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Longitudinal testing of a dietary self-care motivational model in adolescents with diabetes

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ABSTRACT

Objective: Based on self-determination theory, this study tests a model positing that perceived autonomy support from parents and health care providers positively predicts self-efficacy and autonomous self-regulation in dietary self-care. In turn, self-efficacy and autonomous self-regulation predict better dietary self-care over time.
Method: Longitudinal data were collected in a consecutive series of 289 adolescent patients with type I diabetes at two time points separated by a two-year interval.
Results: Structural equation modeling analysis revealed that perceived autonomy support from health care providers at Time 1 (T1) positively predicted self-efficacy and autonomous self-regulation at Time 2 (T2), T1 self-efficacy and autonomous self-regulation positively predicted T2 dietary self-care, and T1 dietary self-care positively predicted T2 autonomous self-regulation.
Conclusion: Autonomy support from health care providers appears to help adolescents develop motivational factors for dietary self-care and adhere to dietary recommendations.

Introduction

Dietary self-care is associated with blood glucose control, which is central to type I diabetes treatment and prognosis [1]. However, following a well-balanced diet combined with adequate insulin intake to maintain strict control of blood glucose can be daunting for young patients. The data show that self-care is particularly problematic for adolescents: fewer than 50% manage to follow dietary recommendations [2]. Autonomous self-regulation and perceived self-efficacy have recently emerged as key variables in dietary self-care [3–6]. According to organismic integration theory, a sub-theory of self-determination theory (SDT) [7], when supported and nurtured by others, these motivational factors enable the internalization of healthy behaviors that are not initially valued or interesting [8]. Growing evidence supports this proposal. For instance, adolescents in conflict with significant others have greater problems with self-care [9] compared to those who perceive that their problems are approached with warmth and empathy [9,10]. However, the psychological processes underlying these relationships remain unclear. This study aims to shed light on the mechanisms by which motivational factors for dietary self-care are facilitated in adolescents with diabetes. Based on SDT, longitudinal relationships between environmental and motivational factors for dietary self-care are examined.

Self-determination theory: Motivational factors and consequences

SDT is a macro-theory of human motivation that emphasizes choice and volition in behavior initiation, as opposed to a sense of being controlled, manipulated, or coerced [8]. Rather than a unidimensional focus on motivation quantity, SDT defines distinct motivation types: autonomous self-regulation (doing something for its own sake), controlled regulation (doing something for an instrumental reason), and amotivation (doing something without intent) [11]. These different regulations are largely determined by the degree to which an environment allows one to experience volition: the more an activity is chosen freely and accepted as one's own, the more it is internalized, congruent with the self, and likely to endure over time. Research shows that autonomous motives relate to long-term adoption of health behaviors, including exercise persistence [12], eating regulation [13], smoking cessation [14], medication adherence [15], and treatment retention [16,17]. Accordingly, studies in adolescents [3] and adults [5,18,19] show that patients with diabetes who follow dietary recommendations under autonomous self-regulation maintain better self-care and metabolic control. Moreover, with respect to autonomous self-regulation, SDT proposes that individuals must perceive that they are capable of achieving what is expected from them. This enables them to take initiative and voluntarily pursue

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required action such as dietary self-care [7]. Studies in adult patients concur that perceived competence and self-efficacy are strong predictors of dietary behaviors [5,20–22]. Albeit not identical, these concepts share similarities, including the capacity to act [23]: because perceived self-efficacy is sensitive to environmental changes, and is socially acquired, it is typically more task- and situation-specific than perceived competence, which is more general in nature, in that it springs from an innate desire to master skills [24,25]. In the literature, patients' confidence in their ability to follow dietary recommendations – a specific diabetes management method – usually indicates perceived self-efficacy [20]. This perception can be assessed in terms of barriers such as temptation, negative mood, and uncontrollable situations [20,26].

Much of the research on the consequences of autonomous self-regulation and self-efficacy has shown that motivational factors have additive effects on adaptive outcomes [27,28]. However, SDT [29] proposes that past experience of autonomy can facilitate subsequent perception of autonomous self-regulation. Similarly, social learning theory [30], from which the concept of self-efficacy derives, posits that past accomplishments are predictive of future self-efficacy perception. Although both motivational factors feature frequently in behavioral change models, they are typically conceived as mutually covariant or as having unidirectional effects on an outcome. A closer examination of potentially reciprocal relationships between these variables and dietary self-care is therefore needed.

The role of significant others on motivational factors for dietary self-care

SDT posits that motivational factors can be stimulated by an environment that is autonomy-supportive rather than controlling. Autonomy-supportive environments provide choice, positive feedback, and a meaningful rationale for action, whereas controlling environments involve pressure or coercive measures to motivate behavior [31]. In pediatric settings, the supportive role of health care providers has long been recognized as essential for diabetes care [32–36]. However, little is known about the extent to which pediatricians, nurses, and nutritionists are autonomy supportive with adolescents. To date, autonomy support from health care providers has largely been documented in adults with diabetes [5,18,19,21,37].

Results show that the more patients are supported by providers, the more they feel effective and autonomously self-regulated toward self-care [5,19]. Among the few studies that have focused on supporting behaviors similar to autonomy support, the DAWN youth study [38] suggests that adolescents should be offered choices and nonjudgmental advice about their care.

Research also reveals that parental actions that facilitate self-directed care and are aligned with adolescents' wishes foster feelings of effectiveness toward care [33,39,40]. Kyngäs et al. [34] show that adolescents practice good adherence when their parents show interest in them, accept them as they are, and provide positive feedback. In contrast, because diabetes care is an issue on which parents and adolescents often disagree, parent–child conflicts [41] negatively impact self-care [42]. For instance, when parents are perceived as intrusive, controlling, or coercive, self-care tends to be less than optimal [42].

Taken together, these findings suggest that experience with others influences motivational factors for self-care. However, the research is limited by the traditional use of cross-sectional data or a focus on changes over time rather than competing hypotheses about directionality [3,5,21]. Moreover, investigations of the internalization of requested behaviors tend to consider that environmental factors exercise a unidirectional influence on patients [11]. According to social learning theory, individuals with high self-efficacy can reach out and cultivate more supportive relationships [43]. Moreover, studies on delinquency find that unacceptable adolescent behavior negatively affects parents' interpersonal style over time [44,45]. There is therefore a need to advance our understanding of the variables that influence internalization of dietary behaviors over time. Another compelling question is whether autonomy support from different sources, in this case parents and health care providers, is an important dimension to consider for adolescent dietary self-care; in other life domains, positive representations of significant others (e.g., parents, teachers, friends) differentially predict positive outcomes [27,28].

The present study

Using a longitudinal research design with two measurement points (0 and 24 months), we tested a model of dietary self-care internalization based on SDT's organismic integration theory [7], whereby 1) autonomy support from parents and health care providers at Time 1 (T1) positively predicts autonomous self-regulation and self-efficacy perception at Time 2 (T2), and 2) autonomous self-regulation and self-efficacy perception at T1 positively predict dietary self-care at T2. In supplementary models, we tested for the presence of reciprocal and reverse relationships between dietary behaviors, perception of self-efficacy, and autonomous self-regulation in order to determine potential directionality. Longitudinal relationships were examined across gender and diabetes duration, as previous research indicates that these variables are related to dietary self-care [3].

Method

Participants

Participants were recruited from two major pediatric diabetes centers in Québec (Canada). In all, 316 patients were invited to participate, of whom 289 (156 boys) agreed. The main reasons for not participating included lack of time or interest (n=11) and incomplete questionnaires (n=16). Mean age of patients was 14 years (SD=1.5), mean age at diagnosis was 8.2 years (SD=3.7), and mean diabetes duration was 5.6 years (SD=3.8).

Participants were recruited following approval from appropriate institutional review boards. Families were either informed about the study by telephone prior to their appointment or during the visit. Written consent from parents and assent from adolescents was obtained before questionnaire completion. Because visits were scheduled every three months, recruiting lasted one year to ensure that all eligible patients could participate. Eligibility criteria included presence of type I diabetes, age between 11 and 17 years, and ability to read and speak French. All participants were asked to complete a follow-up questionnaire 24 months later.

Measures

Self-efficacy

On a nine-item scale [21], participants rated their confidence in their ability to follow their dietary plan, given common barriers. The barriers included three situations: temptation (e.g., "When someone offers me foods that are high in calories"), negative mood (e.g., "When I feel annoyed or angry"), and uncontrollable situations (e.g., "When I eat at a friend's house"). Items were rated on a ten-point scale ranging from 0 (I am not confident at all that I can follow the dietary plan) to 10 (I am completely confident that I can follow the dietary plan). Internal consistencies for all scales are presented in Table 2.

Autonomous self-regulation

The autonomous self-regulation scale [41] contains 12 statements in response to the question, "Why do you follow your diet?" Three items were used to assess four motivational constructs reflecting varying degrees of internalization of dietary behaviors: intrinsic

motivation (e.g., "For the satisfaction of eating healthy"; $\alpha_{T1}=.75$; $\alpha_{T2}=.84$), identified regulation (e.g., "To feel better"; $\alpha_{T1}=.83$; $\alpha_{T2}=.76$), controlled regulation (e.g., "Because my doctor asks me to"; $\alpha_{T1}=.72$; $\alpha_{T2}=.68$), and amotivation (e.g., "I don't know what I'm getting out of it"; $\alpha_{T1}=.79$; $\alpha_{T2}=.88$). Items were scored on a five-point scale ranging from 1 (completely disagree) to 5 (completely agree). The motivation types were weighted and summed to form an overall index of autonomous self-regulation: ((2×(intrinsic motivation)) + (identified regulation))−((controlled regulation)−(2×(amotivation))). Thus, a continuous variable was constructed, ranging from less (−12) to more (+12) autonomous self-regulation.

Autonomy support from parents

A modified version of the Perception of Parents Scale (POPS) [46] was used [47]. The original POPS scale contained 21 items for mothers and 21 for fathers. To assess the interpersonal style of both parents, the items were aggregated. Three scholars (other than the principal investigator) independently reviewed the items and removed three for redundancy. The remaining 18 items were adapted to diabetes-related situations. Sample statements are, "My parents seem to know how I feel about my diabetes," "My parents find time to talk with me about my diabetes," and "My parents accept me and like me as I am." Items were scored on a seven-point scale ranging from 1 (not at all true) to 7 (absolutely true).

Autonomy support from health care providers

A modified seven-item version of the Health Care Climate Questionnaire [12] was used to assess autonomy support from health care providers. A sample statement is, "I feel that my health care providers provided me with choices and options about handling my diabetes." Items were scored on a seven-point scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Dietary self-care

Dietary self-care was assessed using the Diet subscale of the Summary of Diabetes Self-Care Activities scale [48]. The five items of this subscale assessed, over the previous seven days, overall dietary management and adherence to recommended caloric, fiber, fat, and sugar intake. The first two items were scored on a five-level descriptor scale ranging from 1 (never) to 5 (always) and the remainder were rated on a five-point scale ranging from 1 (0%) to 5 (100%). This scale was developed for use with adults, but has been adapted for and used with adolescents with diabetes in previous studies [20,49,50].

Statistical analyses

Model adequacy was assessed by structural equation modeling (SEM) using EQS [51]. Models were tested with standardized coefficients obtained using maximum likelihood estimation and fit was ascertained by the comparative fit index (CFI), the non-normed fit index (NNFI), and the root-mean-square error of approximation (RMSEA) [52].

Before testing the proposed model, a measurement model (M0) estimated the relationships among observed and latent variables to ensure that latent variables adequately represented manifest indicators. The hypothesized model (M1), which assumes normal causation, was then tested. This model comprises unidirectional paths from T1 autonomy support from parents and providers to T2 autonomous self-regulation and self-efficacy, as well as paths from T1 autonomous self-regulation and self-efficacy to T2 dietary self-care. To rule out possible alternative explanations, M1 was compared to three competing models: a stability model (M2), a reversed causation model (M3), and a reciprocal model (M4). Autoregressive effects were included in all models to control for initial levels of latent factors [53]. Synchronous correlations between latent factors were estimated, and error terms (uniqueness) between corresponding indicators were included. M2 included autoregressive effects only. M3 included, in addition to autoregressive effects, unidirectional paths from T1 dietary self-care to T2 autonomous self-regulation and self-efficacy, and unidirectional paths from T1 autonomous self-regulation and self-efficacy to T2 support from parents and providers. M4 was a combination of M1 and M3.

Results

Of the 289 adolescents who participated in the first study wave, 237 (82%) completed the second wave. The main reasons for withdrawal were inability to make contact with the participant (n=5), lack of interest (n=27), and incomplete data (n=20). Dropout analyses revealed no significant differences between adolescents who participated at both time points and those who did not on the study variables (autonomy support from parents and providers, autonomous self-regulation, self-efficacy, dietary self-care) or background variables (gender, age), except for diabetes duration. Participants who completed both questionnaires had diabetes for a shorter time than those who dropped out, $F(1,288)=85.57$, $P<.01$. Although this results pattern suggests no selection bias, it is generally considered inappropriate to disregard missing values [54,55]. We therefore decided to use the full participant sample with the full information maximum likelihood (FIML) method in EQS version 6.1.

The measurement model provided a satisfactory fit to the data (see Table 1; M0). All indicators loaded significantly on latent variables, with coefficients ranging from .41 to .97 at T1 and from .30 to .95 at T2. Means, standard deviations, reliabilities, and correlations between latent variables are presented in Table 2. Hancock's coefficient (also called coefficient H) was calculated to determine measurement reliability [56]. Calculated using standardized factor loadings, this coefficient estimates the stability of the latent construct across multiple observed variables. Values equal to or greater than .70 are deemed satisfactory [56]. All correlations were in the expected direction, with the exception of a nonsignificant relationship between T1 dietary self-care and T2 support from providers. Test-retest correlations were moderate and a repeated measure analysis with MANOVA suggested no mean fluctuation for variables over time, $F(1, 313) = 1.651$, ns.

Model testing

All four models yielded a satisfactory fit to the data (see Table 1). The chi-square difference tests showed that the hypothesized (M1) and reversed causation (M3) models were superior to the stability model (M0), suggesting causal ordering relationships among variables. The reciprocal model (M4) provided better data fit than M1, M2, and M3. Results for M4 are summarized in Fig. 1 (covariances not shown), showing that prior experience of support from health care providers was positively related to subsequent autonomous self-regulation and dietary self-efficacy (while controlling for gender and diabetes duration effects). Results also show that T1 parental support was not related to autonomous self-regulation or self-efficacy at T2. Instead, T1 self-efficacy was positively related to subsequent parental support. Prior experience of autonomous self-regulation and self-efficacy were positively related to subsequent dietary self-care. However, T1 dietary self-care was also related to T2 autonomous self-regulation, suggesting a reciprocal rather than a unidirectional relationship.

Multi-group analyses comparing boys and girls were performed to examine if M4 was invariant across gender, again controlling for diabetes duration. Four models were successively tested to determine parameter equivalences (factor loadings, factor variances and covariances, and path coefficients; see Table 1; Model 5a) [57]. In the least restrictive model (Model 5a), no parameters were constrained to be equal across gender, whereas in the most restrictive model (Model 5d) factor loadings, factor variances, factor covariances, and path coefficients were constrained to be equal. Findings support the invariance of M4 across gender because differences in chi-square value were not significant as stringent equality constraints were imposed. This suggests that the same motivational processes are at play for boys and girls in dietary self-care.

Discussion

This study aimed to determine potential causal relationships between autonomy support, autonomous self-regulation, self-efficacy, and dietary self-care in adolescents with type I diabetes. It was hypothesized that autonomy support from parents and health care providers at T1 would relate positively to perceived autonomous self-regulation and self-efficacy at T2, and that this perception at T1 would relate positively to dietary self-care at T2. The results support most of the hypothesized relationships, except for the proposal that parental autonomy fosters subsequent motivational factors. However, consistent with past research, autonomy support from health care

Table 1
Fit indices for the tested models

Model description	χ^2	*df*	CFI	NNFI	RMSEA	$\Delta\chi^2$	Δdf
M0: measurement model	597.486	385	.983	.978	.042	–	–
SEM							
M1: hypothesized model (normal causation)	640.042	399	.979	.974	.044		
M2: stability	663.003	405	.977	.972	.045	(M2 vs. M1) = 22.961**	6
M3: reversed causation	638.697	399	.979	.975	.044	(M3 vs. M2) = 24.306**	6
M4: reciprocal	615.403	393	.982	.977	.043	(M4 vs. M2) = 47.600**	12
						(M4 vs. M1) = 24.639**	6
						(M4 vs. M3) = 23.294**	6
Gender invariance							
M5a: no invariance	1694.806	746	.994	.992	.064		
M5b: FL	1723.709	766	.993	.991	.063	(M5b vs. M5a) = 28.903	20
M5c: FL+FV+FC	1767.204	802	.999	.992	.062	(M5c vs. M5b) = 43.495	36
M5d: FL+FV+FC+path coefficients	1795.458	824	.995	.994	.062	(M5d vs. M5c) = 28.254	22

Note. CFI = comparative fit index; NNFI = non-normed fit index; RMSEA = root mean square error of approximation; FL = factor loadings; FV = factor variances; FC = factor covariances; SEM = structural equation modeling.
** $P<.01$.

providers positively predicts autonomous self-regulation and self-efficacy over time. The results also show that these motivational factors were associated with dietary self-care over two years. Autonomous self-regulation and dietary self-care were reciprocally related: improvement in one contributes to improvement in the other. Moreover, self-efficacy predicted subsequent perceived autonomy support from parents, and equivalently for boys and girls.

The predictive role of autonomy support for motivational factors

The results revealed no association between parental support and adolescents' motivational factors, although these constructs were significantly related. Other studies also found no association between family dynamics and diabetes care [58,59]. One possible explanation for this is that support for dietary self-care received from parents is not as important to adolescents as support received from other social agents. In fact, it is well documented that adolescents need less parental support as they age [60], partly because their interests move outwards from the home. In the case of dietary self-care, adolescents gradually handle it in other settings (e.g., school). It is therefore possible that parents are less able to monitor and support adolescents in their dietary choices. Parents may also choose to more closely support other components of their child's regimen, such as insulin intake. Furthermore, as adolescents spend more time with their friends than parents, friends may play an increasingly important role, such as helping them feel good about their diabetes [61]. Despite these non-significant effects, it is noteworthy that self-efficacy perception is positively related to subsequent parental autonomy support. One explanation for this comes from social cognitive theory, which postulates that belief in their capabilities can help people reach out, find supportive relationships, and maintain them over time [43]. Thus, providing autonomy support for dietary self-care should be a priority for care givers, with the potential to spill over into better motivation and dietary self-care at home.

This study suggests that the more adolescents feel that health care providers understand their dietary self-care challenges, accept them as they are, and provide them with choices, the more they will be autonomously motivated toward dietary self-care, and the greater their confidence in achieving this over time. This concurs with Williams and colleagues' findings that support from physicians promotes autonomous self-regulation and competence for dietary self-care in a sample of adults with type 2 diabetes [5,19]. The positive association between providers' autonomy support and adolescents' dietary self-efficacy also corroborates the support-efficacy model [62], which proposes that through support (i.e., warmth, affection, and nurturance), individuals develop a belief in their ability to meet demands and overcome challenges [63–65]. Perhaps providers are not as emotionally involved in adolescents' dietary self-care practices as parents, and

Table 2
Means, standard deviations, and correlations between latent variables

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
Time 1														
1. Gender[a]	.56	.50	–											
2. Diabetes duration	5.59	3.81	−.04	–										
3. Support from parents	5.41	0.93	.05	−.07	(.83)									
4. Support from providers	5.57	0.95	−.01	−.18**	.61**	(.70)								
5. Autonomous self-reg.	4.93	3.93	.06	−.04	.56**	.65**	(.90)							
6. Self-efficacy	6.27	2.08	.11	−.06	.40**	.49**	.58**	(.78)						
7. Dietary self-care	3.53	0.63	−.00	.03	.27**	.19**	.30**	.31**	(.95)					
Time 2														
8. Support from parents	5.55	0.90	.03	.09	**.66****	.55**	.46**	.43**	.18**	(.84)				
9. Support from providers	5.52	0.97	.01	−.02	.44**	**.48****	.37**	.21**	.05	.54**	(.72)			.
10. Autonomous self-reg.	5.77	3.90	.11	.04	.41**	.47**	**.65****	.38**	.35**	.51**	.58**	(.92)		
11. Self-efficacy	6.26	1.85	.36**	.03	.24**	.34**	.47**	**.50****	.16*	.41**	.37**	.55**	(.78)	
12. Dietary self-care	3.55	0.59	−.03	.06	.32**	.19**	.38**	.35**	**.41****	.30**	.21**	.38**	.22**	(.92)

Note. Gender[a]: girls = 0, boys = 1; self-reg. = self-regulation; correlations in bold represent test–retest relationships; reliabilities (coefficient H) are shown in the diagonal.
* $P<.05$.
** $P<.01$.

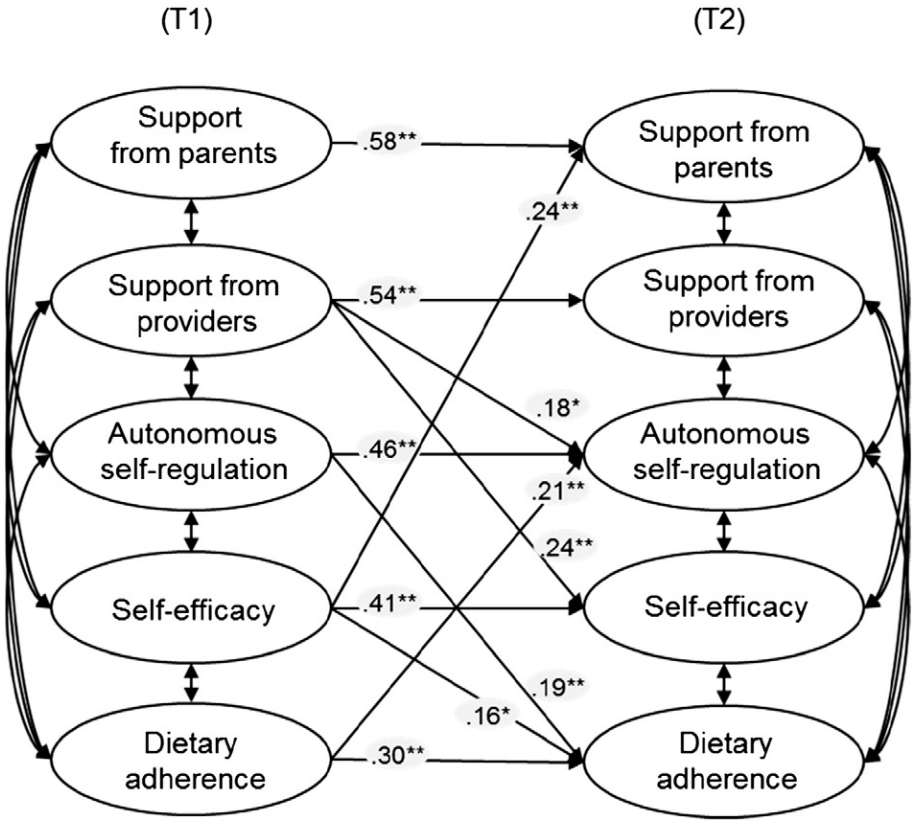

Fig. 1. Reciprocal model with significant standardized path coefficients. Results were controlled for gender and diabetes duration; *P<.05, **P<.01.

accordingly, adolescents are more willing to accept their support. Alternatively, adolescents may feel that providers are more thoroughly versed in treatment challenges. Interestingly, adolescents see their health care providers about two or three times per year on average [3], and for approximately seven minutes per follow-up [66]. Our results underscore that autonomy-supportive health care providers facilitate, in both boys and girls, the internalization of autonomous self-regulation as well as self-efficacy perception concerning dietary behaviors. Thus, by supporting their patients' self-care needs and ideas, providers can help them build the motivational foundations necessary for maintaining good dietary practices, and ultimately, good health. Nevertheless, our findings need to be confirmed with further studies.

The predictive role of motivational factors for dietary behaviors

Initial motivational factors are indicative of subsequent dietary behaviors. Specifically, self-efficacy appears to act as an antecedent of dietary self-care. In the literature, some cross-sectional studies have related self-efficacy to better self-care in adolescent [20,67] and adult patients [21,68–70]. Thus, Nouwen and colleagues [20] show that adolescents who doubt their ability to follow dietary recommendations are less likely to do so. According to SDT, the likelihood of dietary self-care is greater when the environment includes autonomy-supportive practices focusing on desired behaviors. In this way, patients are helped to master needed health behaviors. However, to maintain these behaviors, SDT also stresses that patients must exercise not only self-efficacy but also autonomy. Our results corroborate this, in that the more adolescents are autonomously motivated, the better their adherence over time. Our results also concur with Williams and al. [5] and Julien et al. [37], who studied this relationship in adults with diabetes over a six-month and a one-year period, respectively. In the present study, autonomous self-regulation and dietary self-care are reciprocally related: as autonomous self-regulation increases, dietary self-care improves, and as dietary self-care improves, autonomous self-regulation increases. Conversely, Julien et al. [37] found that the direction of the relationship goes from autonomous self-regulation to dietary self-care. These differing results may be attributed to differences in the populations studied (adolescents vs. adults), disease evolution and management (type 1 vs. type 2 diabetes), or the time lag involved (1- vs. 2-year follow-up).

Limitations and future research directions

Our study has a number of strengths and limitations. Strengths include 1) use of an established theoretical framework to guide the research hypotheses; 2) use of all consecutive adolescent patients with type 1 diabetes referred for follow-up (rather than a selected group or convenience sample), minimizing potential selection bias; and 3) use of a 24-month longitudinal design with repeated measures to determine potential causal relationships. However, although the present design offers support for cross-lagged associations, definitive conclusions about causality and mediation are unwarranted. Further studies are needed, with longitudinal data from at least three time points, to more thoroughly investigate meditation effects. Intervention studies could also be conducted to verify whether promoting an autonomy-supportive style in providers helps them be more autonomy-supportive of their patients, and whether this positive climate facilitates better self-care over time. Moreover, because only self-report measured were used, the findings of the present study must be interpreted with caution. Future studies could obtain data from other sources, such as parents or health care providers. Other possibilities for research include more detailed examinations of 1) how self-efficacy perception influences adolescents' subsequent assessments of parental support, and 2) the role of other social agents – such as siblings and friends – on the internalization of dietary behaviors over time.

Conclusion

In sum, adolescents who voluntarily manage their dietary self-care with the help and support of health care providers will subsequently take pleasure in choosing and preparing their food, and will experience self-efficacy in doing so. Over time, they are likely to maintain better self-care practices. Our results show that autonomy support from providers can enhance the internalization of required behaviors and facilitate self-care over time. Compared to other patient cohorts, adolescents are known to have problems maintaining good self-care. Accordingly, controlling and coercive measures are not recommended to motivate adolescents who refuse to adopt prescribed dietary recommendations, as they may prevent the internalization of these required health behaviors. Health care providers should be aware that autonomy support constitutes a patient-centered approach that focuses on patients' needs [71]. Hence, they are encouraged to provide recommendations in an autonomously supportive way and to guide patients so that they can begin to understand why an external behavior (e.g., dietary recommendations) or an uninteresting activity (e.g., dietary monitoring) is beneficial for long-term health. Throughout this caregiving process, health care providers must learn to acknowledge patients' thoughts, feelings, and goals concerning self-care. While providing constructive feedback, self-care guidance, and clear expectations of health outcomes, providers will help young patients to join the dots between "what they do" (dietary self-care) and "what happens" as a result (better metabolic control and health).

Conflict of interest

All authors declare having NO conflict of interests with this research article.

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