The Social Context and Illness Identity in Youth with Type 1 Diabetes: A Three-Wave Longitudinal Study

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Abstract

Youth with type 1 diabetes are confronted with the challenging task of integrating diabetes into their identity. This integration process, referred to as illness identity, may play an important role in how youth with type 1 diabetes cope with normative and illness-specific challenges. In line with socio-ecological theorizing, the present study investigated the longitudinal interplay between illness identity and two important social contexts for youth, the parent and peer contexts. A total of 559 (54.5% female; mean age = 18.8 years) adolescents (14-17 years) and emerging adults (18-25 years) with type 1 diabetes completed questionnaires at three time-points with intervals of one year. A total of 98% of these participants had the Belgian nationality, and all of them spoke Dutch. At each time point, illness identity (i.e., acceptance, enrichment, rejection, and engulfment), peer support, extreme peer orientation, parental responsiveness, parental psychological control, and parental overprotection were self-assessed. The present findings show that overprotective parenting may lead to youth feeling engulfed by their diabetes. Further, when type 1 diabetes becomes adaptively integrated into youth's identity, the data suggest that youth may be better prepared to engage in healthy peer relationships. Thus, the present findings show that illness identity may be affected by the social context, and in turn may have an impact on parent and peer relationships as well. In general, the present findings underscore the importance of adaptive illness integration for youth with type 1 diabetes, and further emphasize the importance of achieving a coherent identity.

Keywords: chronic disease; diabetes mellitus, type 1; illness identity; social context; adolescents; emerging adults

Introduction

Identity formation is an important developmental task for adolescents in industrialized nations. While coping with rapid hormonal and bodily changes, they are confronted with life questions such as 'Who am I?' and 'Who do I want to become?' (Erikson, 1968). In industrialized nations, this identity work peaks during the late teens and twenties, a life period referred to as emerging adulthood (Arnett, 2000). Achieving a sense of identity synthesis in which different life roles, experiences, and commitments are integrated, contributes to psychological well-being in this challenging transition to adulthood (Schwartz, Zamboanga, Wang, & Olthuis, 2009).

Type 1 diabetes is one of the most common chronic illnesses in Western youth. This metabolic condition has a substantial impact on youth's lives because of the need for testing blood glucose, administering insulin, and adhering to strict dietary prescriptions, all on a daily basis (Daneman, 2006). In absence of exact numbers, the global prevalence rate is roughly estimated to be around 0.17% (Center for Disease Control and Prevention, 2012). Achieving a coherent and well-integrated identity has been found to protect against diabetes-related distress and depressive symptoms in youth with type 1 diabetes, emphasizing the importance of identity development for these youth (Luyckx et al., 2008). Hence, as youth are confronted with diabetes, they need to find a way to integrate their illness as part of who they are in order to achieve identity synthesis (Leventhal, Idler, & Leventhal, 1999).

To provide insight into how having a chronic illness, such as diabetes, may be integrated into one's identity, the concept of illness identity has been forwarded (Charmaz, 1987). As patients' illness identity has been associated with important generic and illness-specific outcomes (Oris et al., 2016), both theory and clinical practice can benefit from the investigation of mechanisms that possibly shape one's illness identity. In line with socio-ecological theorizing (Bronfenbrenner, 1986), numerous studies have shown that the micro-context plays a major role in how youth manage and adapt to chronic illness (Berg et al., 2017). Adjusting to chronic illness during the transition to adulthood indeed takes place in a dynamic setting involving transactional processes between patients and their immediate social contexts (Berg et al., 2017; Wiebe, Berg, Mello, & Kelly, 2018). Therefore, the present three-wave longitudinal study in a large sample of youth with type 1 diabetes investigated the longitudinal interplay between

patients' illness identity and their perceptions of two important immediate social contexts, the parent and peer contexts.

Illness Identity

Adolescents and emerging adults are confronted with normative developmental challenges such as growing independent from parents, engaging in more intimate relationships with peers, and transitioning from high school to college (Barry, Madsen, Nelson, Carroll, & Badger, 2009). Such challenges provide youth with opportunities to explore different aspects of the self (Pasupathi, 2013). Tackling these normative challenges, however, may be hindered by the daily illness-specific challenges that come with diabetes, thereby complicating the formation of a coherent and integrated identity (Silverstein et al., 2005).

The task of growing independent from parents may be somewhat delayed for youth with diabetes, as parents are typically involved in the care for diabetes throughout adolescence, and ideally stay involved during the transition to adulthood as well to ensure proper illness management (Helgeson et al., 2013). This prolonged dependency on parents may, however, complicate identity formation, as it possibly delays the acquisition of a sense of uniqueness or distinctiveness (Monaghan, Helgeson, & Wiebe, 2015). Recent theorizing emphasized that distinctiveness is a core aspect of identity and that feeling distinct is possibly an important step toward achieving a coherent identity (Doeselaar, Becht, Klimstra, & Meeus, 2018).

Many youth grow more independent from parents when transitioning to college. This transition can be demanding for youth with diabetes. Adhering to their treatment in such a new context is challenging. They need to inform others about their diagnosis and need to become increasingly responsible for their treatment as they move away from parents (Mellinger, 2003). Further, college life comes with a range of opportunities for taking part in social activities with peers. However, some youth experience type 1 diabetes as a complicating factor for participating in such events, for example due to the fear of experiencing hypoglycemia during the event or being judged as abnormal by peers (Wilson, 2010). Also, prolonged parental involvement may be perceived as a debilitating factor for taking part in social activities with peers (Spencer, Cooper, & Milton, 2013). Perceiving diabetes as a social barrier

entails the risk that youth may favor fitting in with peers at the expense of accepting diabetes as part of the self, even though in essence diabetes and fitting in with peers do not exclude each other (Drew, Berg, & Wiebe, 2010). One study found that adolescents who anticipated negative reactions from their friends toward their treatment regimen were more likely to neglect their treatment and have worse glycemic control, demonstrating that some youth find it difficult to cope with diabetes treatment and join in activities with their peers at the same time (Hains et al., 2007).

Many youth with diabetes thus experience an identity conflict between the non-normative stressors that come with diabetes and the formation of a coherent sense of identity (Commissariat, Kenowitz, Trast, Heptulla, & Gonzalez, 2016). Tackling this conflict is an ongoing process that many youth struggle with throughout the transition to adulthood (Sparud-Lundin, Öhrn, & Danielson, 2010). As a result of this conflict, there are several possible consequences with respect to identity formation when growing up with diabetes. One possible consequence is that youth reject diabetes from their identity. Rejecting diabetes may result from the fear that important others would focus excessively on one's diabetes rather than other aspects of one's self. Rejecting diabetes may protect against this fear by reconciling one's former or healthy self, but may lead to poor treatment adherence (Tilden, Charman, Sharples, & Fosbury, 2005), and lower well-being (Skinner, John, & Hampson, 2000). Another possibility is that youth feel engulfed by their diabetes when they perceive diabetes as intruding different life domains. When feeling engulfed, diabetes takes a central place in one's identity and affects other aspects of the self as well (Morea, Friend, & Bennett, 2008). Some youth, however, explicitly acknowledge and accept diabetes as part of their identity (Commissariat et al., 2016), and some even indicate that having diabetes brings along positive changes to identity (Asbring, 2001). Finding benefit in diabetes can in turn be a resource for coping with normative and illness-specific challenges (Tran, Wiebe, Fortenberry, Butler, & Berg, 2011). These studies thus demonstrate that illness integration can manifest itself along different dimensions. Hence, the concept of illness identity was forwarded to gain more insight into the ways that patients handle the challenging task of integrating their illness into their identity (Charmaz, 1987).

Oris et al. (2016) integrated different perspectives within the literature on illness identity and developed the Illness Identity Questionnaire (IIQ), distinguishing among four illness identity

dimensions: acceptance, enrichment, engulfment, and rejection. Acceptance is defined as the degree to which someone accepts his/her illness and the challenges it brings as part of one's identity, without feeling overwhelmed by it. Enrichment comprises the degree to which someone experiences positive changes in one's identity, including personal growth and an enriched sense of self, as a consequence of his/her illness. Both acceptance and enrichment have been linked to favorable generic and illness-specific outcomes (Luyckx et al., 2008; Morea et al., 2008). In a previous cross-sectional study using baseline data from the present study, acceptance was positively related to well-being and treatment adherence, whereas it was negatively related to symptoms of mental distress. Enrichment was positively related to well-being (Oris et al., 2016).

The concept of rejection, within research on chronic illness, has its roots in qualitative studies on treatment adherence (Tilden et al., 2005). It comprises the degree to which someone rejects the illness as part of his/her identity, thereby avoiding to think or talk about the illness in daily life, and possibly neglecting treatment adherence. Using baseline data from the present study, rejection was negatively related to treatment adherence (Oris et al., 2016). Finally, engulfment encompasses the degree to which one's identity is completely defined by his/her illness. For someone scoring high on engulfment, the illness pervades all domains of daily life (Morea et al., 2008). Again using baseline data from the present study, engulfment positively predicted depressive symptoms and diabetes-related distress, and negatively predicted satisfaction with life (Oris et al., 2016). Thus, patients who reject their illness from their identity or feel engulfed by it are possibly at increased risk for experiencing generic and illness-specific complications.

The role of parents and peers for illness identity

Socio-ecological theorizing emphasizes that youth development takes place as part of a dynamic system characterized by ongoing reciprocal processes between the individual and their environment (Bronfenbrenner, 1986). Parents and peers in particular contribute to youth development and diabetes functioning as they interact with youth on a daily basis (Berg et al., 2017). Youth's well-being and ability to keep diabetes under control depend to a great extent on whether these interactions are supportive and reflect involvement with diabetes management that is not overly intrusive (Wiebe et al.,

2018). Conversely, having type 1 diabetes may impact the social context as well (Berg et al., 2017). For example, studies reported increased distress in parents after the diagnosis of type 1 diabetes in their child (Whittemore, Jaser, Chao, Jang, & Grey, 2012). Such distress has been related to poorer parenting and, subsequently, suboptimal patient functioning (Epkins & Harper, 2016).

Similar to diabetes management, identity formation is assumed to be driven by continuous interactions between the individual and significant others such as parents and peers (Erikson, 1968). Identity control theory outlines ways in which significant others may have an impact on one's identity, and vice versa (Kerpelman, Pittman, & Lamke, 1997). When individuals behave in a certain way or make certain life choices, significant others provide social feedback on these behaviors or choices. When such feedback does not match one's identity, one could either behave differently to obtain new feedback or alter one's identity to resolve this dissonant and unpleasant state. A single-case study by Tilden et al. (2005), in which a detailed narrative is given of a woman with type 1 diabetes showing poor adherence, illustrates such transactional processes with respect to social context and illness identity. The woman experienced that significant others focused excessively on her diabetes rather than on herself as a person, which was experienced as a rejection of her sense of self. To resolve this unpleasant state, she altered her identity and rejected diabetes from her identity. This rejection led significant others to focus even more on her diabetes, which, in turn, made the woman alter her behavior and avoid significant others. The present study is the first to investigate transactional relations among illness identity, parents, and peers in a quantitative manner. The aim is to obtain a deeper understanding of how illness identity is shaped over time, but also how illness identity, in turn, may play into parent and peer variables.

In addressing this research aim, the focus is on different aspects characterizing relationships with parents and peers. Parental involvement has been found to play an important role in patient functioning, especially during childhood (Wysocki et al., 1996), but also during adolescence and emerging adulthood (Monaghan et al., 2015). One adaptive facet of parental involvement is parental responsiveness. It comprises emotional support and warmth (Schaefer, 1965) and is consistently related to a wide array of beneficial generic (Barber, Stolz, Olsen, Collins, & Burchinal, 2005) and diabetes-specific (Berg et al., 2008) outcomes. Responsiveness has been found to foster children's self-efficacy, an important skill related to adaptive diabetes management (King, Berg, Butner, Butler, & Wiebe, 2014).

Further, parental responsiveness diminishes mental distress and fosters social competence in children, a useful skill when interacting with peers as well (Barber et al., 2005). Responsiveness may thus provide youth with the necessary skills to adaptively integrate diabetes into their identity.

Not all facets of parental involvement can be considered adaptive (Young, Lord, Patel, Gruhn, & Jaser, 2014). Psychological control encompasses the degree to which parents try to exert influence on their child's thoughts through manipulative techniques such as criticism and guilt-induction (Barber, 1996). It has been related to mental distress in both healthy and chronically ill children and to antisocial behavior in diverse samples of youth (Barber et al., 2005; Butler, Skinner, Gelfand, Berg, & Wiebe, 2007). Moreover, youth experiencing a psychologically controlling parenting style are more likely to behave in a rebellious manner (Van Petegem, Soenens, Vansteenkiste, & Beyers, 2015), which in the present context may translate into youth rebelling against parental advice and guidelines for diabetes management. A final parenting dimension investigated in the present study is overprotective parenting. A key component that distinguishes overprotective parenting from other parenting constructs is its unique combination of parental warmth/support, anxious rearing, and restricting children's autonomy (Brenning, Soenens, Van Petegem, & Kins, 2017). Overprotection has been operationalized in an inconsistent way in previous studies in youth with diabetes. Therefore, the role of overprotection in this population remains inconclusive (Ellis et al., 2008). Parental overprotection is believed to affect children's self-regulation by diminishing self-efficacy beliefs (Wiebe, Helgeson, & Berg, 2016). Limited self-regulation capacities in managing diabetes may lead to feelings of being engulfed by diabetes.

A normative transition toward adulthood is characterized by a decline in parental involvement accompanied by more intense peer relationships (Furman & Buhrmester, 1992). In a structured interview adolescents with diabetes identified their friends as the most important source of emotional support (La Greca et al., 1995). However, quantitative research is inconclusive on the role of peer support for youth with type 1 diabetes (Palladino & Helgeson, 2012). In the present study, perceived emotional support from peers was measured (further referred to as peer support), which was found to negatively predict diabetes-specific distress in the present sample (Raymaekers et al., 2017). Most studies on peer relationships in the context of chronic illness investigated peer support (Palladino & Helgeson, 2012).

However, peers may exert influence in more ways than merely through support (Prinstein & Giletta, 2016). In this respect, Drew et al. (2010) tried to capture tendencies to fit in with peers at the expense of normative developmental tasks and diabetes management, which has been referred to as extreme peer orientation (Fuligni & Eccles, 1993). A high quality relationship with parents predicted less extreme peer orientation, and less extreme peer orientation, in turn, predicted better diabetes management (Drew et al., 2010). In the present sample, extreme peer orientation was found to predict worse glycemic control in emerging adults (Raymaekers et al., 2017). As peers pay less attention to treatment adherence than parents (La Greca et al., 1995), patients who reject diabetes from their identity may increasingly orient themselves toward the peer context. Conversely, patients willing to favor their peers over parental advice may reject their diabetes from their identity to avoid being confronted with their suboptimal diabetes regulation.

Current Study

The present three-wave longitudinal study in adolescents and emerging adults with type 1 diabetes examined how illness identity relates to youth perceptions of parenting and peer relationships over time. All bi-directional associations among illness identity, parenting, peer support, and extreme peer orientation were tested. As longitudinal research examining adolescents and emerging adults with type 1 diabetes in relation to their social context is limited (Wiebe et al., 2016), many of the paths tested were exploratory. Nevertheless, based on prior findings and theorizing we expected to uncover the following directional relations among the study variables.

With respect to social-contextual variables predicting illness identity, first, perceived parental responsiveness and emotional peer support were expected to positively predict acceptance and enrichment and to negatively predict engulfment and rejection, by fostering an empathic environment in which youth with type 1 diabetes can safely explore who they are (Berg et al., 2008). Second, as psychologically controlling parenting may stimulate rebellious behavior going against parents' and physicians' guidelines (Van Petegem et al., 2015), psychological control was expected to positively predict rejection of diabetes. Third, as overprotective parenting interferes with autonomy development in regulating diabetes and may install a sense of helplessness in youth (Wiebe et al., 2016), the task of

adaptively integrating diabetes into one's identity may be overwhelming for these youth. Hence, overprotection was expected to positively predict engulfment. Finally, extreme peer orientation was expected to positively predict rejection, given that being too oriented to fitting in with peers may detract from an adaptive integration of diabetes in one's daily life. Relatedly, rejecting diabetes may make youth orient themselves away from the parental context and toward the peer context, and thus lead to more extreme peer orientation.

As recent theorizing emphasizes the transactional nature by which diabetes and social contexts influence each other (Berg et al., 2017), paths from illness identity to social-contextual variables were expected to occur as well. Most of these paths tested were exploratory. However, we expected that when diabetes is adaptively integrated in one's identity, there would be no need to hide diabetes and its treatment when in the company of peers. Hence, acceptance (and possibly enrichment) were expected to negatively predict extreme peer orientation, whereas rejection was tentatively expected to positively predict extreme peer orientation.

Further, in the general population parental involvement declines on the way to adulthood (Furman & Buhrmester, 1992). However, for youth with diabetes, parents may be involved somewhat longer in the lives of their child (Monaghan et al., 2015). Hence, it was explored whether transactional relations involving perceived parenting were moderated by age, and whether relations with illness identity would be stronger in adolescents than in emerging adults. Similarly, it was explored whether prospective paths were moderated by gender, as previous research has found gender differences in support seeking behavior (Enzlin, Mathieu, & Demyttenaere, 2002).

Lastly, the hypothesized transactional processes among illness identity and social contextual variables were expected to occur both at the between- and within-person levels. For example, parental overprotection was expected to positively predict engulfment. At the between-person level, this implies that youth who experience more overprotection at baseline were expected to have higher engulfment at a later point in time as compared to youth who experience less overprotection at baseline. Such a prediction on the expected rank-order of individuals over time can be valuable, as testing that prediction provides information about the individuals who are at risk to have relatively high engulfment at a later point in time (Hernán, 2018). However, one could also hypothesize that experiencing high parental

overprotection at baseline leads to increases in engulfment within the individual. The latter prediction infers a process on the within-person level. Processes on the within-person level are of substantial interest for both fundamental theories on human development as well as for clinical practice (Curran & Bauer, 2011). In the present study, it is expected that hypothesized relationships occur at both the within-person and between-person levels. Returning to the overprotection-engulfment example, it is expected that youth who experience more overprotection at baseline will have relatively higher levels of engulfment at a later time point, and overprotection is assumed to lead to increased engulfment within the individual.

Hence, to assess directionality of effects among the study variables, both the classical cross-lagged panel model (CLPM) and the random intercept cross-lagged paned model (RI-CLPM) were used (Hamaker, Kuiper, & Grasman, 2015). The CLPM was used to test hypotheses on the lagged rank-order associations of youth over time. The random-intercept cross-lagged panel model was used to test predictions at the within-person level. However, with only three measurement waves, the power to detect significant deviations from the expected within-person variable means may be too low (Berry & Willoughby, 2017). Hence, the cut-off for statistical significance was relaxed to .1 instead of .05 in the RI-CLPMs (Masselink et al., 2018).

Methods

Participants and Procedure

The present three-wave longitudinal study is part of an ongoing project in which participants are recruited via the Belgian Diabetes Registry (Raymaekers et al., 2017). At the start of the project, 1,450 Dutch-speaking adolescents and emerging adults (14-25 years) with type 1 diabetes were sent questionnaire bundles and informed consent forms, including a detailed briefing of the study purpose and content. Parents provided written consent for youth below 18 years of age. Participants were rewarded one cinema ticket each time they participated. The project was approved by the Medical Ethics Committee, and Social and Societal Ethics Committee of KU Leuven. Participants with impaired cognitive abilities as declared by their parents were excluded from analyses (n = 5). At T1, 575 completed bundles were returned [Response Rate (RR) = 41.2%], of which 559 were eligible for analysis (54.1% girls). A total of 53 bundles did not reach destination and were returned sealed. The following

year, at T2, 573 of the participants at T1 were invited again and 429 completed bundles were returned (RR = 74.9%), of which 423 were eligible for analysis (56.3% girls). Another year later, at T3, 542 of patients that participated in at least one of the previous waves were sent bundles, resulting in a response rate of 70.9%. A total of 381 participants provided data eligible for analysis at T3 (55.5% girls). Finally, 14 participants of which the mother and/or father had died before or during the study were excluded from analyses. Hence, the present analyses were conducted on a sample of 545 participants (559 at T1 - 14). A total of 98% of these participants had the Belgian nationality, and 95% of participants' parents had the Belgian nationality. Other participant characteristics can be found in Table 1. Little's MCAR test on variables of all three waves was significant [$\chi^2(974) = 1173.47$, $p < .001$], but the normed χ^2 was 1.20, indicating that data were likely missing completely at random (Bollen, 1989). Hence, the full information maximum likelihood (FIML) procedure was used to account for missing data (Enders, 2010).

Measures

Illness identity.

The Illness Identity Questionnaire, which has been validated in Dutch in the present sample at T1, taps into the four illness identity dimensions: rejection (5 items), acceptance (6 items), engulfment (8 items), and enrichment (8 items) (Oris et al., 2016). Items were answered on a five-point Likert scale, ranging from 'strongly disagree' (1) to 'strongly agree' (5). Sample items read: 'I just avoid thinking about my diabetes' (rejection), 'I accept being a person with diabetes' (acceptance), 'My diabetes dominates my life' (engulfment), and 'Because of my diabetes, I have become a stronger person' (enrichment). Cronbach's alphas for rejection, acceptance, engulfment, and enrichment, were 0.84, 0.84, 0.90, and 0.90 at T1, 0.84, 0.86, 0.89, and 0.91 at T2, and 0.88, 0.87, 0.90, and 0.91 at T3, respectively.

Perceived emotional support from peers.

Perceived emotional support from peers was measured using the subscales quality of communication and degree of trust (8 items) of the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987). Beyers, Goossens, Vansant, and Moors (2003) translated the scale from English to Dutch by first independently translating the items and then deciding in group upon a final version. Items

were answered on a four-point Likert-type scale, ranging from 'almost never' (1) to 'almost always' (4). A sample item reads: 'My friends encourage me to talk about my difficulties'. Cronbach's alpha was 0.84 at T1, and 0.85 at T2 and T3, respectively.

Extreme peer orientation.

The Extreme Peer Orientation questionnaire (7 items) was used to measure tendencies to fit in with peers at the expense of important developmental and diabetes-specific tasks (Drew et al., 2010; Fuligni & Eccles, 1993). The items were back-translated to Dutch using the translation/back-translation procedure (Chapman & Carter, 1979) and were answered on a four-point Likert-type scale, ranging from 'almost never' (1) to 'almost always' (4). A sample item reads: 'Would you ignore your diabetes management needs in order to make someone like you?'. Cronbach's alpha was 0.71 at T1, 0.73 at T2, and 0.72 at T3, respectively.

Parenting.

Patients reported on three parenting dimensions of both mother and father. Parental responsiveness was assessed with the parental responsiveness scale (7 items) from the Child Report of Parent Behavior Inventory (Schaefer, 1965). A sample item reads: 'My mother/father makes me feel better after discussing my worries with her/him'. Cronbach's alpha for mother and father was 0.89 and 0.91 at T1, 0.90 and 0.92 at T2, and 0.91 and 0.92 at T3, respectively. The Psychological Control Scale – Youth Self Report (8 items) was used to assess psychological control (Barber, 1996). A sample item reads: 'My mother/father will avoid looking at me when I have disappointed her/him'. Cronbach's alpha, for mother and father was 0.78 and 0.78 at T1, 0.80 and 0.79 at T2, and 0.83 and 0.83 at T3, respectively. These two questionnaires were translated into Dutch by Soenens, Vansteenkiste, Luyckx, and Goossens (2006), according to the guidelines of the International Test Commision (Hambleton, 1994). Finally, parental overprotection was measured with eight items from the Dutch Multidimensional Overprotective Parenting Scale (Brenning et al., 2017) and one item from the Egna Minnen Beträffande Uppfostran instrument (EMBU; Gerlsma, Arrindell, van der Veen, & Emmelkamp, 1991). A sample item reads: 'My mother/father is overanxious'. Cronbach's alpha, for mother and father was 0.85 and 0.84 at T1, 0.88 and 0.86 at T2, and 0.90 and 0.87 at T3, respectively. All items were answered on a five-point Likert scale, ranging from 'strongly disagree' (1) to 'strongly agree' (5). To reduce the number of

variables in the statistical models, the scores for mother and father were averaged for the present analyses. Correlations at baseline between mother and father parenting were 0.57, 0.66, and 0.65, for responsiveness, psychological control, and overprotection, respectively.

Statistical analyses.

To assess directionality of effects, cross-lagged analysis from a structural equation modelling approach with manifest variables was used. Rather than working with indicators, item scores were averaged to compute the variable scale scores, as the structural equation models would otherwise become under-identified (Kline, 2015). Person-level scale scores were only computed if at least 80% of the scale's items were completed. Means and standard deviations can be found in Table 2. Zero-order Pearson correlations among the scale scores can be found in Tables 3 and 4. In all models, age and illness duration at baseline, gender, and type of insulin administration were controlled for. To test the predictions at the between- and within-person levels, CLPM and RI-CLPM were used, respectively. In the CLPMs, all within-time associations, cross-lagged paths, autoregressive/stability paths, and paths from the control variables to the main study variables were estimated. In the RI-CLPMs, repeated measures of the main study variables served as indicators for the trait-like individual components. These components can be interpreted similarly to the random-intercept parameters in multilevel regression analysis. For each observed scale score at one time point, the variance that remains after accounting for this latent trait-like component and the overall group mean can be interpreted as the individual's deviation from their expected scores at that time point (Hamaker et al., 2015), in short referred to as the within-person component. All within-time associations, cross-lagged paths, autoregressive/stability paths between adjacent time points, and paths from the control variables to the within-person components were included.

For both RI-CLPM and CLPM, four separate models were analyzed to keep the ratio of freely estimated parameters to cases acceptable (Kline, 2015). Each model included peer support, extreme peer orientation, parental responsiveness, psychological control, overprotection, and one of four illness identity dimensions. The models were estimated using robust maximum likelihood estimation to account for non-normality in the data. Standard model fit indices were used to evaluate model fit, whereby

RMSEA should be below 0.08, SRMR should be below 0.09, CFI should exceed 0.90, and the χ^2-value divided by its degrees of freedom was also computed, for which values below 2 indicate good model fit (Kline, 2015).

For each of the classical cross-lagged panel models, the following model comparisons were made. First, it was investigated whether paths could be fixed over time. Therefore, a model in which identical cross-lagged paths were allowed to differ over time was compared with a model in which these paths were fixed over time. For instance, in the model with fixed cross-lagged paths, the path from overprotection at T1 toward engulfment at T2 was fixed as equal to the path from overprotection at T2 toward engulfment at T3. Second, multi-group analyses were performed to investigate whether gender and age at baseline (dummy coded as 0 = adolescents/14-17 years; 1 = emerging adults/18-25 years) moderated the cross-lagged path estimates. To assess whether the model with paths allowed to differ between groups had a significantly better fit to the data than the model with fixed paths, comparative fit indices were checked. A significant Yuan-Bentler scaled $\Delta\chi^2$ ($p < .05$), ΔRMSEA exceeding 0.015, and ΔCFI exceeding 0.010 in favor of the free model would indicate a significantly better fit of the free model over the fixed one. As the baseline RI-CLPM already involves more parameters than the CLPM, it was a priori decided to fix cross-lagged paths over time and to not explore moderation by gender and age. In doing so, the ratio of cases to freely estimated parameters in the RI-CLPM was kept reasonable (Adachi & Willoughby, 2015; Kline, 2015).

The authors expected the following paths to be statistically significant, possibly both at the between- and within-person levels. First, parental responsiveness and peer support were expected to positively predict acceptance and enrichment, and negatively rejection and engulfment. Second, psychological control was expected to positively predict rejection. Third, overprotection was expected to positively predict engulfment. Fourth, extreme peer orientation was expected to positively predict rejection, and rejection, in turn, was expected to positively predict extreme peer orientation. Finally, acceptance and enrichment were expected to negatively predict extreme peer orientation. The statistical tests for these paths could thus be considered confirmatory. All the other paths in the model were either exploratory, or not the primary focus of interest for the present paper (e.g., all paths among parenting

variables, paths between peer and parenting variables, and paths from the control variables to the main study variables). All analyses were conducted in R 3.5.0 and the R package 'lavaan' 0.6-3 (Rosseel, 2012).

Results

Classical Cross-Lagged Panel Model Analyses

All CLPMs had excellent fit to the data (Table 5). As fixing cross-lagged coefficients from T1 to T2 as equal to coefficients from T2 to T3 did not significantly worsen model fit, the more parsimonious models were favored in which cross-lagged coefficients were fixed over time (Table 5). Stability or autoregressive paths can be found in Table 6. In all models, parental responsiveness negatively predicted psychological control, overprotection positively predicted psychological control, and extreme peer orientation negatively predicted overprotection. In addition, in the rejection model (Figure 1, rejection), rejection negatively predicted peer support, and positively predicted psychological control and extreme peer orientation. In the acceptance model (Figure 1, acceptance), acceptance positively predicted peer support and negatively extreme peer orientation. In the engulfment model (Figure 1, engulfment), extreme peer orientation, negatively predicted parental responsiveness. Engulfment was positively predicted by overprotection. In the enrichment model (Figure 1, enrichment), enrichment negatively predicted psychological control. Extreme peer orientation negatively predicted parental responsiveness.

In each of the four models, multi-group analyses for gender and age were performed (Table 5). With respect to gender, fixing cross-lagged estimates to be equal between boys and girls did not significantly worsen the models' fit as compared to the less parsimonious models that allowed cross-lagged paths to vary between the two genders. This finding indicates that gender did not moderate any of the cross-lagged paths. With respect to age groups, no evidence was found for a moderation by age. Thus, it was concluded that neither gender nor age moderated cross-lagged paths in any of the models.

Random Intercept Cross-Lagged Panel Analyses

All RI-CLPMs had excellent fit to the data. Rejection: [χ^2 (72) = 76.707; p = .330; χ^2/df = 1.065; RMSEA = .011, CI[0,.027]; SRMR = .027; CFI = .999], Acceptance: [χ^2 (72) = 63.268; p = .759; χ^2/df = .879; RMSEA = 0, CI[0,.017]; SRMR = .024; CFI = 1], Engulfment: [χ^2 (72) = 63.862; p = .742; χ^2/df = .887;

RMSEA = 0, CI[0,.018]; SRMR = .025; CFI = 1], and Enrichment: [χ^2 (72) = 57.015; p = .902; χ^2/df = .792; RMSEA = 0, CI[0,.010]; SRMR = .024; CFI = 1]. Stability or autoregressive paths can be found in Table 5. In all models, extreme peer orientation negatively predicted overprotection (Figure 2). In the rejection (Figure 2, rejection) and engulfment (Figure 2, engulfment) models psychological control positively predicted extreme peer orientation. With respect to paths involving illness identity, overprotection positively predicted rejection (Figure 2, rejection), and acceptance negatively predicted extreme peer orientation (Figure 2, acceptance). Further, extreme peer orientation negatively predicted engulfment, and overprotection positively predicted engulfment (Figure 2, engulfment).

Discussion

Youth with type 1 diabetes are confronted with the challenging task of integrating diabetes into their identity (Silverstein et al., 2005). The way in which an illness becomes part of one's identity has been referred to as illness identity (Charmaz, 1987). Previous literature acknowledged the importance of illness identity for physical and mental well-being. Hence, individual differences in the way that type 1 diabetes is, or becomes, part of one's identity have been acknowledged as being important for daily functioning and adaptation (Commissariat et al., 2016). In the present study it was investigated whether illness identity was predicted by perceptions of the parent and peer contexts. Hence, classical cross-lagged panel modeling was conducted to test predictions about changes in the between-person rank-order over time. Random intercept cross-lagged panel modeling was conducted to test predictions about within-person changes over time. Although many bi-directional relations among variables were tested, the focus in the discussion is on the paths involving illness identity.

Parent and Peer Variables Predicting Illness Identity

To begin with, the paths from the social context to illness identity are discussed. First, in line with expectations, parental overprotection was found to positively predict engulfment, both between- and within-persons. Thus, youth who perceived parents as more overprotective relative to their peers, were at risk to experience more engulfment later on, again relative to their peers. Moreover, our results suggest that experiencing more overprotective parenting leads to feelings of being engulfed by type 1 diabetes within-persons. The anxious component of overprotective parenting may contaminate youth's own

confidence in managing diabetes independently, thereby affecting their skills to self-regulate their diabetes (Wiebe et al., 2016). When parental involvement starts to decline from adolescence onward, youth with overprotective parents may thus experience more difficulties when having to deal with their diabetes increasingly on their own, and, as a consequence, experience more engulfment. Parents' own engulfment may play a role as well. When parents feel overwhelmed by the challenge that comes with their child's diabetes, they may resort to a more overprotective rearing style. At the same time, children may adopt their parents' feelings of engulfment (Prikken et al., 2019).

Another explanation for the obtained findings may be that poor illness management leads to both feelings of engulfment and overprotective parenting. However, in the present sample, it was found that neither treatment adherence nor glycemic control were related to overprotective parenting (Prikken et al., 2019). Further, in the present sample, engulfment was unrelated to treatment adherence and glycemic control (Oris et al., 2016). These findings seem to contradict the alternative explanation. Nevertheless, future research could test whether poor illness management (partially) explains the relationship between engulfment and overprotective parenting.

Second, although this was not explicitly expected, extreme peer orientation was found to negatively predict engulfment at the within-person level. Extreme peer orientation is characterized by an excessive desire for peer acceptance at the expense of managing one's diabetes (Drew et al., 2010). Youth who are extremely oriented toward peers may thus perceive diabetes as a barrier to engage in activities with peers and therefore start neglecting their diabetes. Such a mindset seems incompatible with the most defining aspect of engulfment, being the experience that one's illness dominates all aspects of identity and life (Morea et al., 2008). Thus, being oriented toward the peer context may make youth experience less engulfment. Engulfment, in turn, was found to negatively predict extreme peer orientation, suggesting that the relationship between engulfment and extreme peer orientation goes in both directions. Bearing in mind that these paths were exploratory, future research is needed to assess the robustness of the relationship. No such bi-directional association was found at the between-person level, suggesting that the relative rank-order of engulfment levels cannot be predicted by earlier levels of extreme peer orientation, and vice versa, in this age group.

Third, except for the path from overprotection to engulfment, none of the other hypothesized paths from the social context to illness identity were confirmed. Thus, in contrast to what was expected, it cannot be concluded that responsive parenting and peer relationships foster adaptive illness integration or buffer maladaptive integration. Moreover, neither extreme peer orientation, nor psychological control predicted rejection. A possible explanation for this lack of associations may be that illness identity was studied from the age of 14 years onwards. One's illness identity may have developed already during earlier life stages. During childhood, parents take care of diabetes management, more so than patients themselves (Wysocki et al., 1996). During these daily diabetes-related interactions with their child, parents may impact their children's illness-related mental representations, cognitions, and emotions to a greater degree (Leventhal et al., 1999; Wiebe et al., 2018). However, over the course of mid- to late adolescence, parental involvement declines as patients manage their diabetes increasingly on their own (Palmer et al., 2009). In the present sample of adolescents and emerging adults, the potential impact of social-contextual variables on illness identity may therefore be less than expected. Thus, future research should investigate antecedents of illness identity during earlier life stages.

Illness Identity Predicting Peer Variables

With respect to illness identity predicting parent and peer variables, first, extreme peer orientation was found to be positively predicted by rejection and negatively by acceptance at the between-person level. The path from acceptance to extreme peer orientation was found at the within-person level as well. These findings were in line with expectations. Thus, adaptively integrating diabetes into one's identity may make it easier for youth to engage in a healthy manner with their peers. The data thus support the hypothesis that youth do not have the urge to hide or neglect diabetes in the presence of peers in case that diabetes becomes part of one's identity. For the same reason, it was expected that enrichment would negatively predict extreme peer orientation as well. This path, however, was not significant. Accepting diabetes may be a more fundamental and important step in the illness integration process than feeling enriched by diabetes. Future research should further investigate the possible added value of enrichment on top of accepting type 1 diabetes.

Second, at the between-person level, acceptance was found to positively predict peer support, whereas rejection negatively predicted peer support. Thus, youth with relatively high levels of adaptive illness integration experience more peer support the following years compared to youth with less adaptive illness integration. Accepting diabetes as part of one's sense of self may thus prepare youth to engage in healthy relationships with friends, an important developmental asset during adolescence and emerging adulthood (Hartup & Stevens, 1999). Being able to rely on supportive relationships with friends is an important social-regulation skill from which diabetes management may benefit (Wiebe et al., 2018). The present results thus suggest the importance of adaptively integrating diabetes into one's identity to foster adaptive peer relationships and avoid that patients become extremely oriented toward the peer context at the expense of managing one's diabetes. Difficulties to adaptively integrate diabetes as part of one's sense of self possibly interferes with the formation of a coherent identity. Similar to the female patient in the qualitative case study by Tilden et al. (2005), being confused about one's identity may make youth feel alienated from their social surroundings (Charmaz, 1987). Future longitudinal studies should examine whether failure to adaptively integrate diabetes into one's identity indeed plays into identity confusion.

Illness Identity Predicting Perceived Parenting

Illness identity was also predictive of perceived parenting dimensions. At the between-person level, rejection positively predicted psychological control, and enrichment negatively predicted psychological control. No paths from illness identity to perceived parenting were found at the within-person level. Patients who reject their diabetes thus seem at risk to experience their parents as more controlling and manipulative later on, whereas feeling enriched by diabetes possibly protects against the perception of such intrusive parenting. Despite that psychological control has been found to negatively impact diabetes management, some parents may resort to psychological control in an attempt to shape their child's thoughts and behaviors surrounding diabetes management when their child rejects diabetes (Butler et al., 2007). However, to obtain a clearer picture of the underlying mechanisms, future research should include parent reports and explore the role of possible mediators intervening in these relations.

In light of a recent review by Meeus (2016), it may not be surprising that patients' illness identity was found as a driving force for perceived relationships with peers and parents during adolescence and emerging adulthood. Meeus (2016) summarized findings of different longitudinal studies testing the directionality of effects linking social-contextual variables and psychosocial functioning in youth. He concluded that mainly adolescent psychosocial functioning predicted the quantity and quality of relationships with parents and peers later on, an effect which was replicated several times in different countries. However, evidence for peer and parental relationships as driving forces for psychosocial development during adolescence was less consistent. Thus, in line with the developmental model outlined by Berg et al. (2017), the present findings emphasize the importance of investigating development in youth with type 1 diabetes in a transactional manner. The importance of such an approach is further emphasized by the finding that illness identity was found to be an important driving mechanism for peer and parent experiences.

Study limitations

When interpreting the present findings, some study limitations should be taken into account. First, although the cross-lagged design allows to uncover directionality of effects among study variables, no causality can be inferred as variables not accounted for in the models may modulate the prospective relations obtained. Second, ideally, within-person inferences are made with a minimum of four observations per variable per study case to increase certainty around the within-person estimates. The power to detect within-person changes over time is low with only three repeated measures per variable to estimate both the within-person expected variable mean (sometimes referred to as the trait-like individual component) and deviations from that mean (Berry & Willoughby, 2017; Masselink et al., 2018). Therefore, paths of the random-intercept models that were significant at the .1 level were interpreted as well. Before strong conclusions can be drawn, future studies should test these paths in a design with four or more data waves to increase the certainty around these estimates.

Third, the present sample's homogenous nature should be taken into account. Almost all participants had the Belgian nationality and all of them spoke Dutch. Further, most participants were well-educated. These are important factors involved in shaping someone's social context

(Bronfenbrenner, 1986). Thus it is possible that the obtained transactional relations among the study variables differ in both quality and strength from samples with demographic characteristics differing from the present sample. Related to this, Belgian insurance is much cheaper and more straightforward to access compared to the United States. It has been shown that American youth without insurance had increased risks to present with diabetic ketoacidosis when diagnosed with type 1 diabetes (Maniatis et al., 2005). Moreover, during the transition to college, American youth need to figure out what insurance can get them their necessary treatment supplies and prescriptions (Mellinger, 2003). These are factors that may affect illness identity formation. Future research should examine whether the present findings and conclusions can be replicated in other samples as well. Fourth, all study variables were measured through self-reports, possibly confounding the results with shared method variance. Further, future research could include parent and peer reports as well to obtain more objective measures of social-contextual variables and compare these reports with the subjective experience of social contextual variables as measured in the present study.

Fifth, throughout the transition to adulthood, the constellation of the micro-system and one's perception of the micro-system are subject to continuous change. For example, during these life phases, social network size generally increases, family network size remains stable (Wrzus, Hänel, Wagner, & Neyer, 2013), and resistance to peer influence decreases up to the age of fourteen before starting to increase again (Steinberg & Monahan, 2007). These changing constellations may alter how illness identity predicts and is predicted by the parent and peer contexts at different ages. However, the present sample was characterized by a wide age range (14-25 years) at baseline. Future studies could narrow their scope around a smaller age range to investigate transactions among illness identity and the social context within more confined age categories. Sixth, a time interval of one year between measurement waves may have been too long to capture relevant transactions that occur only at the daily or weekly level. Daily diary studies should examine how daily interactions with parents and peers relate to daily fluctuations in illness identity.

Finally, many chronic illnesses share certain characteristics such as the need for treatment adherence, the subjective experience of stigma, and the striving for normalcy (Lambert & Keogh, 2015). Future research should investigate links between the social context and identity in youth with other

chronic illnesses than type 1 diabetes. The obtained findings may have trans-diagnostic value for our understanding of the role parents and peers may play in identity development of youth with a different chronic illness.

Conclusion

Identity formation is a challenging task in the transition to adulthood. When confronted with a chronic condition, such as type 1 diabetes, youth must integrate their illness into their identity. The present three-wave longitudinal study in adolescents and emerging adults with type 1 diabetes is the first study to investigate the role of the social context in the formation of illness identity in a quantitative manner. The cross-lagged approach used to assess directionality of effects revealed some important insights in line with recent socio-ecological theorizing (Berg et al., 2017). The present findings show that overprotective parenting may make youth identify themselves to a large extent in terms of their diabetes. Feeling engulfed by diabetes is associated with ill-being, and is therefore a maladaptive way of illness integration (Oris et al., 2016). Further, when type 1 diabetes becomes adaptively integrated into youth's identity, the data suggest that youth may be better prepared to engage in healthy peer relationships. In sum, the present findings underscore the importance of adaptive illness integration into identity for youth with type 1 diabetes.

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Table 1. Participants' characteristics at baseline (n = 545)

Gender	
Boys	45.5%
Girls	54.5%
Age [a]	18.8 (3.2)
Mean age at diagnosis [a]	11.2 (5.5)
Illness duration [a]	7.6 (5.0)
Insulin administration	
Injection	78.5%
Pump	20.9%
Civil status (more than 1 option)	
Living with parents	72.5%
Living with partner/(re)married	7.4%
Relationship (living separately)	23.3%
Living alone	12.3%
Work	
Student	74.9%
Working	20.4%
Unemployed	4.2%
Education	
University or college	20.0%
General secondary education	33.4%
Technical or vocational education	35.4%
Primary education	5.7%
Unqualified	2.6%

[a] Mean value with standard deviation between brackets

Table 2. Means and standard deviations (between brackets) of the study variables

Variables	Time 1	Time 2	Time 3
1. Peer support	3.08 (.56)	3.09 (.56)	3.07 (.56)
2. Extreme peer orientation	1.42 (.39)	1.37 (.35)	1.36 (.36)
3. Parental Responsiveness	3.88 (.77)	3.86 (.76)	3.89 (.77)
4. Psychological control	2.11 (.68)	2.14 (.69)	2.14 (.73)
5. Overprotection	2.65 (.79)	2.58 (.84)	2.58 (.86)
6. Rejection	2.26 (.99)	2.22 (.96)	2.04 (.93)
7. Acceptance	3.91 (.86)	3.92 (.84)	4.06 (.80)
8. Engulfment	2.19 (.87)	2.13 (.81)	2.21 (.84)
9. Enrichment	2.90 (.94)	2.95 (.92)	2.89 (.92)

Table 3. Within-time correlations among study variables at Times 1, 2, and 3

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Peer support	--	-.18***/-.15** -.18***	.25***/.32*** .32***	-.15***/-.17*** -.21***	-.10*/-.12* -.12*	-.27***/-.24*** -.26***	.22***/.21*** .21***	-.25***/-.15** -.12*	.20***/.18*** .16**
2. Extreme peer orientation		--	-.19***/-.24*** -.26***	.35***/.26*** .36***	.24***/.15** .15**	.40***/.39*** .32***	-.35***/-.28*** -.30***	.32***/.21*** .20***	-.20***/-.15** -.10*
3. Parental Responsiveness			--	-.40***/-.48*** -.48***	.02/-.01 -.01	-.18***/-.23*** -.25***	.18***/.26*** .20***	-.13**/-.20*** -.22***	.27***/.29*** .21***
4. Psychological control				--	.42***/.39*** .49***	.30***/.21*** .30***	-.20***/-.15** -.20***	.29***/.21*** .24***	-.04/-.10* -.08
5. Overprotection					--	.23***/.11* .21***	-.14**/-.04 -.12*	.26***/.18*** .23***	.04/.03 .03
6. Rejection						--	-.63***/-.67*** -.66***	.49***/.40*** .46***	-.33***/-.37*** -.29***
7. Acceptance							--	-.56***/-.46*** -.43***	.37***/.37*** .32***
8. Engulfment								--	-.09*/-.03 .06
9. Enrichment									--

Note. Coefficients are respectively for Time 1, 2, and 3.
*p < .05, **p < .01, ***p < .001

Table 4. Between-time correlations among study variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Peer support	.58***/.49*** .64***	-.14**/-.18*** -.16**	.26***/.22*** .29***	-.11*/-.16** -.19***	-.11*/-.17** -.12*	-.14**/-.14** -.21***	.09/.09 .13*	-.10/-.11* -.13*	.09/.09 .12*
2. Extreme peer orientation	-.20***/-.14** -.12*	.55***/.57*** .63***	-.21***/-.22*** -.24***	.15**/.26*** .20***	.05/.15** .11*	.35***/.26*** .32***	-.21***/-.21*** -.20***	.14**/.12* .16**	-.11*/-.10* -.12*
3. Parental Responsiveness	.23***/.25*** .30***	-.21***/-.17** -.18**	.75***/.73*** .80***	-.37***/-.42*** -.43***	-.02/-.02 -.03	-.09/-.07 -.21***	.14**/.11* .21***	-.11*/-.17** -.21***	.24***/.22*** .25***
4. Psychological control	-.19***/-.21*** -.19**	.22***/.24*** .22***	-.38***/-.42*** -.43***	.57***/.61*** .67***	.32***/.30*** .34***	.23***/.19*** .23***	-.12*/-.13* -.17**	.18***/.18*** .23***	.00/-.02 -.09
5. Overprotection	-.16**/-.15** -.10	.15**/.12* .13*	-.06/-.06 -.04	.34***/.39*** .35***	.69***/.64*** .70***	.16**/.13* .16**	-.08/-.04 -.08	.17**/.10 .22***	.07/.10 .08
6. Rejection	-.23***/-.25*** -.25***	.37***/.38*** .30***	-.23***/-.27*** -.22***	.23***/.32*** .26***	.16**/.19*** .13*	.72***/.65*** .76***	-.51***/-.55*** -.59***	.37***/.30*** .33***	-.26***/-.24*** -.26***
7. Acceptance	.18***/.23*** .20***	-.28***/-.26*** -.22***	.25***/.21*** .19***	-.18***/-.19*** -.15**	-.06/-.11* -.06	-.54***/-.53*** -.58***	.67***/.62*** .70***	-.36***/-.34*** -.33***	.25***/.26*** .30***
8. Engulfment	-.19***/-.17** -.08	.22***/.31*** .19***	-.12*/-.17** -.18**	.21***/.27*** .24***	.11*/.19*** .19***	.37***/.38*** .41***	-.37***/-.34*** -.40***	.66***/.58*** .75***	.00/.04 .02
9. Enrichment	.17***/.14** .19***	-.16**/-.15** -.10	.23***/.18*** .24*	-.11*/-.13* -.14	.01/-.04 -.02	-.29***/-.25*** -.32***	.28***/.29*** .34***	.01/.00 .01	.68***/.66*** .74***

Note. Coefficients are respectively for correlations between time 1 and 2, time 1 and 3, and time 2 and 3.
*$p < .05$, **$p < .01$, ***$p < .001$

Table 5. Model fit indices for cross-lagged panel model comparisons for time, age at baseline, and gender

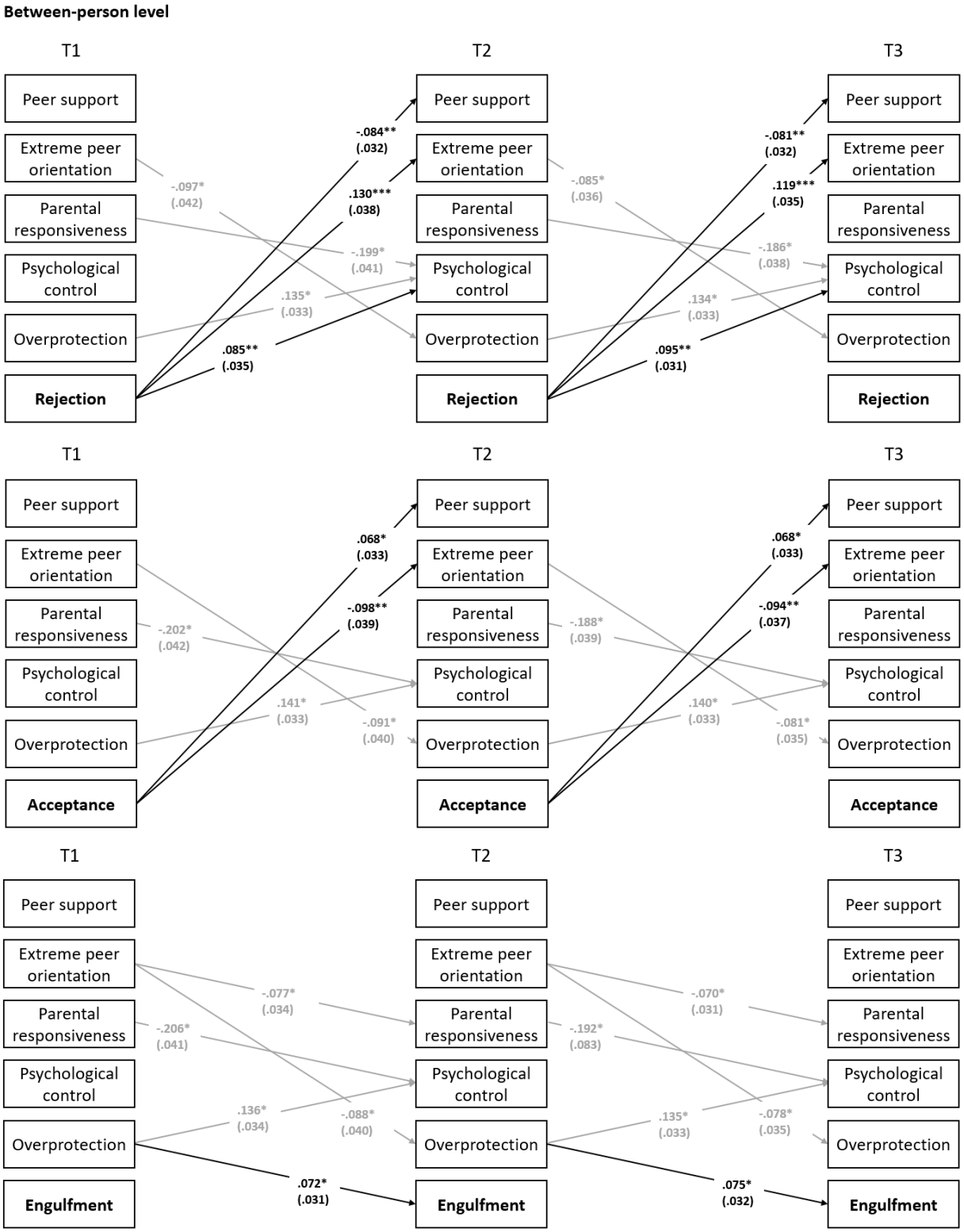
	χ^2 (df)	$\Delta\chi^2$ (df)	p-value	χ^2/df	RMSEA	(Δ)RMSEA	SRMR	CFI	ΔCFI
Time									
Rejection									
Free	35.28 (30)	/	.232	1.176	.018	/	.011	.998	/
Fixed	55.102 (60)	/	.655	.918	0	/	.015	1	/
Comparison	/	19.94 (30)	.918	/	/	.018	/	/	-.002
Acceptance									
Free	40.73 (30)	/	.091	1.358	.026	/	.012	.996	/
Fixed	53.36 (60)	/	.715	.889	0	/	.015	1	/
Comparison	/	12.77 (30)	.997	/	/	.026	/	/	-.004
Engulfment									
Free	40.53 (30)	/	.095	1.351	.025	/	.012	.996	/
Fixed	61.64 (60)	/	.417	1.027	.007	/	.017	.999	/
Comparison	/	21.44 (30)	.874	/	/	.018	/	/	-.003
Enrichment									
Free	32.44 (30)	/	.348	1.081	.012	/	.011	.999	/
Fixed	45.37 (60)	/	.919	.756	0	/	.014	1	/
Comparison	/	12.78 (30)	.997	/	/	.012	/	/	<.001
Multi-group Age									
Rejection									
Free	141.16 (120)	/	.091	1.177	.026	/	.028	.993	/
Fixed	171.74 (150)	/	.108	1.145	.023	/	.038	.993	/
Comparison	/	31.39 (30)	.397	/		.002	/	/	<.001
Acceptance									
Free	108.43 (120)	/	.767	.904	0	/	.027	1	/
Fixed	146.41 (150)	/	.568	.976	0	/	.042	1	/
Comparison	/	37.98 (30)	.150	/	/	0	/	/	0
Engulfment									
Free	119.96 (120)	/	.484	1	0	/	.028	1	/
Fixed	149.52 (150)	/	.496	.997	0	/	.040	1	/
Comparison	/	29.50 (30)	.491	/	/	0	/	/	0
Enrichment									
Free	102.72 (120)	/	.871	.856	0	/	.026	1	/
Fixed	139.92 (150)	/	.711	.933	0	/	.039	1	/
Comparison	/	37.2 (30)	.171	/	/	0	/	/	0
Multi-group Gender									
Rejection									
Free	121.39 (120)	/	.447	1.012	.007	/	.023	1	/
Fixed	154.41 (150)	/	.386	1.029	.010	/	.032	.999	/
Comparison	/	33.18 (30)	.315	/	/	-.004	/	/	<.001
Acceptance									
Free	121.49 (120)	/	.445	1.012	.007	/	.024	1	/
Fixed	146.82 (150)	/	.558	.979	0	/	.031	1	/
Comparison	/	25.37 (30)	.707	/	/	.007	/	/	<.001
Engulfment									
Free	126.93 (120)	/	.315	1.058	.015	/	.027	.998	/
Fixed	152.25 (150)	/	.433	1.015	.007	/	.033	.999	/
Comparison	/	25.32 (30)	.709	/	/	.007	/	/	-.002
Enrichment									
Free	114.78 (120)	/	.617	.957	0	/	.024	1	/
Fixed	147.64 (150)	/	.539	.984	0	/	.033	1	/
Comparison	/	32.94 (30)	.325	/	/	0	/	/	0

Table 6. Stability paths of the (random intercept) cross-lagged panel models.

Variable	Time 1-2	Time 1-3	Time 2-3
Model: Rejection			
1. Peer support	.527***/.285*	.147*/--	.484***/.366**
2. Extreme peer orientation	.505***/-.181	.266***/--	.483***/.070
3. Parental Responsiveness	.722***/.134	.313***/--	.518***/.257
4. Psychological control	.433***/.037	.279***/--	.362***/.258*
5. Overprotection	.673***/.284*	.249***/--	.518***/.371***
6. Rejection	.676***/.390*	.166**/--	.616***/.519***
Model: Acceptance			
1. Peer support	.530***/.316*	.149*/--	.486***/.388**
2. Extreme peer orientation	.521***/-.240	.275***/--	.458***/.099
3. Parental Responsiveness	.723***/.135	.299***/--	.531***/.270
4. Psychological control	.441***/.033	.279***/--	.368***/.251
5. Overprotection	.677***/.270*	.254***/--	.525***/.345**
6. Acceptance	.658***/.230	.268***/--	.532***/.285
Model: Engulfment			
1. Peer support	.538***/.351**	.143*/--	.496***/.433***
2. Extreme peer orientation	.573***/.011	.277***/--	.473***/.118
3. Parental Responsiveness	.730***/.133	.298***/--	.537***/.261
4. Psychological control	.437***/.041	.283***/--	.362***/.254*
5. Overprotection	.680***/.270*	.260***/--	.512***/.335*
6. Engulfment	.669***/.187	.164**/--	.637***/.362***
Model: Enrichment			
1. Peer support	.534***/.290*	.150*/--	.489***/.373**
2. Extreme peer orientation	.540***/-.128	.280***/--	.474***/.117
3. Parental Responsiveness	.723***/.107	.296***/--	.535***/.252
4. Psychological control	.453***/.044	.293***/--	.368***/.256*
5. Overprotection	.680***/.287*	.246***/--	.526***/.358***
6. Enrichment	.667***/.098	.279***/--	.545***/.235

Note. Coefficients are respectively for classical CLPMs and random intercept CLPMs. To make the models identified, no stability paths from time 1 to 3 were estimated for the random intercept CLPMs.
*$p < .05$, **$p < .01$, ***$p < .001$

Figures


Between-person level
T1
T2
T3
Peer support
Extreme peer orientation
Parental responsiveness
Psychological control
Overprotection
Rejection
Acceptance
Engulfment
-.084** (.032)
.130*** (.038)
-.097* (.042)
-.199* (.041)
.135* (.033)
.085** (.035)
-.085* (.036)
-.081** (.032)
.119*** (.035)
-.186* (.038)
.134* (.033)
.095** (.031)
.068* (.033)
-.098** (.039)
-.202* (.042)
-.091* (.040)
.141* (.033)
-.188* (.039)
-.094** (.037)
-.081* (.035)
.140* (.033)
-.077* (.034)
-.206* (.041)
.136* (.034)
-.088* (.040)
.072* (.031)
-.070* (.031)
-.192* (.083)
-.078* (.035)
.135* (.033)
.075* (.032)

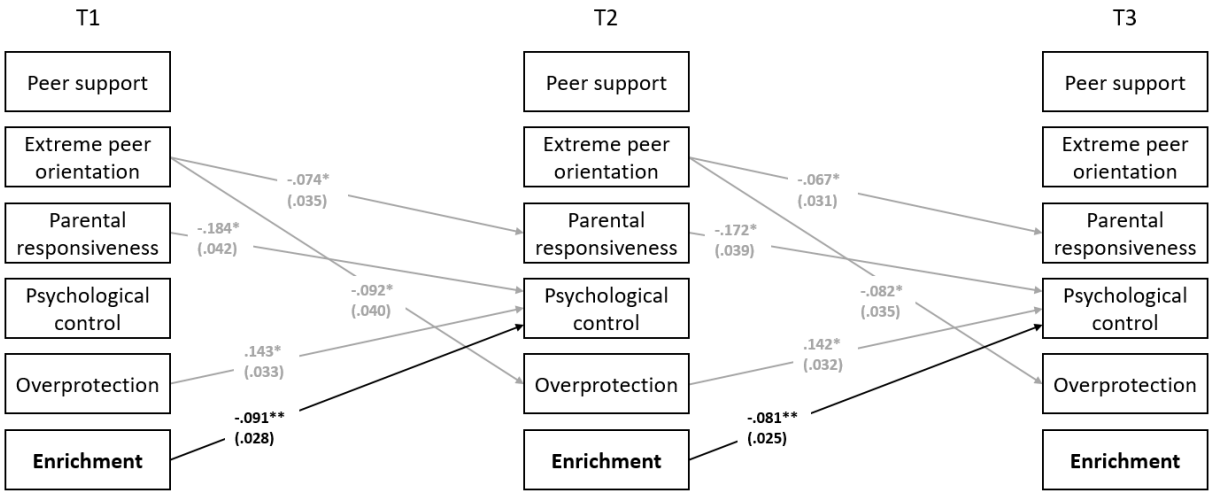
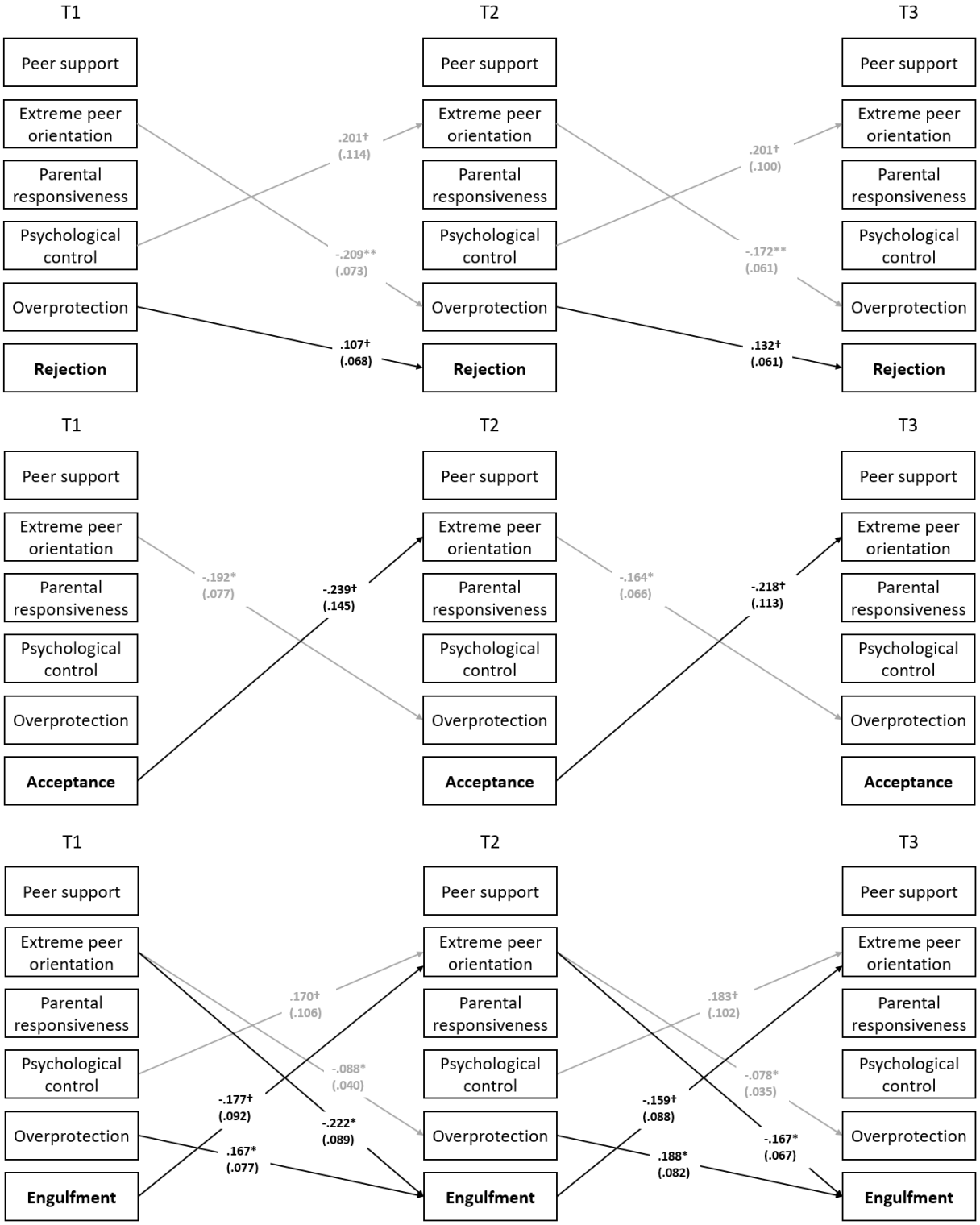


Fig. 1 Classical cross-lagged panel models linking peer support, extreme peer orientation, parental responsiveness, psychological control, and overprotection, with rejection, acceptance, engulfment, and enrichment over time. For reasons of clarity, stability paths, within-time associations and paths from the control variables (gender, age, illness duration, type of insulin administration) are not presented in the figure. Paths not involving illness identity are in grey, as they are not the focus of the present manuscript. Stability paths can be found in Table 6. All coefficients are standardized. The standard errors are presented between brackets below the standardized coefficients.

$*p < .05$, $**p < .01$, $***p < .001$

Within-person level



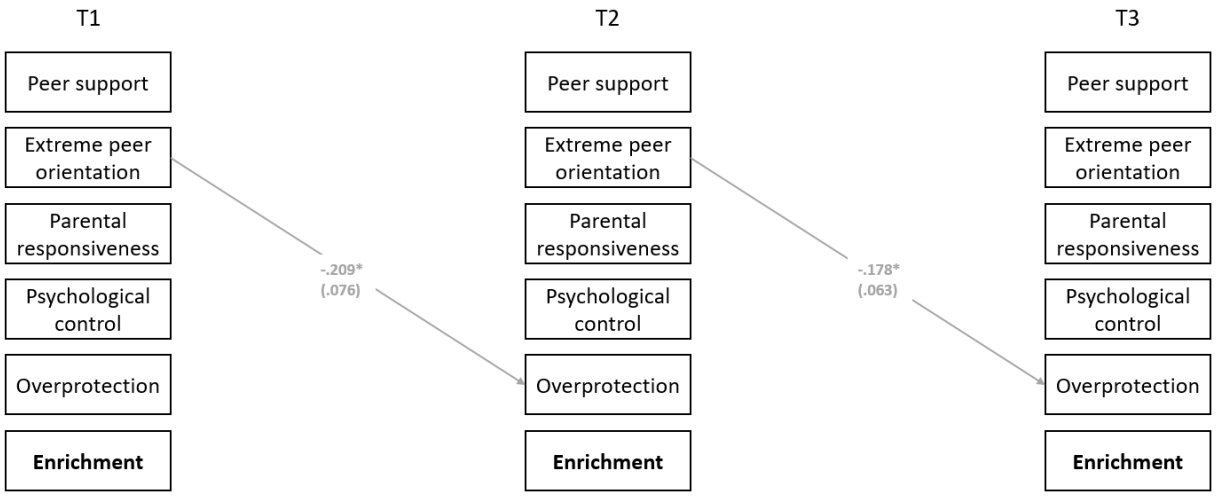


Fig. 2 Random intercept cross-lagged panel models linking peer support, extreme peer orientation, parental responsiveness, psychological control, and overprotection, with rejection, acceptance, engulfment, and enrichment over time. For reasons of clarity, stability paths, within-time associations, paths from the control variables (gender, age, illness duration, type of insulin administration), and the between-person associations are not presented in the figure. Paths not involving illness identity are in grey, as they are not the focus of the present manuscript. Stability paths can be found in Table 6. All coefficients are standardized. The standard errors are presented between brackets below the standardized coefficients.

*†p < .1 *p < .05, **p < .01, ***p < .001*

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Authors' Contributions

K.R. wrote the manuscript, performed the statistical analyses, and helped in coordinating the study; K.L. helped in performing the statistical analyses, contributed to the write-up of the manuscript and reviewed/edited the manuscript; L.O., and S.P., helped in coordinating the study and reviewed/edited the manuscript; I.W. helped coordinating the study; J.V., E.G., and P.M. reviewed/edited the manuscript. All authors read and approved the final manuscript.

Data Sharing Declaration

The datasets generated and/or analyzed during the current study are not publicly available but are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors have no relevant conflict of interest to disclose.

Compliance with Ethical Standards

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Ethical Approval

Ethical approval was provided by the Medical Ethics Committee and Social and Societal Ethics Committee of KU Leuven.

Informed consent

All participants were sent questionnaire bundles and informed consent forms, including a detailed briefing of the study purpose and content. All participants included in the analyses gave written consent. Parents provided written consent for youth below 18 years of age.