Journal of Psychosomatic Research 77 (2014) 484–491

Contents lists available at ScienceDirect

Journal of Psychosomatic Research

Cognitive adaptation theory as a predictor of adjustment to emerging adulthood for youth with and without type 1 diabetes

Vicki S. Helgeson [a,*], Kerry A. Reynolds [b], Linda M. Siminerio [c], Dorothy J. Becker [d], Oscar Escobar [d]

[a] Carnegie Mellon University, United States
[b] Rand Corporation, United States
[c] University of Pittsburgh School of Medicine, United States
[d] Children's Hospital of Pittsburgh, United States

ARTICLE INFO

Article history:
Received 6 March 2014
Received in revised form 20 September 2014
Accepted 23 September 2014

Keywords:
Cognitive adaptation theory
Diabetes
Emerging adult
Resilience

ABSTRACT

Objective: The purpose of the study was to determine whether resilience, defined by cognitive adaptation theory, predicted emerging adulthood outcomes among youth with and without type 1 diabetes.
Methods: Youth with ($n = 118$) and without type 1 diabetes ($n = 122$), who were part of a previous longitudinal study during adolescence, completed on-line questionnaires during their senior year of high school and one and two years later. They were average age 18, 53% female, and 93% white. Questionnaires assessed cognitive adaptation theory (CAT) indicators (self-esteem, mastery, optimism) and psychological, relationship, behavioral, vocational, and, for those with diabetes, diabetes outcomes.
Results: The CAT index at baseline predicted reduced psychological distress, enhanced psychological well-being, increased friend support, reduced friend conflict, the presence of romantic relationships, reduced likelihood of romantic breakups, higher GPA, higher work satisfaction, and lower work stress during the transition to emerging adulthood. Among those with diabetes, the CAT index predicted better self-care behavior and revealed a marginal relation to better glycemic control. Analyses controlled for baseline levels when appropriate. Findings were stronger one year than two years post high school graduation, and findings were stronger for those with than without diabetes. Youth with diabetes also scored lower on the CAT index than youth without diabetes.
Conclusions: These findings suggest that the implications of CAT include not only psychological health but also relationship, vocational, and diabetes outcomes. Those who score lower on CAT indicators should be identified as children so that interventions designed to enhance resilience can be implemented.

Introduction

Early research in the field of health psychology focused on pathology and identifying risk factors for poor psychological and physical health. Over the past couple of decades, the field has experienced a paradigm shift as investigators have moved from a disease model that focuses on variables that place one at risk for poor health to a resilience model that identifies variables that predict adapting to and flourishing under adversity [1]. Research has shown that many people fare well after trauma, stressful life events, and threats to health. For example, as early as 1988, Wallender et al. [2] found that the majority of children with chronic physical problems did not experience significant psychological problems, although they were at increased risk for adjustment difficulties. More recently, a meta-analytic review of the literature showed that children with diabetes were more depressed than children without diabetes [3], but effect sizes were small and decreasing over time, suggesting that the majority of children with diabetes are not depressed and do not suffer from major psychological problems. In our research comparing youth with to those without diabetes, we found relatively few differences [4]. Because many people seem to fare well under conditions of adversity, researchers have begun to investigate the factors that predict these positive outcomes.

Resilience is one name that has been assigned to factors that protect one from the negative sequele that accompany major stressors and promote successful adaptation to adversity [1]. Resilient people are said to recover more quickly from stress and maintain a high level of functioning throughout adversity [1,5]. In the area of life-span development, resilience is described in the context of maintaining and optimizing psychological health throughout an accumulation of life challenges [6]. Resilient people are not only able to maintain normal functioning but can experience growth as they confront the normative losses, threats, and opportunities that pervade the lifespan. This framework suggests that resilience might be an important construct to examine as people navigate developmental challenges, such as the transition to emerging adulthood.

* Corresponding author at: Psychology Department, Carnegie Mellon University, Pittsburgh, PA 15213, United States. Tel.: +1 412 268 2624; fax: +1 412 268 8280.
E-mail address: vh2e@andrew.cmu.edu (V.S. Helgeson).

http://dx.doi.org/10.1016/j.jpsychores.2014.09.013
0022-3999/

Emerging adulthood is the period of development between the ages of 18 and 25—a period that is distinct from adolescence and young adulthood [7]. This stage of development is a relatively recent phenomenon, appearing over the last century when key events that formerly defined the onset of adulthood, such as employment, marriage, and parenthood, were postponed. It is during emerging adulthood that youth explore possibilities in the areas of work and love and make choices that will define themselves as adults [7]. From a vocational perspective, the majority of youth graduate from high school and go on to further their education or enter the labor force. From a relational perspective, young adults separate from their families of origin and form attachments to peers, including romantic partners. According to Arnett [7], "Emerging adulthood is a time of life when many different directions remain possible… when the scope of independent exploration of life's possibilities is greater for most people than it will be at any other period of the life course." (p. 469).

Emerging adulthood also is the period of development that is associated with the highest rate of risk behaviors [7]—perhaps because of the increased freedom that this period brings. This age group has the highest rate of alcohol/drug usage, unprotected sex, and driving while intoxicated [8]. There is some evidence that depressive symptoms peak in young adulthood [9], and reports of stress are higher during emerging adulthood than any other point in the lifespan [10]. Emerging adulthood is also an important developmental period in which to examine disturbed eating behavior, as the age of onset for bulimia is late adolescence and early adulthood [11]. Thus, emerging adulthood is a period associated with increased risk as well as increased opportunities [12]. Despite the fact that emerging adults face numerous challenges, this group of people has only recently come to the forefront of researchers' agendas.

In the present paper, we examine resilience in the context of the transition to emerging adulthood, using cognitive adaptation theory [13] as a framework for conceptualizing resilience. According to cognitive adaptation theory, traumatic events threaten people's assumptions about the self and the world—specifically, assumptions that one has personal control over what happens to the self, that the self is good (i.e., esteem), and that positive events are more likely to occur than negative events [13]. One way that people successfully adjust—that is, cognitively adapt—is to find ways to regain a sense of control, esteem, and optimism. That is, cognitive adaptation theory argues that resilient people are those who can maintain high self-esteem, high personal control, and high optimism in the face of challenges and trauma [13]. Although cognitive adaptation theory has been widely applied to threats to health [14,15], it is not a framework that has been used to understand adaptation to developmental challenges, such as the transition to emerging adulthood. Yet, cognitive adaptation theory may be particularly useful in predicting successful adjustment to this transition. Emerging adulthood is characterized as a period of instability [16]. The fluctuations that occur in roles, relationships, and living arrangements during emerging adulthood—even if positive—may be stressful. Because resilience generally and cognitive adaptation theory specifically is about adapting to change, emerging adulthood is an important context in which to study the implications of these personal characteristics. The stress associated with emerging adulthood could be effectively managed by high levels of self-esteem, mastery, and optimism. In the present paper, we ask whether these components of cognitive adaptation theory can promote successful adjustment to the transition to emerging adulthood. We are not only interested in psychological outcomes and risk behaviors, but also outcomes that are relevant to the changes that emerging adults experience in relationships and vocation.

Cognitive adaptation theory also is considered to be especially adaptive under conditions of high risk or severe threat. For example, Helgeson [17] showed that perceived control, a component of cognitive adaptation theory, predicted less distress among cardiac patients 3 months later only among those with a worse prognosis and those who had been rehospitalized. In another study of people with heart disease, a cognitive adaptation index composed of self-esteem, optimism, and control predicted better adjustment 6 months later, especially so for those who experienced a recurrent event in the intervening 6 months [18]. The more severe the threat or risk factor, the more important it may be to maintain high levels of optimism, self-esteem, and perceived control.

One group of "at-risk" emerging adults are those with type 1 diabetes. Type 1 diabetes is an autoimmune disorder characterized by an inability of the pancreas to produce insulin, an essential metabolic hormone. Taking care of type 1 diabetes requires monitoring food intake and blood glucose levels, injecting insulin on a regular basis, engaging in physical exercise, and adjusting insulin levels depending on the outcomes of the aforementioned activities. There is some evidence that cognitive adaptation indicators are related to positive outcomes among those with type 1 diabetes. In a study of adults with diabetes, a resilience index defined by optimism, self-esteem, and self-efficacy buffered the effects of stress on glycemic control one year later [19]. Luycks and Seiffge-Krenke [20] found that a positive self-concept which included a positive body image and mastery predicted better glycemic control over the transition from adolescence to emerging adulthood.

Because type 1 diabetes is a health threat, we predict that cognitive adaptation indicators will be more predictive of positive health outcomes among those with than those without type 1 diabetes. There are several reasons that emerging adulthood may be a particularly difficult transition for youth with type 1 diabetes to negotiate. Emerging adults with type 1 diabetes not only have to take on more of the responsibilities for the daily care of diabetes but also have to transition from the pediatric health care system to the adult health care system—a transition that is characterized by numerous difficulties [21]. Finally, the previously described challenges of emerging adulthood may be even more stressful for those with type 1 diabetes. Research has shown that adults with diabetes are more likely than those without diabetes to suffer from depressive symptoms [22]. Research also has shown that people with diabetes—especially females—are at increased risk for eating disorders compared to those without diabetes [23], and disturbed eating behavior is linked to diabetes-related complications [24]. Risk behaviors, especially alcohol use, can be more problematic for emerging adults with than without type 1 diabetes because alcohol increases blood sugar levels and impairs judgment that may be needed to enact appropriate self-care behavior.

Thus, cognitive adaptation indicators might be especially predictive of good adjustment to the transition to emerging adulthood for those with type 1 diabetes because these individuals face greater challenges than those without type 1 diabetes. This prediction would be consistent with research on cognitive adaptation theory that shows cognitive adaption indicators reveal stronger relations to good health outcomes under conditions of more severe threat.

The goal of the present study is to examine whether markers of cognitive adaptation theory during youths' senior year of high school predict emerging adulthood outcomes one year later and two years later, when the vast majority of youth leave home. A second goal is to test whether the relation of cognitive adaptation indicators to outcomes is stronger for those with than without type 1 diabetes, as youth with type 1 diabetes face additional strains during this transition. We also explored interactions with sex because sex differences in mental health are pervasive [25], but did not make specific predictions. We examined psychological, relational, behavioral, vocational, and, for youth with diabetes, disease-related outcomes. Because cognitive adaptation indicators are expected to predict lower levels of distress as well as higher levels of well-being, we examine both positive and negative outcomes within each of these domains.

Method

Participants

Participants were recruited from a previous longitudinal study on the transition through adolescence (see 4 for details). Adolescents

with diabetes were recruited from a local Children's Hospital, when they were average age 12, in the 5th, 6th or 7th grade, had been diagnosed with diabetes for at least one year, and had no other major chronic illnesses. Healthy adolescents who were in grades 5, 6, and 7 and had no major chronic illness were recruited from two sources: health fairs at area malls and a local pediatric physician network. Of the 132 youth with diabetes and the 131 youth without diabetes who participated in that study, 118 (89%) emerging adults with diabetes and 122 (93%) emerging adults without diabetes agreed to participate in the present study when contacted in their senior year of high school. Participants in both groups were on average age 18 at study start; the majority were Caucasian; and approximately half the sample was female. Demographic characteristics of the two groups during their senior year of high school (Time 1 [T1]) are shown in Table 1.

Procedure

Institutional Review Board approval was obtained prior to study commencement. Because participants would be leaving home and possibly the geographic area over the course of the study, all instruments were administered via on-line questionnaires. Informed consent from parents and assent from youth was obtained by mail during the senior year of high school. When participants turned 18 years old, they were contacted to provide informed consent as adults. Youth then completed an on-line questionnaire during their senior year of high school that assessed aspects of cognitive adaptation theory, psychological well-being, and risk behaviors. One year later (Time 2 [T2]) and two years later (Time 3 [T3]), participants were emailed a link to a similar on-line questionnaire that also included questions about college and work. If participants had difficulty completing the questionnaire on-line, we mailed them a paper version of the questionnaire. Paper questionnaires were completed by 12% of the sample at T1, 12% at T2, and 20% at T3. There were no differences in demographic or medical variables between participants who completed the questionnaire online or via paper.

Instruments

Some demographic variables were assessed in the earlier study (e.g., race, social status [26]), household structure, birthdate). At T1, body mass index (BMI) was assessed via self-report of height and weight, and those with diabetes were asked about their insulin delivery method. At T2 and T3, respondents were asked if they were attending college, if they were working, and if they lived at home. All of the instruments listed below were administered at all three waves of assessment, unless otherwise noted. In some cases, we developed composite indices among variables that were highly correlated and meant to represent a single conceptual construct. Those indices, their components variables, and internal consistencies are shown in Table 2.

Table 1
Participant demographics.

	Diabetes ($n = 118$)	Controls ($n = 122$)
Sex	53% female	53% female
Race	93% white	93% white
Social status[a]	42.38 (11.16)	46.45 (13.70)
Household structure (%mom/dad)	75%	76%
T1 Age	18.13 (.40)	18.03 (.50)
T1 Body mass index[a]	25.76 (4.16)	24.07 (4.71)
T1 Insulin delivery method	56% pump	
T2 Full-time college (%)	75%	74%
T2 Working (%)	49%	52%
T2 Living at home (%)	38%	37%

Note: Sex, race, social status, household structure, and birthdate were collected from the original study when participants were average age 12 [4]. Social status was measured with the four-factor Hollingshead Index [26].
[a] Health status difference at $p < .05$

Cognitive adaptation indicators

We measured self-esteem with the 10-item Rosenberg Self-Esteem Scale [27], mastery with Pearlin and Schooler's mastery scale [28], and optimism with the 8-item Life Orientation Test [29]. All of these instruments have been widely used with young adults and have well-established reliability and validity. Because the three scales were correlated at T1 (r's ranged from .68–.70, p's < .001), T2 (r's ranged from .64 to .73, p's < .001), and T3 (r's ranged from .67 to .71, p's < .001), we created a cognitive adaptation theory (CAT) index for each time of assessment.

Psychological outcomes

Psychological distress was measured with three scales: the 20-item Center for Epidemiologic Study Depression Inventory [30]; the UCLA Loneliness Scale, Version 3 [31]; and the abbreviated form (4-item) of the Perceived Stress Scale [32]. All of these scales have well-established reliability and validity and have been widely used with young adults. The three scales were correlated .53 to .70 at T1, .57 to .71 at T2; and .37 to .68 at T3 (all p's < .001). Because they were conceptually similar and moderately to highly correlated, we standardized the three scales and averaged them into a single psychological distress index.

Psychological well-being was measured with the 5-item Satisfaction with Life Inventory [33] and the Purpose in Life subscale from Ryff's Well-Being Inventory [34]. These two scales were correlated .43, .41, and .38 at T1, T2, and T3, respectively. Because both of these scales focused on the positive aspects of psychological health and were empirically correlated, we standardized the two scales and averaged them into a single psychological well-being index.

We administered two subscales from the valid and reliable Eating Disorder Inventory [35]: drive for thinness (excessive concern with dieting, preoccupation with weight) and bulimia (episodes of uncontrollable eating or bingeing). Three items from the drive for thinness scale were removed because they are biased by the presence of diabetes [36]. Their inclusion in previous research has artificially inflated the presence of eating disturbances among people with diabetes. Because the two scales were correlated at each wave of assessment (r's = .65, .66, and .54, respectively), we combined the two into an *eating disturbance* index.

We sought to develop composite indices to reduce the number of analyses and guard against type 1 error. We note that the intercorrelations of the variables that comprised each index was generally

Table 2
Indices, components, and internal consistencies.

		T1	T2	T3
Cognitive adaptation index	Optimism	.78	.78	.83
	Mastery	.75	.80	.75
	Self-esteem	.88	.91	.89
Psychological distress	depressive symptoms	.89	.93	.92
	Loneliness	.84	.86	.87
	Perceived stress	.72	.76	.75
Psychological well-being	Life satisfaction	.90	.92	.88
	Purpose in life	.73	.77	.79
Disturbed eating behavior	Drive for thinness	.91	.91	.91
	Bulimic symptoms	.82	.85	.88
Friend support	Intimacy	.88	.87	.86
	Emotional support	.90	.90	.89
	Instrumental support	.84	.82	.84
Friend conflict	Impatience	.80	.82	.85
	Insensitivity	.84	.83	.85
	Interference	.68	.70	.72
	Rejection	.84	.85	.78

stronger than the intercorrelations of variables across indices. For example, at T1 the average intercorrelation of the three CAT indicators was .69 and the average intercorrelation of the psychological distress indicators was .62, whereas the average intercorrelation of the CAT indicators with the psychological distress indicators was modestly lower at .55. The discrepancy was much larger for disturbed eating behavior where the intercorrelation of the two eating disturbance indicators at T1 was .65 and the average intercorrelation of the CAT indicators with the eating disturbance indicators was 19.

We also examined the correlations among the three psychological outcome indices. Two of the three psychological outcomes—distress and well-being—revealed moderate to high correlations (r's ranged from .56 to .62 across the three assessments), whereas disturbed eating behavior was moderately related to distress (r's ranged from .42 to .46 across the three assessments) and modestly related to well-being (r's ranged from −.13 to −.21). Given this pattern of correlations, it did not make sense to combine all three psychological outcomes into a single index.

Relationship outcomes

Friend support was measured with the Berndt and Keefe [37] friendship questionnaire, which has been shown to have excellent reliability and validity. We used the intimacy, instrumental support, and emotional support subscales which showed high internal consistency at each wave of assessment (alphas ranged from .82 to .90) to create a friend support index. The internal consistency of the index was .91 at each of the three waves.

Friend conflict was measured with the Test of Negative Social Exchange [38], which has high test–retest reliability and high internal consistency. We used the impatience, insensitivity, interference, and rejection subscales to create a friend conflict index. The internal consistencies for the individual scales ranged from .68 to .85 across the waves of assessment. The internal consistency of the index was .91 at T1, .90 at T2, and .88 at T3.

At T2 and T3, we examined both the *presence of romantic relationships* as well as the *dissolution of romantic relationships* with two face-valid items. Respondents were asked: "Do you have anyone that you would consider to be a boyfriend/girlfriend?" They were also asked, "Have you had a romantic relationship breakup in the past year?" For both questions, responses were "yes" or "no."

Behavioral outcomes

We measured the behavioral outcomes at T2 and T3. We asked participants how often they had *smoked* in the past 12 months, in accordance with this question from the Monitoring the Future Study [39]. We created a dichotomous variable, such that 0 indicated never smoked in the past year and 1 indicated had ever smoked in the past year. We measured *alcohol consumption* and *binge drinking* also with questions from the Monitoring the Future Study [39]. Participants reported the number of times they drank more than a few sips of alcohol during the past month and were assigned either a 1 (had consumed any alcohol) or a 0 (had not consumed any alcohol). To measure binge drinking, participants were asked how often they had consumed five or more drinks on a single occasion (four or more drinks for females) in the past month. We created a categorical variable, such that 1 represented one or more binges and 0 represented no binges in the past month.

Vocational outcomes

At T2, 75% of respondents said that they were full-time college students and 50% of respondents said that they were working either full or part-time. College students were asked what their *GPA* was at the end of each school year at T2 and T3. Those who held jobs were asked to complete a measure of *job satisfaction* and *occupational stress* at T2 and T3. Job satisfaction was measured with the 10-item Hibbard and Pope [40] scale, which asks respondents how satisfied they are with 10 different aspects of work (e.g., control, pay, skills utilized). The internal consistency was .94 at both T2 and T3. Respondents completed Norris and Uhl's [41] 4-item occupational stress subscale from their widely used chronic strain scale. Subscales have been shown to be distinct from other domains of chronic strain by factor analysis. The internal consistency was .86 at T2 and .80 at T3.

Diabetes outcomes

For emerging adults with diabetes, *self-care* was measured with the 14-item Self-Care Inventory [42,43], which was updated by adding eight more contemporary items as described previously [44]. Respondents are asked how well they followed their physicians' recommendations on a 5-point scale (1 = never to 5 = always/very often) for glucose testing, insulin administration, diet, exercise, and other diabetes behaviors reflecting domains regarded as important by the American Diabetes Association. Internal consistency for this index was good (T1: $\alpha = .85$; T2: $\alpha = .88$; T3 = .86). *Glycemic control* was measured using the participants' most recent HbA1c, which was requested from each participant's current physician.

Overview of analyses

First, we examined whether the CAT index was related to any of the demographic or medical variables to determine whether such variables needed to be statistically controlled in the analyses. Because we were investigating whether relations differed for those with and without type 1 diabetes, it also was important to control for any variables upon which the two groups differed. As shown in Table 1, there were no group (diabetes vs. controls) differences in any of the demographic variables except for social status and BMI. Thus, all analyses that included group (diabetes vs. healthy) statistically controlled for social status[1] and BMI.

Next we examined whether there were group, time, or group by time differences in the CAT index with a repeated measures analysis of covariance.

Finally, we examined our primary question of whether the CAT index predicts emerging adulthood outcomes with multiple regression analysis. We predicted T2 and T3 outcomes, controlling for the respective T1 outcome (when available), social status, and BMI on the first step of the equation. Thus, by controlling for the respective T1 outcome, these longitudinal analyses enable us to predict changes in outcomes between T1 and T2 and between T2 and T3. We entered the CAT index, sex, and group on the second step, followed by the three two-way interactions on the third step: sex by group, CAT index by sex, CAT index by group. When outcomes were dichotomous (attend college or not), we followed the same procedure with logistic regression analysis. The results of the multiple regression analyses are shown in Table 3, and the results from the logistic regression analyses are shown in Table 4.

[1] In response to a reviewer's suggestion, we examined whether social status moderated the relations of the cognitive adaptation index to outcomes. On four occasions this interaction was significant: T2 wellbeing, T3 wellbeing, T2 friend support, and T2 friend conflict. In each case, the relation of the CAT index to the outcome was stronger for persons of lower than higher social status. We used the procedures outlined by Aiken and West [60] to examine the pattern of these interactions. In all cases, the cognitive adaptation index was more strongly related to the outcome for those with lower than higher social status. This is consistent with the conceptual idea reviewed in the introduction that cognitive adaptation indicators seem to be more strongly related to beneficial outcomes under conditions of more severe threat.

Results

Relation to demographic and disease variables

We examined whether the CAT index was related to any of the demographic or medical variables. The CAT index was unrelated to sex, race, social status, household structure, age, or BMI. For emerging adults with diabetes, the CAT index was unrelated to length of illness or insulin delivery method (injections vs. pump). Thus, no additional variables needed to be statistically controlled.

Group differences in CAT

The group by time repeated measures analysis of covariance revealed a main effect for group, $F(1, 223) = 6.42$ $p < .05$; partial $\eta^2 = .03$, such that those with diabetes scored lower on the CAT index ($M = -.13$; SE = .07; CI −.28; −.01) than those without diabetes ($M = .13$; SE = .07; CI .00; .28). There was no effect of time or interaction between time and group.

Predicting emerging adulthood outcomes

Psychological outcomes

As shown in Table 3, the CAT index predicted reduced psychological distress at T2 but not at T3. There were no interactions with sex or group at either wave of followup. The CAT index predicted enhanced psychological well-being at T2 but not T3. Group significantly predicted well-being at T2, indicating that the diabetes group scored lower on well-being than the control group. There were no interactions of CAT with sex or group. The CAT index did not predict T2 eating disturbance but interacted with group to predict T3 eating disturbance. Separate regression analyses for diabetes and control groups revealed no relation of the CAT index for the control group ($\beta = -.03$, n.s.) but a trend toward a protective effect of the index for the diabetes group ($\beta = -.10$, $p = .10$). In addition, sex predicted eating disturbances at both waves, such that females scored higher than males.

Relationship outcomes

The CAT index predicted increased friend support at T2 but not at T3. The CAT index did not predict T2 friend conflict but interacted with group to predict T3 friend conflict, such that there was no relation of the CAT index to friend conflict for the control group ($\beta = .10$, ns.) but a relation to less friend conflict for the diabetes group ($\beta = -.26$, $p < .01$).

As shown in Table 4, the CAT index interacted with sex to predict being in a romantic relationship at T2, such that women who scored high on the index were more likely to be in a romantic relationship (B = .54, SE = .22, $p < .05$, odds ratio = 1.71) but no relation was observed among men (B = −.20, SE = .24, n.s., odds ratio = .82). At T3, the CAT index predicted being in a romantic relationship for the overall sample. The CAT index also predicted a reduced likelihood of relationship breakup at T2, and interacted with group to predict T3 breakups. Among the control group, the CAT index did not predict T3 breakups ($\beta = -.16$, SE = .23, n.s., odds ratio = .85), but the CAT index predicted reduced T3 breakups for the diabetes group ($\beta = -.93$, SE = .30, $p < .005$, odds ratio = .40).

Behavioral outcomes

The CAT index did not predict alcohol use at T2 but did interact with group to predict alcohol use at T3. The CAT index did not predict alcohol use among the control group ($\beta = .11$, SE = .22, n.s., odds ratio = 1.12) but predicted decreased alcohol use among the diabetes group ($\beta = -.65$, SE = .27, $p < .05$, odds ratio = .52). The CAT index did not predict binge drinking. The CAT index interacted with group to predict smoking at T2, such that the index predicted reduced smoking for the control group (B = −.78, SE = .26, $p < .005$, odds ratio = .46) but did not predict smoking for the diabetes group (B = .01, SE = .23, n.s., odds ratio = 1.01). The CAT index did not predict T3 smoking.

Vocational outcomes

The CAT index predicted GPA at T3 for those who attended college (see Table 3), such that a higher score on the CAT index was associated with higher GPAs. Among those youth working, the CAT index marginally predicted higher job satisfaction at T2 and significantly predicted higher job satisfaction at T3. The CAT index also predicted reduced work stress at both T2 and T3.

Diabetes outcomes

Among those with diabetes, the CAT index predicted better self-care at both T2 and T3. The CAT index interacted with sex to predict glycemic control at T2, but the effect was not significant for either males (Beta = .14, p = .11) or females (Beta = −.17, p = .11). There was a trend for the CAT index to predict better glycemic control at T3.

Table 3
Multiple regression: Predicting psychological, relationship, vocational, and diabetes outcomes.

	Distress				Well-being				Eating disturbance				Friend support			
	T2	ΔR^2	T3	ΔR^2	T2	ΔR^2	T3	ΔR^2	T2	ΔR^2	T3	ΔR^2	T2	ΔR^2	T3	ΔR^2
T1 Outcome	.45***		.39***		.39***		.45***		.70***		.67***		.55***		.40***	
Social status	.07		.05		.03		.07		.06		.10*		.07		.06	
BMI	−.03	.41	−.02	.24	.03	.34	−.05	.31	−.10*	.58	.04	.53	.01	.39	−.07	.21
CAT	−.23**		−.11		.23***		.12		−.02		−.07		.16**		.08	
Sex	.09+		.11+		.05		.07		.16***		.18**		.16**		.03	
Group	.05	.04	.08	.03	−.20***	.07	−.09	.02	.01	.02	.08	.02	.02	.03	−.08	.02
Sex × Group											−.10					
Sex × CAT											.13					
Group × CAT											−.13*	.01				
Total ΔR^2		.45		.27		.41		.33		.60		.56		.42		.23

	Friend conflict				GPA				Job satisfaction				Work stress			
	T2	ΔR^2	T3	ΔR^2	T2	ΔR^2	T3	ΔR^2	T2	ΔR^2	T3	ΔR^2	T2	ΔR^2	T3	ΔR^2
T1 Outcome	.39***		.40***		–		–		–		–		–		–	
Social status	.09		.11+		−.07		.05		.15+		.07		−.09		−.02	
BMI	−.05	.18	.12*	.21	.16+	.02	.11	.01	−.02	.02	−.28**	.10	.02	.01	.12	.02
CAT	−.05		.35+		.03		.23**		.17+		.21*		−.25*		−.28**	
Sex	.01		−.15+		−.09		.24**		−.08		.04		.09		.11	
Group	.08	.01	−.32	.02	.00	.01	−.05	.11	.01	.04	.06	.04	−.12	.07	−.07	.09
Sex × Group			.41*													
Sex × CAT			−.31+													
Group × CAT			−.20*	.05												
Total ΔR^2		.19		.28		.03		.12		.06		.14		.08		.11

	Self-care				HbA1c			
	T2	ΔR^2	T3	ΔR^2	T2	ΔR^2	T3	ΔR^2
T1 Outcome	.59***	.41	.50***	.34	.77***	.61	.75***	.56
CAT	.19*		.33***		.43+		−.13+	
Sex	.01	.03	.04	.11	.01	.00	.04	.01
Sex × CAT					−.48*	.02		
Total ΔR^2		.44		.45		.63		.57

Note: T1 = Time 1, T2 = Time 2, T3 = Time 3; CAT = cognitive adaptation theory index; BMI = body mass index; sex scored 0 = male and 1 = female; group scored 0 = diabetes and 1 = controls; +$p < .10$; * $p < .05$; ** $p < .01$; ***$p < .001$

Table 4
Logistic regression: Predicting relationship outcomes and risk behavior.

	Romantic relationship		Romantic Breakup		Alcohol		Smoking	
	T2	T3	T2	T3	T2	T3	T2	T3
Social status	.02 + (.01)	.02 (.01)	.01 (.01)	.01 (.01)	.04 (.01)	.04 (.01)	−.02 (.01)	−.00 (.01)
BMI	.05 (.03)	.09** (.03)	−.02 (.03)	−.01 (.04)	−.07* (.03)	−.05 (.04)	−.12** (.04)	−.04 (.03)
Sex	−.83* (.39)	−.58* (.28)	.59* (.29)	.96* (.45)	−.14 (.28)	−.50 (.41)	.09 (.42)	−.03 (.27)
Sample	.03 (.92)	.20 (.29)	.14 (.29)	.69 (1.12)	−.16 (.28)	−.03 (.96)	1.34 (.94)	.11 (.28)
CAT	−1.21* (.66)	.37* (.16)	−.36* (.16)	.49 (.68)	−.12 (.16)	.93 (.60)	−.88 (.61)	−.24 (.16)
Sex × Group	.23 (.57)			−.42 (.66)		−.10 (.58)	−.63 (.58)	
Sex × CAT				−.39 (.39)		−.49 (.34)	.06 (.35)	
Group × CAT				−.77* (.38)		−.73* (.34)	.80* (.35)	

Note: T2 = Time 2, T3 = Time 3′ CAT = cognitive adaptation theory index; BMI = body mass index; sex scored 0 = male and 1 = female; group scored 0 = diabetes and 1 = controls; + $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

Discussion

Overall, there was substantial evidence from this study that youth in their senior year of high school who had high self-esteem, high levels of mastery, and high levels of optimism showed a more positive adjustment during the transition to emerging adulthood one and two years later compared to their counterparts who scored low on these variables. These cognitive adaptation indicators predicted lower levels of adverse outcomes and higher levels of positive outcomes. The CAT index also predicted an array of outcomes, spanning psychological health, relationship functioning, behavior, and vocation. Specifically, the cognitive adaptation index predicted reduced psychological distress, enhanced psychological well-being, increased friend support, reduced friend conflict, the presence of romantic relationships, reduced likelihood of romantic breakups, higher GPA, higher levels of work satisfaction, and lower levels of work stress. Analyses controlled for baseline levels of the outcomes when relevant, so the cognitive adaptation index is predicting *changes* in these outcomes over the transition out of high school.

For psychological outcomes, the findings were stronger for the first year after high school graduation than the second year after high school graduation. It may be that the first year after high school graduation is accompanied by greater change and greater uncertainty. Changes are experienced in living situations, relationships with parents, relationships with friends, and vocation (college or work). These resilient personality traits may be more helpful in managing the stress associated with the changes that occur during the initial time of transition.

We predicted that the cognitive adaptation index would confer more benefits for those with than those without type 1 diabetes, as cognitive adaptation theory is expected to have a greater impact under conditions of more severe threat [17,18]. We found some support for this hypothesis. The cognitive adaptation index predicted lower levels of bulimic symptoms, lower levels of friend conflict, lower rates of romantic relationship breakup, and lower levels of alcohol use only for those with type 1 diabetes. These findings are consistent with a recent study of adolescents with type 1 diabetes that linked similar cognitive adaptation indicators to less distress, higher quality of life, and better glycemic control [45]. Interestingly, the instances in which the cognitive adaptation index interacted with group and revealed links to benefits for those with diabetes only appeared at the Time 3 assessment. It is possible that those with diabetes are continuing to undergo greater fluctuation in their lives two years after high school graduation than those without diabetes. There may simply be more for those with diabetes to adapt to, leading to longer lasting effects of cognitive adaptation.

The cognitive adaptation index was not only a more robust predictor of outcomes for emerging adults with than without type 1 diabetes, but the cognitive adaptation index also predicted diabetes-specific outcomes. Emerging adults with diabetes who scored higher on this index enacted better self-care behavior one year and two years after high school graduation. This finding is important, as self-care often deteriorates during this period of time [46,47]. There was some modest evidence that the cognitive adaptation index was linked to better glycemic control. Such a link would be extremely important as emerging adults are at risk for poor glycemic control when they move from the pediatric health care system to the adult health care system [48].

That the CAT index predicted outcomes for emerging adults with diabetes is especially important in light of the fact that emerging adults with diabetes scored lower on the cognitive adaptation index compared to their peers without diabetes. In a previous report, we compared the two groups of emerging adults on psychological well-being and risk behaviors one year after high school graduation [49]. In that report, we showed that the two groups did not differ in the life paths chosen (e.g., college), depressive symptoms, or disturbed eating behavior. However, youth with diabetes scored lower on life satisfaction and life purpose—our two indicators of psychological well-being—over time. In this paper, we note that youth with diabetes continue to score lower than youth without diabetes on these indicators of well-being.

Clinically, these findings suggest that it is important to identify youth who lack self-esteem, a sense of personal control, and optimism during adolescence as they may be at risk for poor outcomes as young adults—especially those with diabetes. Research also should test whether interventions can maximize the cognitive or behavioral manifestations of these traits among youth. Cognitive behavioral therapy is one possibility, as it is aimed at altering maladaptive cognitions. Other more recent interventions have focused on resilience or growth with some success [50,51]—including increases in optimism, self-esteem, and perceived control [52], but these interventions are not typically aimed at youth, the CAT index or include those with diabetes. Developing an intervention aimed at the indicators of CAT among children or adolescents may be difficult. Successful interventions in the area of pediatric diabetes tend to focus on the family, specifically communication and family support for self-care [53,54]. One possibility is to take the framework of these existing successful interventions and add a component aimed at resilience.

These findings not only have relevance for health care practitioners who work with youth, including youth with diabetes, but they also have implications for cognitive adaptation theory itself. This study broadens the scope of previous research by showing the adaptive significance of CAT extends to outcomes that include relationship variables, risk behaviors, and adherence. We used cognitive adaptation theory as a framework for resilience, but there are similar constructs that have been related to a broad array of positive outcomes. Self-control [55] is one such construct, the core features of which are the ability to change and adapt to existing circumstances [55]. Effortful control is another construct [56], which includes inhibition, activation, and change. In studies of college students, self-control has been associated with a broad array of positive outcomes, many of which were measured in this study, including a higher GPA, lower eating disturbances, lower alcohol problems, lower levels of psychological distress, and more positive relationship outcomes [55]. In a study of adolescents with

type 1 diabetes, self-control predicted a lower likelihood of deteriorating glycemic control over 2 years [57]. In studies of children more generally, effortful control has been linked to reduced negative emotion, social competence, and other indicators of good adjustment [56]. Thus, the indicators of cognitive adaptation theory undoubtedly have overlap with other constructs that have been used to reflect resilience. It is unclear at this point whether there is something unique about the cognitive adaptation index compared to other resilience constructs.

There may be a synergy among the three components of cognitive adaptation theory, such that the index is more than the sum of its parts. When we reran the analyses and replaced the CAT index with the individual indicators of self-esteem, mastery, and optimism, there was no consistent pattern showing one indicator variable was more predictive than others and, on some occasions, none of the individual variables reached statistical significance, suggesting that there is something unique about the CAT index. These findings are consistent with previous research that was conducted with cardiac patients [14], in showing that the CAT index is a superior predictor of outcomes compared to its individual components.

What are the mechanisms by which CAT in particular, or resilience more generally, might affect these outcomes? One reason those who score high on CAT indicators adopt better health care practices and avoid risk behaviors might be because they have a stronger belief in the association of their own behavior to health outcomes. That is, their beliefs about personal control in the context of high self-esteem and an optimistic outlook might lead to increased persistence and a promotion-focused mentality. Research in the area of diabetes has show that resilience, operationalized in a way parallel to our cognitive adaptation index (i.e., defined by self-esteem, optimism, and self-efficacy), was related to lower levels of maladaptive coping (e.g., withdrawal, self-criticism, denial, disengagement) and higher levels of adaptive coping (e.g., cognitive restructuring, problem solving, acceptance) in adolescents [45] and adults [58]. In terms of our relationship outcomes, persons who are characterized by CAT indicators are likely to be viewed as more attractive to others. We have known for a long time that people are drawn to those with positive dispositions and shy away from those with more negative moods [59]. The literature on effortful control in children shows links not only to reduced negative emotion but also prosocial behavior, empathy, and having a conscience [56]. These links could explain why those who scored high on the CAT index were more likely to have supportive friendships and be involved in romantic relationships and less likely to have conflictual friendships or to have suffered a romantic relationship breakup. Regardless of the specific way in which resilience is operationalized, a task for future researchers is to examine the underlying mechanisms that link this individual difference variable to such a broad array of positive outcomes.

Before concluding, we acknowledge several limitations of this research and suggest directions for future research. First, the sample was largely Caucasian, greatly limiting the generalizability of the findings. The study of a more diverse group of emerging adults with respect to race, ethnicity, and social status will demonstrate whether the CAT index is more or less powerful in these varying subgroups and circumstances. Second, we studied the very onset of emerging adulthood, when we expected the greatest changes and challenges to occur. It remains to be seen as to whether the resilience offered by the CAT index persists throughout this developmental period. Additional waves of followup would not only allow us to examine whether the links of the CAT index to outcomes persist but would allow us to examine the within-person variability in the relation between the CAT index and outcomes. Third, there was some empirical overlap between our indicators of CAT and our indicators of psychological distress. Despite this overlap, however, the T1 CAT index predicted changes in distress over time. Fourth, the use of composite indices makes it difficult to interpret scaling (i.e., meaning of one unit change in the index) and makes the measurement error of the individual components additive. Composite indices typically make it difficult to compare study findings to other research, but in this case there is precedent for the use of the cognitive adaptation index (e.g., [18,19]). Relatedly, the CAT index is not a clinical measure of psychopathology, and there are no clear markers of clinically significant distress that can be derived from it to date. Finally, although this research drew links between the CAT index and a wide array of emerging adulthood outcomes, the precise mechanism by which these benefits appeared was not examined. Future research should attempt to examine more proximal psychological mechanisms, perhaps through ecological momentary assessment methods, and extend the investigation into physiological mechanisms that might underlie the connections of these resilient traits to health.

Conflict of interest

None of the authors have any conflict of interest to declare.

Acknowledgments

We appreciate the support of the study project manager, Pamela Snyder, and the research assistants, in particular Abigail Kunz-Vaughn, who worked on this project. This work was supported by the National Institutes of Health (R01 DK060586).

References

[1] Zautra AJ, Reich JW. Resilience: The meanings, methods, and measures of a fundamental characteristic of human adaptation. In: Folkman S, editor. The Oxford handbook of stress, health, and coping. New York: Oxford University Press; 2010. p. 173–85.
[2] Wallander JL, Varni JW, Babani L, Banis HT, Wilcox KT. Children with chronic physical disorders: Maternal reports of their psychological adjustment. J Pediatr Psychol 1988;13:197–212.
[3] Reynolds KA, Helgeson VS. Children with diabetes compared to peers: Depressed? Distressed?: A meta-analytic review. Ann Behav Med 2011;42:29–41.
[4] Helgeson VS, Snyder PR, Escobar O, Siminerio L, Becker D. Comparison of adolescents with and without diabetes on indices of psychosocial functioning for three years. J Pediatr Psychol 2007;37:794–806.
[5] Garmezy N. Resilience and vulnerability to adverse developmental outcomes associated with poverty. Am Behav Sci 1991;34:416–30.
[6] Staudinger UM, Marsiske M, Baltes PB. Resilience and reserve capacity in later adulthood: Potentials and limits of development across the life span. In: Cicchetti D, Cohen DJ, editors. Developmental psychopathology. , Risk, disorder, and adaptationOxford England: John Wiley & Sons; 1995. p. 801–47.
[7] Arnett JJ. Emerging adulthood: A theory of development from the late teens through the twenties. Am Psychol 2000;55:469–80.
[8] Substance Abuse and Mental Health Services Administration. Results from the 2010 National Survey on Drug Use and Health: Summary of national findings. http://www.samhsa.gov/data/nsduh/2k10nsduh/2k10results.htm; 2011. [Accessed April 8, 2013].
[9] Kessler RC, Mickelson KD, Walters EE, Zhao S, Hamilton L. Age and depression in the MIDUS survey. In: Brim OG, Ryff CD, Kessler RC, editors. How healthy are we? A national study of well-being at midlife. Chicago, IL: The University of Chicago Press; 2004. p. 227–51.
[10] Stone AA, Schwartz JE, Broderick JE, Deaton A. A snapshot of the age distribution of psychological well-being in the United States. Proc Natl Acad Sci U S A 2010;107:9985–90.
[11] American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Washington, D.C.: American Psychiatric Association; 2013
[12] Luecken LJ, Gress JL. Early adversity and resilience in emerging adulthood. In: Reich JW, Zautra AJ, Hall J, editors. Handbook of adult resilience. New York: Guilford Press; 2010. p. 238–57.
[13] Taylor SE, Brown J. Illusion and well-being: A social psychological perspective on mental health. Psychol Bull 1988;103:193–210.
[14] Helgeson VS. Cognitive adaptation, psychological adjustment, and disease progression among angioplasty patients: 4 years later. Health Psychol 2003;22:30–8.
[15] Tomich PL, Helgeson VS. Cognitive adaptation theory and breast cancer recurrence: Are there limits? J Consult Clin Psychol 2006;74:980–7.
[16] Arnett JJ. Socialization in emerging adulthood: From the family to the wider world, from socialization to self-socialization. In: Grusec JE, Hastings PD, editors. Handbook of socialization: Theory and research. New York: Guilford Press; 2007. p. 208–37.
[17] Helgeson VS. Moderators of the relation between perceived control and adjustment to chronic illness. J Pers Soc Psychol 1992;63:656–66.
[18] Helgeson VS. Applicability of cognitive adaptation theory to predicting adjustment to heart disease after coronary angioplasty. Health Psychol 1999;18:561–9.
[19] Yi JP, Vitaliano PP, Smith R, Yi JC, Weinger K. The role of resilience on psychological adjustment and physical health in patients with diabetes. Br J Health Psychol 2008;13:311–25.

[20] Luyckx K, Seiffge-Krenke I. Continuity and change in glycemic control trajectories from adolescence to emerging adulthood. Diabetes Care 2009;32:797–801.
[21] Allen D, Gregory J. The transition from children's to adult diabetes services: understanding the 'problem'. Diabet Med 2009;26:162–6.
[22] Gendelman N, Snell-Bergeon JK, McFann K, Kinney G, Paul Wadwa R, Bishop F, et al. Prevalence and correlates of depression in individuals with and without type 1 diabetes. Diabetes Care 2009;32:575–9.
[23] Jones JM, Lawson ML, Daneman D, Olmstead MP, Rodin G. Eating disorders in adolescent females with and without type 1 diabetes: Cross sectional study. Br Med J 2000;320:1563–6.
[24] Rydall AC, Rodin GM, Olmsted MP, Devenyi RG, Daneman D. Disordered eating behavior and microvascular complications in young women with insulin-dependent diabetes mellitus. N Engl J Med 1997;336:1849–54.
[25] Helgeson VS. Gender and health: A social psychological perspective. In: Baum A, Revenson T, Singer J, editors. Handbook of health psychology. 2nd ed. New York: Psychology Press; 2012. p. 518–37.
[26] Hollingshead AB. Four factor index of social status. New Haven, CT: Yale University; 1975.
[27] Rosenberg M. Society and the adolescent self image. Princeton, NJ: Princeton University Press; 1965.
[28] Pearlin LI, Schooler C. The structure of coping. J Health Soc Behav 1978;19:2–21.
[29] Scheier MF, Carver CS. The Self-Consciousness Scale: A revised version for use with general populations. J Appl Soc Psychol 1985;15:687–99.
[30] Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. Appl Psychol Meas 1977;1:385–401.
[31] Russell RK. UCLA Loneliness Scale (version 3): Reliability, validity, and factor structure. J Pers Assess 1996;66:20–40.
[32] Cohen S, Kamarc T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav 1983;24:385–96.
[33] Diener E. Subjective well-being. Psychol Bull 1984;95:542–75.
[34] Ryff CD. Happiness is everything, or is it? Explorations on the meaning of psychological well-being. J Pers Soc Psychol 1989;57:1069–81.
[35] Garner DM. Eating disorder inventory-2. Odessa, FL: Psychological Assessment Resources, Inc; 1990.
[36] Steel JM, Young RJ, Lloyd GG, Macintyre CC. Abnormal eating attitudes in young insulin-dependent diabetics. Br J Psychiatry 1989;155:515–21.
[37] Berndt TJ, Keefe K. Friends' influence on adolescents' adjustment to school. Child Dev 1995;66:1312–29.
[38] Ruehlman LS, Karoly P. With a little flak from my friends: Development and preliminary validation of the Test of Negative Social Exchange (TENSE). Psychol Assess 1991;3:97–104.
[39] Johnston LD, O'Malley PM, Bachman JG, Shulenberg JE. Monitoring the Future national survey results on drug use, 1975–2004: Volume II, college students and adults ages 19–45. Bethesda, MD: National Institute on Drug Abuse; 2005.
[40] Hibbard JH, Pope CR. The quality of social roles as predictors of morbidity and mortality. Soc Sci Med 1993;36:217–25.
[41] Norris FH, Uhl GA. Chronic stress as a mediator of acute stress: The case of Hurricate Hugo. J Appl Soc Psychol 1993;23:1263–84.
[42] Self care behaviors among adolescents with diabetes. Paper presented at: Ninth Annual Sessions of the Society of Behavioral Medicine; April 1988 [Baltimore, MD].
[43] Lewin AB, LaGreca AM, Geffken GR, Williams LB, Duke DC, Storch EA, et al. Validity and reliability of an adolescent and parent rating scale of type 1 diabetes adherence behaviors: The Self-Care Inventory (SCI). J Pediatr Psychol 2009;34:999–1007. http://dx.doi.org/10.1093/jpepsy/jsp032.
[44] Helgeson VS, Reynolds KA, Siminerio L, Escobar O, Becker D. Parent and adolescent distribution of responsibility for diabetes self-care: Links to health outcomes. J Pediatr Psychol 2008;33:497–508. http://dx.doi.org/10.1093/jpepsy/jsm081.
[45] Yi-Frazier JP, Yaptangco M, Semana S, Buscaino E, Thompson V, Cochrane K, et al. The association of personal resilience with stress, coping, and diabetes outcomes in adolescents with type 1 diabetes: Variable- and person-focused approaches. J Health Psychol 2013:1–11.
[46] Lyons SK, Becker DJ, Helgeson VS. Transfer from pediatric to adult health care: Effects on diabetes outcomes. Pediatr Diabetes 2014 [in press].
[47] Peters A, Laffel L. Diabetes care for emerging adults: Recommendations for transition from pediatric to adult diabetes care systems. Diabetes Care 2011;34:2477–85.
[48] Helgeson VS, Reynolds KA, Snyder PR, Palladino DK, Becker DJ, Siminerio L, et al. Characterizing the transition from pediatric to adult care among emerging adults with Type 1 diabetes. Diabet Med 2013;30:610–5 [PMCID 23157171].
[49] Palladino DK, Helgeson VS, Reynolds KA, Becker D, Siminerio L, Escobar O. Emerging adults with type 1 diabetes: A comparison to peers without diabetes. J Pediatr Psychol 2013;38:506–17.
[50] Marigold DC, Holmes JG, Ross M. Fostering relationship resilience: An intervention for low self-esteem individuals. J Exp Soc Psychol 2010;46:624–30.
[51] Knaevelsrud C, Liedl A, Maercker A. Posttraumatic growth, optimism and openess as outcomes of a cognitive-behavioural intervention for posttraumatic stress reactions. J Health Psychol 2010;15:1030–8.
[52] Lee V, Robin Cohen S, Edgar L, Laizner AM, Gagnon AJ. Meaning-making intervention during breast or colorectal cancer treatment improves self-esteem, optimism, and self-efficacy. Soc Sci Med 2006;62:3133–45.
[53] Laffel L, Vangsness L, Connell A, Goebel-Fabbri A, Butler D, Anderson BJ. Impact of ambulatory, family-focused teamwork intervention on glycemic control in youth with type 1 diabetes. J Pediatr 2003;142:409–16.
[54] Wysocki T, Harris MA, Buckloh LM, Mertlich D, Lochrie AS, Mauras N, et al. Randomized trial of behavioral family systems therapy for diabetes: Maintenance of effects on diabetes outcomes in adolescents. Diabetes Care 2007;30:555–60.
[55] Tangney JP, Baumeister RF, Boone AL. High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. J Pers 2008;72:271–324.
[56] Eisenberg N, Smith CL, Spinrad TL. Effortful control: Relations with emotion regulation, adjustment, and socialization in childhood. New York, NY: Guilford Publications; 2011 259–82.
[57] King PS, Berg CA, Butner J, Drew LM, Foster C, Donaldson D, et al. Longitudinal trajectories of metabolic control across adolescence: Associations with parental involvement, adolescents' psychosocial maturity, and health care utilization. J Adolesc Health 2011;50:491–6.
[58] Yi-Frazier JP, Smith R, Vitaliano PP, Yi JC, Mai S, Hillman M, et al. A person-focused analysis of resilience resources and coping in diabetes patients. Stress Health 2010;26:51–60.
[59] Coyne J. Depression and the response of others. J Abnorm Psychol 1976;85:186–93.
[60] Aiken LS, West SG. Multiple regression: Testing and interpreting interactions. Thousand Oaks, California: SAGE Publications; 1996.