value denoting a high degree of adherence.

Diabetes acceptance was measured by the Acceptance and Action Diabetes Questionnaire (AADQ) [14,15], which includes 11 items assessing acceptance of negative thoughts and emotions about diabetes. Patients rate their agreement with each item on a seven-point scale. Principal components analysis with oblique rotation revealed that, in our sample, this scale consisted of three factors: non-avoidance (such as ‘I try to avoid reminders of my diabetes’); acceptance of emotions and physical sensations (‘I often deny to myself what diabetes can do to my body’); and treatment acceptance (‘I avoid taking, or forget to take, my medication because it reminds me that I have diabetes’). A score for each factor was calculated by averaging their reversed items, with high scores reflecting a high degree of acceptance.

Autonomous motivation was assessed with the Treatment Self-Regulation Questionnaire (TSRQ) [29], which includes 19 items asking patients to rate their level of agreement according to a seven-point scale. Each item corresponds to a reason for taking medication and checking glucose levels or for sticking to a diet and taking exercise. An example of a more autonomous reason is ‘I personally believe that these are important in remaining healthy’. An example of a non-autonomous reason is ‘I would be ashamed of myself if I didn’t’.

2.4. Statistical analyses

Data analyses were carried out using SPSS v18 software. The level of significance was defined as a \(P\) value < 0.05. Missing
Table 2
Self-questionnaire mean scores and standard deviations for each study variable by induction group.

<table>
<thead>
<tr>
<th></th>
<th>Mastery group</th>
<th>Threat group</th>
<th>Positive-emotion group</th>
<th>Negative-emotion group</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSRQ* Autonomous motivation</td>
<td>5.81 ± 1.01</td>
<td>5.38 ± 1.13</td>
<td>5.66 ± 0.70</td>
<td>5.70 ± 1.03</td>
</tr>
<tr>
<td>AADQc Non-avoidance</td>
<td>4.00 ± 2.05</td>
<td>5.23 ± 1.53</td>
<td>4.08 ± 1.79</td>
<td>4.13 ± 1.81</td>
</tr>
<tr>
<td></td>
<td>6.63 ± 0.74</td>
<td>5.70 ± 1.36</td>
<td>6.58 ± 0.63</td>
<td>6.55 ± 0.86</td>
</tr>
<tr>
<td>Emotion acceptance</td>
<td>5.19 ± 1.23</td>
<td>4.78 ± 1.40</td>
<td>4.11 ± 1.83</td>
<td>4.60 ± 1.52</td>
</tr>
<tr>
<td>MAQc Adherence</td>
<td>4.88 ± 0.17</td>
<td>4.54 ± 0.56</td>
<td>4.74 ± 0.40</td>
<td>4.81 ± 0.29</td>
</tr>
</tbody>
</table>

TSRQ: Treatment Self-Regulation Questionnaire; AADQ: Acceptance and Action Diabetes Questionnaire; MAQ: Medication Adherence Questionnaire.

a Scores are from 0 to 10.
b Scores are from 1 to 7.
c Scores are from 1 to 5.

Data were subjected to intention-to-treat analysis, and participants with no outcome data were excluded from the specific analysis. Preliminary analyses were performed first to check that demographic and clinical variables did not differ across the four experimental groups by using analysis of variance (ANOVA) for continuous variables and chi-square tests for categorical variables. Student’s tests for independent samples were then used to confirm that threat and mastery induction had the expected effects. Experimental analyses consisted of comparing study variables (adherence, motivation and acceptance) across all induction groups, again using Student’s tests for independent samples. The two intervention groups (mastery vs threat induction) were first compared, followed by comparison of each intervention group with its control group (mastery vs positive emotion and threat vs negative emotion) to ensure that the principal results were specific to the diabetes event inductions.

### 3. Results

There were no significant differences among the four induction groups in terms of demographic and clinical variables (Table 1). As for emotions assessed by the BMIS, there was no significant difference between threat induction and negative-emotion induction or between mastery induction and positive-emotion induction (NS for both). In other words, these inductions had no difference in emotional valence.

Patients in the threat group reported a weaker perception of diabetes as a threatening disease (3.19 ± 1.55) than did the mastery patients (4.01 ± 1.33; \( P < 0.05 \)). There was also a trend difference between the threat group and negative-emotion group (3.92 ± 1.76; \( P = 0.087 \)), with the former exhibiting a lower level of perceived threat. As expected, there was no significant difference between the mastery and positive-emotion groups in terms of threat perception (NS). However, these two groups varied significantly as regards the emotion–mastery continuum (\( P < 0.05 \)). Patients in the mastery group exhibited lower scores (4.60 ± 1.95), meaning that their perceived mastery was stronger and that they were less hampered by negative emotions than their control patients (5.57 ± 1.46).

### 3.1. Differences among induction conditions

Means and standard deviations (SD) of the study variables for each patient group are presented in Table 2.

According to the MAQ (adherence), patients in the threat group reported less adherence than those in the mastery group (\( P < 0.01 \)). Comparison of the threat group and negative-emotion group revealed that the former again reported less adherence (\( P < 0.05 \)). Moreover, there was a trend difference between the mastery group and positive-emotion group, with a higher score in the former (\( P = 0.087 \)).

According to the AADQ (acceptance), patients in the threat group reported less avoidance than those in both the mastery group (\( P < 0.05 \)) and negative-emotion group (\( P < 0.05 \)). Also, patients in the mastery group reported greater treatment acceptance than those in the threat group (\( P < 0.01 \)), although their scores were not significantly different from those in the positive-emotion group.

As for the TSRQ (motivation), there was no significant difference across study groups in terms of their reported motivation (data not shown).

### 4. Discussion

This study investigated the effects of induced autobiographical recall in type 2 diabetic patients. The key finding was that patients reported fewer adherences after recalling a personal threat event. Our suggested explanation for this is that patients modified their perception of their adherence after remembering a situation in which they felt threatened by their diabetes. Previous studies have already shown that personal perceptions are important motivators of self-care behaviours [5,18,20,21,23]. Moreover, changing patients’ perceptions has proved effective for changing adherence [30] and is the core principle at the heart of CBT [9]. Our present results suggest that, after a brief autobiographical threat recall, patients change their perceptions. After such an induction, it is possible that patients question their health behaviours and thus go on to improve their adherence. This result is important for the feasibility of such an intervention in clinical practice, as a brief induction is less time-consuming than the usual psychological treatment, including CBT.
Consistent with our present findings, previous cross-sectional studies have also found a negative relationship between the perception of diabetes as a threat (physical, personal and social consequences of the disease, symptoms and negative emotions) and self-reported adherence [18,22,23]. One recent study, for example, showed that patients who adhered fully to their treatment reported lower perception of consequences, fewer symptoms and lower distress levels than those who were less adherent [23]. Another study based on self-questionnaires found that perceived symptoms were negatively associated with adherence in South Asian patients, and that the perception of consequences was negatively correlated with patient adherence in Pacific Islanders [18]. It is worth noting, however, that other cross-sectional studies found the opposite relationship between threat perception and adherence [20,21]. This discrepancy might be explained by the cross-sectional design of the studies, which does not allow for differentiation between causes and consequences. For this reason, instead of investigating only the cross-sectional association between threat perception and adherence as in most previous studies, our present study used an experimental randomized design. To the best of our knowledge, this is the first such study to demonstrate that the recall of threat leads to lower self-reported adherence.

Our results are consistent with the core principles of CBT (exposure and restructuring) [9]. Patients, who remembered a threatening personal past event, felt less threatened by it. Several mechanisms may account for this effect. First, according to the gratification effect [31], it is possible that comparing a negative past with the present situation reinforces the feeling that the present is non-threatening [32]. This means that, after thinking about the past threatening event, patients can change their opinion of their present situation and feel less threatened by comparison. A second explanation might be the catharsis effect [33], in which recall of the past threatening event triggers an emotional release from it. It is true that patients felt better after expressing their fears. Whatever the underlying mechanisms, our present findings suggest that it is beneficial for type 2 diabetes patients to recall threatening situations in their past as diabetics. Moreover, patients who recalled a threatening personal event also reported less avoidance, which suggest that they were more accepting of their disease [15] and able to use more vigilance behaviours to cope with it [34], such as adherence [12]. Thus, as far as can be confirmed, this is the first study to have assessed the link between diabetes perceptions and diabetes acceptance.

Taken altogether, these findings point to the need for health professionals to question diabetic patients about their past threatening disease-related events. Contrary to common belief, discussing such events can bring about positive changes in patients’ perceptions. Moreover, even a brief 15-minute induction is enough to engender change, although an important distinction should be made as regards threat induction in our study: it was focused on personal threatening events (for example, ‘I was hospitalized because of complications with my diabetes’ and ‘I felt threatened during this past event’) rather than threats made by third parties (such as ‘If you don’t take your treatment properly, your leg will have to be amputated’). Our findings indicate the need to actively discuss such threatening events with patients, although no conclusions can be drawn as regards the impact of the other sorts of threats they may encounter.

Our findings suggest that the recall of personal mastery may also be beneficial for patients, albeit to a lesser degree than threat induction. Patients who recalled a personal past event based on mastery reported stronger mastery perceptions than their control group patients. In addition, they were more accepting of treatment than the threat group. These results are logical given that, during mastery induction, patients recalled a past event relating to the effectiveness of their treatment and their own behaviour for coping with the disease. Nevertheless, they are encouraging because of the difficulty of improving mastery perception in diabetes patients. Because of the many different treatments available for diabetes, mastery perception levels tend to be rather high compared with those for other diseases [25]. This may explain why our study found no results to support previous research linking self-efficacy and autonomous motivation [35]. A 1-year longitudinal study showed how a motivational interview with a physician was able to improve diabetes mastery and motivation [36]. It may be that a brief psychological intervention such as ours was not enough to boost patients’ motivation as regards their treatment. Although more future research is needed to establish whether our results can be replicated over the long term, they are still important because disease perceptions and acceptance are key factors of adherence [12,15].

Our study had several strong points to support the validity of its findings, including an experimental randomized design, population-based recruitment and the use of tried-and-tested measures. It also, however, had a number of limitations that may point the way forward for future research. First, diabetes perceptions were evaluated only after the inductions, although participants were randomized into four groups that were similar in terms of demographic variables, as no differences were found across these groups. This experimental study was the first of its kind to test between-subject effects of threat and mastery induction, but future research will need to apply a longitudinal design to test within-subject differences (before and after induction). Second, the generalizability of our findings is somewhat limited, due mainly to the modest sample size and the fact that patients were recruited from a single hospital site. Patients treated in hospital are relatively committed to their care and may not be representative of all patients with type 2 diabetes. Nevertheless, the study included both inpatients and outpatients to increase the heterogeneity of the sample. Finally, adherence was evaluated by means of a self-reported questionnaire, which can be biased by social desirability and therefore overestimate adherence [28]. However, a review of the available literature has highlighted a good match between self-reported adherence and objective measures of adherence [37].

5. Conclusion

Thus, despite these shortcomings, it can be concluded from our study that physicians should not be reluctant to ask their patients to talk about their threatening personal past disease-related events, as such reports may be a way to modify adherence. Our findings, albeit preliminary, point to new avenues
for the future development of effective brief interventions based on autobiographical recall.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

Contributions:

E.F. researched data, analyzed data and wrote the manuscript. B.R. recruited patients, researched data, contributed to the discussion and reviewed the manuscript. M.I. contributed to the discussion and reviewed the manuscript. M.B. recruited patients and reviewed the manuscript. I.T. recruited patients, contributed to the discussion and reviewed the manuscript. N.C. contributed to the discussion and reviewed the manuscript.

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