Illness Representations and Coping as Predictors of Emotional Well-being in Adolescents with Type 1 Diabetes

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Objectives  To test whether coping acts to mediate the relationships between illness representations and emotional well-being in adolescents with diabetes. Methods  Seventy adolescents between 11 and 18 years of age were asked to complete the Diabetes Illness Representations Questionnaire (DIRQ), the Well-being Questionnaire, and the Kidcope. Results  Perceived impact, identity, and cognitive restructuring were significant independent predictors for depressive symptomatology. For anxiety, perceived impact and identity were significant predictors, and for positive emotional well-being, treatment effectiveness to control diabetes was the only significant predictor. Multiple regression analyses indicated that coping did not mediate the association between illness representations and positive emotional well-being. Conclusions  Perceived impact was consistently associated with participants’ indices of negative emotional well-being. Contrary to the hypothesized model, coping did not mediate the association between illness representations and emotional well-being in this sample.

Key words  diabetes; adolescents; coping; well-being; illness representations.

Type 1 diabetes is one of the most common chronic childhood conditions, with a prevalence of 2–3 per 1,000 in the United States (Slír, 2002). It is a disorder characterized by inadequate or nonexistent supplies of insulin, without which the body is unable to control blood glucose levels or use that which is in circulation, which results in hyperglycemia, leading to diabetic ketoacidosis, coma, and even death if untreated. Moreover, chronically raised blood glucose levels are associated with a range of serious complications (e.g., DCCT Group, 1994) relating to macrovascular disease (e.g., myocardial infarction, strokes), microvascular disease (e.g., nephropathy, retinopathy), and damage to the central and peripheral nerves and associated problems (e.g., foot ulceration, impotence).

Therefore, individuals must learn to regulate their own blood glucose levels to prevent hyperglycemia and avoid hypoglycemia. This requires a demanding, multi-component regimen, comprising multiple daily insulin injections/infusion, dietary control, regular exercise, and monitoring of blood glucose levels. As a result, diabetes management frequently conflicts with other issues related to social, identity, cognitive, and physiological development, and at the same time, the young person is learning to take over responsibility for the management of her or his diabetes from parents. As a consequence, adolescence is consistently associated with a decline in metabolic control (e.g., Hoey, Mortensen, McGee, & Fitzgerald, 1999). Whilst partly attributed to physiological changes (e.g., Hindmarsh, Matthews, & Silvio, 1988), the main cause is a substantial decline in levels of self-care (e.g., Morris et al., 1997).

However, there is wide variation in diabetes-related functioning in terms of psychological, self-care, and medical outcomes (e.g., Kovacs, Mukerji, Iyengar, & Drash, 1996). In adults, recent research in diabetes and other chronic conditions has found that illness representations may account for the diversity in disease-related functioning (e.g., Petrie, Weinman, Sharpe, & Buckley, 1996). An illness representation is an individual's cognitive representation of his or her illness and differs in at least three ways from other models that concern the role of patient beliefs and attitudes in determining health behaviors: (a) Illness representations are an extension of schema theory from cognitive social psychology. Thus, unlike other social
cognition models, illness representations are grounded in a general theory of cognition that accounts for the merging of incoming information with past experience. (b) Illness representations differ by being patient generated, rather than researcher generated. Illness representations are concerned with those variables that patients themselves believe to be central to their experience of illness and its management. (c) Illness representations include the representation of emotional responses to disease and treatment, which is lacking in the other health belief models.

Using these principles, five broad dimensions of our illness representations have been identified (e.g., Leventhal, Meyer, & Nerenz, 1980; Leventhal, Nerenz, & Steele, 1984): identity, the label for and symptoms associated with the illness (e.g., fatigue, numb feet, thirst); cause, beliefs about the factors responsible for the onset of the illness (e.g., “My diabetes is largely due to my own behavior”); timeline, perceptions about the duration of the illness, in terms of whether it is acute, cyclical, or chronic (e.g., “I will have diabetes for the rest of my life”); consequences, the individual’s expected outcomes of the illness in terms of its likely physical, psychological, social, and economic implications, which includes its impact on day-to-day life (e.g., “My diabetes affects the way other people treat me”) and in the long term (e.g., “I will probably get diabetes complications when I am older”); and control/cure/treatment effectiveness. These are beliefs about the extent to which an illness is amenable to cure or, for chronic illnesses, how good recommended treatments are at controlling the illness (e.g., “How important is following your meal plan for controlling your diabetes?”).

These illness representations are incorporated into a self-regulatory model proposed by Leventhal, Meyer, and Nerenz (1980). This model contends that the individual, confronted with ill health, is motivated to return to a state of health. For example, if individuals experience the symptoms of high blood glucose levels, their beliefs about the impact of diabetes (taking action to lower their blood sugar levels impinging on current activities) and the effectiveness of remedial action (the utility of taking some extra insulin) will direct their behavioral and emotional responses. These individuals subsequently appraise their responses, which entails the evaluation of the effectiveness of each coping strategy and the adoption of alternatives if appropriate. This activity continues until the coping strategies are considered successful in either emotional or behavioral terms and a state of equilibrium is reached (see Figure 1).

Recent research in adolescents with diabetes provides strong support for the importance of illness representations in determining the medical and psychological outcomes of this population. In particular, treatment effectiveness beliefs have been associated cross-sectionally and prospectively with self-care (Griva, Myers, & Newman, 2000; Skinner, John, & Hampson, 2000; Skinner & Hampson, 2001; Skinner, Hampson, & Fife-Schaw, 2002), and perceived consequences (perceived impact) with lower levels of emotional well-being (Skinner et al., 2000; Skinner & Hampson, 2001).

Although none of these studies examined the role of coping in the self-regulatory model, several authors have suggested that coping strategies are important determi-
nants of medical and psychological outcomes in children and adolescents with diabetes (e.g., Hanson et al., 1989; Grey, Cameron, & Thurber, 1991; Reid, Dubow, Carey, & Dura, 1994). However, recent studies in adult populations have questioned the contribution of coping to Leventhal et al.’s (1980) self-regulatory model. For example, Heijmans (1999) and Moss-Morris, Petrie, & Weinman (1996) found that illness representations were more predictive of outcomes than was coping, with no evidence of a hypothesized mediating role for coping.

One of the issues that may explain these results has been the dichotomous classification of coping strategies, for example, problem focused versus emotion focused (Lazarus & Folkman, 1984) or approach versus avoidance (Roth & Cohen, 1986; Suls & Fletcher, 1985). Such dichotomous classifications are, arguably, too simplistic, as people may make use of both types of coping strategy in a situation. Moreover, many coping strategies have more than one function and, as Lazarus (1999) notes, no universally effective or ineffective strategy exists, yet researchers consistently make value judgments about which is the most adaptive. Furthermore, by grouping different coping behaviors together into a few scales, it is possible that the effect of one or more subscales is statistically swamped by aggregating subscales. Therefore, it is possible for a general scale to show a nonsignificant association, when one or more of the subscales have a robust association.

In the context of Leventhal et al.’s (1980) self-regulation framework, it is also important to distinguish between coping in terms of an objective health threat and coping in terms of the emotional response to a health threat. Assessment of coping in terms of the objective aspects may well be confounded by the fact that many studies use indices of self-care as the outcome measure. This will undoubtedly be confounded or share substantial variance with a measure of coping, as problem-focused coping will be self-care. A further limitation of the coping research is the failure to specify a disease-related stressor. Lazarus (1999) clearly asserts that an individual may cope with different situations very differently. Moreover, it is argued that in order to accord with the self-regulatory model, the use of a disease-related stressor is essential.

The present study sought to explore the role of coping in the Leventhal et al. (1980) self-regulatory model by testing whether coping mediated the relationships between illness representations and emotional well-being. To overcome the limitations of previous studies, (a) each coping subscale was examined, thus preventing subscales swamping out significant results or canceling each other out, (b) both positive and negative aspects of emotional well-being were assessed, (c) illness representations were assessed using a questionnaire specifically designed for and validated on adolescents with diabetes, and (d) a diabetes-related stressor was used to illicit coping responses.

Method

Participants

The sample was recruited from the outpatient lists of three consultant pediatricians in southwestern England. Eligibility criteria were age between 11 and 18 years, a diagnosis of diabetes of at least 6 months duration (giving individuals and their families sufficient time to overcome the initial shock of diagnosis), and ability to complete the questionnaire unaided. Patients were excluded if they had a learning disability or a concurrent second chronic illness.

A total of 126 eligible adolescents (64 girls, 62 boys) were approached, of whom 70 (56%) agreed to participate. No gender bias was apparent in recruitment (30 girls, mean [SD] age 14.1 [2.2] years, mean duration of illness, 4.5 [3.6] years; 40 boys, mean age 14.1 [2.0], mean duration of illness 5.4 [3.8] years). The sample was well distributed across the socioeconomic groups according to their parental occupations (professional, 6%; intermediate, 24%; skilled nonmanual, 19%; skilled manual, 20%; semi/unskilled, 26%; unemployed, 5%).

Procedure

Following ethical approval, all eligible participants (or the parents if the youth was under 16 years) were sent a letter and an information sheet. These explained the purpose of the research and made the participants aware of the researcher’s likely presence at their next diabetes clinic. On arrival at the outpatient clinic, potential participants were approached by the researcher and asked if they would take part in the study. Those individuals who agreed to participate, or the parents of those aged under 16, completed consent forms.

Demographic details were then gathered. These consisted of the participant’s age, age at onset of the diabetes, duration of diabetes, sex, and ethnic group. Socioeconomic status was also assessed by applying the Registrar General’s index of social class to the adolescent’s parents’ occupations. The prescribed frequency of insulin administration was also established.

The participants were given the questionnaires in a quiet room after they had attended their appointment with the consultant pediatrician. The researcher explained the instructions and remained in the room with each participant to answer any questions that might arise. At the request of the ethics committee, each participant’s general
practitioner (GP) was informed of the participant's involvement in the study. Data collection took place over a period of 4 months.

**Measures**

The questionnaires were given in the same order of presentation to all participants. Well-being was assessed first. This was because it was the primary outcome measure, thus it was felt necessary for participants to complete this first, so that the process of completing questions about the nature of their diabetes and how they were coping did not affect their perceptions of emotional state. The illness representations instrument was second, as this was a more general measure; then the coping strategies questionnaire was given, which related to a specific diabetes event.

Emotional well-being was assessed using the Well-being Questionnaire (Bradley, 1994), a validated 22-item self-report instrument developed for use with adults with diabetes. It consists of four subscales: depression, anxiety, energy, and positive well-being. A total general well-being score can also be obtained. Recent studies have amended this measure for use with adolescent populations (Skinner & Hampson, 1998; Skinner et al., 2000; Skinner & Hampson, 2001). Pilot interviews by Skinner and Hampson (1998) indicated that younger (healthy) adolescents had difficulties with one item from the energy scale and two items from the positive well-being scale. Consequently, and in line with Skinner and Hampson (2000), these three items were removed from the questionnaire and the two scales were combined to form a single positive well-being scale. In adolescent populations, Skinner and Hampson (1998) reported internal consistencies of .63 for depression, .78 for anxiety, and .87 for the combined positive well-being scale.

Illness representations were assessed using the Diabetes Illness Representations Questionnaire (DIRQ) (Skinner et al., 2003), a validated questionnaire developed from the Personal Models of Diabetes Interview (Hampson, Glasgow, & Toobert 1990; Hampson, Glasgow, & Foster, 1995) and the Illness Perception Questionnaire (Weinman, Petrie, Moss-Morris, & Horne, 1996). This instrument is designed to tap all five dimensions of illness representations; identity, cause, timeline, consequences (subdivided into perceived threat of diabetes to health and perceived impact of diabetes on day-to-day life), and perceived treatment effectiveness (subdivided into effectiveness to control diabetes and effectiveness to prevent complications). In addition, there is one open-ended question that asks participants to “write down what complications of diabetes they know about,” in order to explore their understanding of potential complications of diabetes.

Identity was assessed by asking participants to indicate how often they experienced a range of symptoms on a 4-point scale from *all the time* to *never*, with responses summed to provide a total identity score. The second section examined people's beliefs about the cause(s) of their diabetes and required participants to indicate the extent to which they agreed or disagreed with ten statements about possible causes of diabetes, using a 5-point response option. Timeline, perceived threat, and impact were examined using a set of statements with which participants were required to indicate their agreement, on a 5-point Likert scale. A mean item response score was generated for each scale. Perceptions of treatment effectiveness were assessed by asking individuals to rate how important different aspects of their treatment were for controlling diabetes, and how likely it was that aspects of their treatment would prevent complications. Responses were on a 5-point scale and were used to compute a mean item response score.

The instrument has a reading grade of 7 and in adolescent samples the instrument has good internal consistency (identity \( \alpha = .94 \); timeline \( \alpha = .82 \); threat \( \alpha = .70 \); impact \( \alpha = .67 \); treatment effectiveness to control \( \alpha = .67 \); treatment effectiveness to prevent \( \alpha = .82 \) ) as well as demonstrated validity in predicting self-care, emotional well-being, and coping in adolescents and adults (Skinner, Tantam, Purchon, & John, 2002; Skinner et al., in press).

The Kidcope (Spirito, Stark, & Williams, 1988) was used to examine the coping strategies used. This assesses the frequency of use and perceived efficacy of coping strategies in children aged 7–18 years. In this study, a researcher-identified problem was used, with participants asked to recall and describe a period of time when their blood glucose levels were “too high.” With this time in mind, participants were presented with ten coping strategies (distraction, social withdrawal, cognitive restructuring, self-criticism, blaming others, problem solving, emotional regulation, seeking of social support, wishful thinking, and resignation) and were required to rate the frequency of use and perceived efficacy of each. For frequency, participants indicated whether they used the strategy *not at all*, *sometimes*, *a lot of the time*, or *almost all of the time*; and for efficacy, participants showed how helpful the strategy was, ranging from *not at all* to *very much*. Responses were scored from 0 to 4, and frequency and efficacy scores were totaled to provide an overall score for each coping strategy.

Spirito and colleagues (1988) reported moderate test-retest correlation coefficients for the Kidcope for short periods of time ranging from 3 days to 2 weeks (.21–.58). However, concurrent validity with high correlations with other standardized coping measures has been established.
(Spirito et al., 1988), for example the Adolescent-Coping Orientation for Problem Experiences (Patterson & McCubbin, 1987).

**Analysis**

For coping to act as a mediator between illness representations and depression and positive well-being (or vice versa), three criteria need to be met: (a) Both coping and illness representations must be significantly related to emotional well-being; (b) there must be a relationship between the illness representation (the predictor) and coping (the mediator); (c) after controlling for the effects of the coping on emotional well-being, the relationship between illness representations and emotional well-being should be significantly reduced (Baron & Kenney, 1986).

Therefore the analysis was undertaken in four steps. The first was to determine whether any demographic or medical variables were associated with illness representations, coping, or emotional well-being, so that these effects could be controlled for in subsequent multivariate analysis. Next, the first criterion above was tested by looking to see if there were any significant correlations between both illness representations and coping, with emotional well-being. Where this first criterion was met, correlation analysis was used to test whether there was an association between illness representations and coping. Third, where an illness representation and a coping scale were associated with emotional well-being, multiple regression analysis was used to test whether coping mediated the association between illness beliefs and emotional well-being.

**Results**

**Demographics**

There were no significant differences between boys and girls on any demographic variables, but girls were more likely to be on an intensive injection regimen (with 64%, 13%, and 23% of girls on 2, 3, and 4 injections a day, respectively, compared with 80%, 17%, and 3% of boys; t(2) = 6.60; p < .05). There was an association between injection regimen and socioeconomic status, with participants from higher occupational groups having more injections a day, r(70) = .03; p < .05. There were no gender differences for anxiety (girls M = 5.2, SD = 2.6; boys M = 4.4, SD = 2.3) or positive well-being (girls M = 13.7, SD = 3.0; boys M = 14.4, SD = 3.0), but girls reported being significantly more depressed than boys (girls M = 4.9, SD = 2.1; boys M = 3.9, SD = 1.8), t(68) = 2.05; p < .05.

Neither age, age at diagnosis, or duration of illness were associated with depression or positive well-being, but age was associated with anxiety, such that older participants reported less anxiety, r(70) = −.33; p = .005. Socioeconomic status was significantly correlated with self-criticism from the Kidcope, such that higher socioeconomic status was associated with more self-criticism, r(70) = .37; p < .005. Girls scored significantly higher on problem-solving coping (boys M = 2.6, SD = 2.2; girls M = 3.9, SD = 2.0), t(65) = −2.44; p < .05. There were no other significant associations between medical or demographic variables and coping or well-being measures.

**Bivariate Correlations**

Initial exploratory analysis was conducted by correlating illness representations and all coping scales with depression, anxiety, and positive well-being (see Table I). As 48 correlations were reported, some correction for multiple testing was required. However, if the Bonferroni formula is applied, this changes the alpha to .001, which means the study has a power of only 58 to detect a correlation of 0.4, making the study substantially underpowered. Therefore, to compromise, the alpha was changed to .01, giving the study a power of 83 to detect a correlation of .04 (Faul & Erdfelder, 1992). Perceived impact and identity were associated with all three well-being measures. The two treatment effectiveness measures were both correlated with positive well-being but not with anxiety or depression.

Two of the coping scales evidenced significant correlations with well-being measures. Use of cognitive restructuring was associated with less depression and greater

<table>
<thead>
<tr>
<th>Table I. Correlations of Illness Representations and Coping Scales with Emotional Well-being</th>
<th>Depression</th>
<th>Anxiety</th>
<th>Positive Well-being</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illness Representations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identity</td>
<td>.34*</td>
<td>.31*</td>
<td>−.29*</td>
</tr>
<tr>
<td>Timeline</td>
<td>.16</td>
<td>.06</td>
<td>−.21</td>
</tr>
<tr>
<td>Threat to health</td>
<td>.16</td>
<td>.03</td>
<td>.08</td>
</tr>
<tr>
<td>Perceived impact</td>
<td>.44*</td>
<td>.34*</td>
<td>−.35*</td>
</tr>
<tr>
<td>Effectiveness to control</td>
<td>−.16</td>
<td>.04</td>
<td>.39*</td>
</tr>
<tr>
<td>Effectiveness to prevent</td>
<td>−.16</td>
<td>−.04</td>
<td>.33*</td>
</tr>
<tr>
<td>Coping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distraction</td>
<td>.18</td>
<td>.18</td>
<td>−.09</td>
</tr>
<tr>
<td>Social withdrawal</td>
<td>.27</td>
<td>.25</td>
<td>−.12</td>
</tr>
<tr>
<td>Cognitive restructuring</td>
<td>−.35*</td>
<td>−.22</td>
<td>.33**</td>
</tr>
<tr>
<td>Self-criticism</td>
<td>.04</td>
<td>−.06</td>
<td>−.08</td>
</tr>
<tr>
<td>Blame others</td>
<td>−.11</td>
<td>−.09</td>
<td>−.02</td>
</tr>
<tr>
<td>Problem solving</td>
<td>−.25</td>
<td>−.17</td>
<td>−.16</td>
</tr>
<tr>
<td>Emotional regulation</td>
<td>−.08</td>
<td>−.01</td>
<td>−.23</td>
</tr>
<tr>
<td>Wishful thinking</td>
<td>.23</td>
<td>.19</td>
<td>−.03</td>
</tr>
<tr>
<td>Social support</td>
<td>−.14</td>
<td>.03</td>
<td>.30*</td>
</tr>
<tr>
<td>Resignation</td>
<td>−.12</td>
<td>.13</td>
<td>.13</td>
</tr>
</tbody>
</table>

*p < .01.
positive well-being. Social support was also significantly associated with higher positive well-being scores.

As the first criterion for a mediation effect had been met (see Table I), perceived impact, identity, and the two treatment effectiveness scales were correlated with the cognitive restructuring and social support coping scales. Neither perceived impact nor identity were associated with either of the coping scales, but both treatment effectiveness scales were significantly correlated with cognitive restructuring, control \( r(66) = .42, p < .001 \), prevent \( r(66) = .23, p < .05 \); and with social support, control \( r(66) = .47, p < .001 \), prevent \( r(66) = .44; p < .001 \). Both of the treatment effectiveness scales were significantly correlated, \( r(68) = .64, p < .001 \), as were both of the coping scales, \( r(67) = .34, p < .005 \).

As the first two criteria were met for a mediating role, the effect of coping on the relationship between illness representations and positive-well-being was examined. Using multiple regression with positive well-being as the dependent variable, treatment effectiveness scales were entered on step 1 and then the two coping scales on step 2. When entered using a stepwise method, treatment effectiveness to control diabetes (but not to prevent complications) was a significant predictor on step 1 (see Table 2), but neither of the two coping scales subsequently entered the model on step 2. To explore the possibility that illness beliefs may be mediating the association between coping and well-being, the regression was repeated but in reverse order. On step 1, cognitive restructuring (but not social support) entered the model, but on entering treatment effectiveness to control diabetes on step 2, cognitive restructuring was no longer significantly associated with well-being (see Table 2).

Thus the results indicate that treatment effectiveness beliefs mediated the association between cognitive restructuring and positive well-being.

As perceived impact and identity were not associated with coping, a simple stepwise regression was conducted with depression as the dependent variable, entering gender, perceived impact, identity, and cognitive restructuring into the model. This analysis indicated that all these variables were associated with depression (see Table 2). That is, the greater the perceived impact of diabetes, the higher were participants’ identity scores (i.e., the more symptoms they reported); and the more they reported using cognitive restructuring as a coping strategy, the less depressive symptomatology was reported. For anxiety, identity and impact were the only significant variables to enter the model; that is, the greater the perceived impact of diabetes and the higher participants’ identity scores (i.e., the more symptoms they reported), the more anxiety they reported.

**Discussion**

This study aimed to explore the interaction between coping, illness representations, and emotional well-being in adolescents with type 1 diabetes mellitus. Consistent with current adult literature, coping did not appear to be a robust predictor of emotional well-being. When entered into a multiple regression with illness representation, only cognitive restructuring was associated with emotional well-being.

The self-regulation model (Leventhal et al., 1980) postulates that illness representations determine or influence the strategies used to cope with illness and our emotional responses. However, the results reported here indicate that there is either no relationship between illness representations and coping for depression and anxiety or illness representations mediated the association between coping for positive well-being, contrary to the model (see Figure 1). However, given that some cognitive coping strategies, such as cognitive restructuring (e.g., “I tried to see the good side of things”), are designed to change an individual’s perception (illness representation) of a stressor (diabetes), the mediation effect reported here should not be surprising.

It should be noted that cognitive restructuring is a cognitive emotion-focused coping strategy. The literature frequently discusses emotion focus as a negative or ineffective approach to coping (Band, 1990; Kager & Holden, 1992; Grey, Cameron, & Thurber, 1991), whereas here this coping behavior has positive effects, indirectly for positive well-being and directly for depressive symptomatology.

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**Table II. Multiple Regressions to Predict Depression, Anxiety, and Well-being**

<table>
<thead>
<tr>
<th>Predictors (Positive Well-being)</th>
<th>( \beta )</th>
<th>Adjusted Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness to control</td>
<td>.39***</td>
<td>( R^2 = .14*** )</td>
</tr>
<tr>
<td>Cognitive restructuring</td>
<td>.30*</td>
<td>( R^2 = .09* )</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive restructuring</td>
<td>.18</td>
<td></td>
</tr>
<tr>
<td>Effectiveness to control depression</td>
<td>.29*</td>
<td>( R^2 = .16** )</td>
</tr>
<tr>
<td>Gender</td>
<td>.22</td>
<td></td>
</tr>
<tr>
<td>Perceived impact</td>
<td>.40***</td>
<td></td>
</tr>
<tr>
<td>Identity</td>
<td>.34***</td>
<td></td>
</tr>
<tr>
<td>Cognitive restructuring anxiety</td>
<td>-.32***</td>
<td>( R^2 = .43*** )</td>
</tr>
<tr>
<td>Perceived impact</td>
<td>.32**</td>
<td></td>
</tr>
<tr>
<td>Identity</td>
<td>.30**</td>
<td>( R^2 = .19*** )</td>
</tr>
</tbody>
</table>

Within each step, criteria for entry was the \( \beta, p < .05 \).

\( *p < .05 \)

\( **p < .01 \)

\( ***p < .001 \)
This may be a result of previous studies merging subscales to generate an "emotion-focused" coping scale, in the process of which the pattern of associations for the subscales were aggregated, and therefore meaningful subscale associations were lost. Typically, emotion-focused coping scales assess escape-avoidance mechanisms or wishful thinking, which are commonly associated with poor well-being.

The significant effect of cognitive restructuring in relation to emotional well-being, despite the lack of associations for other specific coping behaviors, illustrates the potential importance of examining individual coping scales rather than dichotomizing an individual's coping efforts.

When considering the illness beliefs that were predictive of well-being, a couple of points are worth noting. First, perceived impact of diabetes was consistently associated with the negative aspects of well-being: depressive symptomatology and anxiety. This association between perceived impact and indices of negative well-being replicates a number of other studies in this area (Skinner & Hampson, 2001; Skinner et al., 2000) and would suggest that this is an important construct in determining young people's emotional well-being, which could be targeted for intervention. Grey and colleagues (1998) have demonstrated that when interventions support the development of coping skills that address the barriers and difficulties adolescents perceive to managing their diabetes, subsequent sustained improvements in glycosylated hemoglobin are seen. Although data on well-being were not reported, the same benefits would be expected here as well.

Second, identity was associated with negative well-being in this study, replicating the results from previous work (Skinner & Hampson, 2001). This has led the developers of the generic Illness Perceptions Questionnaire (IPQ) to conclude that the identity scale frequently acts more as a somatization scale rather than as an illness-specific symptom checklist (Moss-Morris et al., 2002). As the scale used here is the same as in the original IPQ, this would seem to suggest that our results here replicate this problem, with the scale acting more as an indicator of general distress than as a specific diabetes symptom checklist.

A third key finding with regard to illness beliefs was that here, as in other recent studies (Skinner & Hampson, 2001; Skinner et al., 2002), it was the short-term beliefs that predicted outcomes, i.e., treatment effectiveness to control but not to prevent complications, and perceived impact but not perceived threat to health. Given the robustness of these findings across study samples, cross-sectionally and prospectively, this has important implications for the routine practice of health care professionals, who frequently rely on the threat of complications as their tool to motivate improved self-care in young people, as well as adults, with diabetes. Clearly this strategy is inappropriate and, given the results of some studies (Skinner, Howells, Chanon, and McEvilly, 2000) on illness beliefs, may well be counterproductive.

Of course, there are many limitations to this study. The reliance on only self-report data is problematic, but all the measures used had been previously validated on adolescents with diabetes. More problematic is the retrospective nature of the coping assessment and the biases this introduces. Future research could attempt to address this by utilizing parent reports of coping, or portable computerized assessments to generate immediate evaluations of coping strategies. It could also be argued that the self-report data could be affected by the cognitive abilities of the adolescents. This is partly addressed by the studies that validated the instrument (Skinner et al., 2003). In addition, the questionnaire has been assessed for readability, and has a Flesch-Kincaid grade level of 6.8, which suggests it should be comprehensible to the participants of this study.

The sample was relatively small, but it did represent just over half the eligible population. Despite the fact that the participants' GPs were informed about their participation in the study, the participants' responses remained confidential, and this did not seem to affect participation rates, being comparable to studies in the UK in which the GP was not informed (Skinner & Hampson, 1998). Despite the causal path analysis that was undertaken, the study was purely cross-sectional in nature, and although longitudinal data have been published which support the analysis, this is not sufficient to demonstrate a causal link between illness beliefs and emotional well-being. Further research is required to demonstrate the temporal ordering of effects, and to explore the impact and/or interaction of illness beliefs with other key psychological, social, cultural, and medical variables that affect an individual's emotional well-being.

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