Identity dynamics and peer relationship quality in adolescents with a chronic disease: The sample case of congenital heart disease

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ABSTRACT

***Objective**:* Identity formation has been found to relate to psychosocial and disease-specific functioning in chronically ill adolescents. Therefore, examining antecedent factors of identity formation in this population is needed. The main goal of the present longitudinal study was to examine how peer relationship quality influenced identity formation in adolescents with congenital heart disease (CHD).

***Method**:* Adolescents with CHD were selected from the database of pediatric and congenital cardiology of the University Hospitals Leuven. A total of 429 adolescents (14-18 years) with CHD participated at Time 1; 401 were matched on gender and age with community controls recruited at secondary schools. Adolescents completed questionnaires on identity and peer relationship quality. Nine months later, at Time 2, 382 patients again completed these questionnaires.

Results: Adolescents with CHD were generally found to be as competent as controls in addressing the task of identity formation. Moreover, the importance of peer relationships for identity formation was demonstrated. Supportive peer relationships positively influenced the process of identifying with the identity commitments made. Furthermore, such relationships protected adolescents from getting stuck in the exploration process. Finally, reciprocal pathways were uncovered: a maladaptive exploration process was also found to negatively affect peer relationships.

Conclusion: The present study found peer relationship quality to be an important antecedent factor of identity formation in adolescents with CHD. Future research should investigate how changes in peer relationships and identity relate to well-being in these patients.

Index terms: heart defects, congenital; identity; peers; adolescence; longitudinal.

INTRODUCTION

An important developmental task for late adolescents is personal identity formation [1]. One of the first empirical identity models was Marcia's paradigm [2], in which two identity dimensions were distinguished. Exploration refers to the weighing of different identity alternatives; commitment refers to making identity-related choices. The study of identity in adolescents with chronic diseases remains a neglected area of research. The extent to which these adolescents succeed in addressing the identity task could, however, generate important information for tailoring individualized transitional care efforts, aimed at preparing patients to make the transfer from pediatric to adult health care. Recent research demonstrated the value of assessing identity in adolescents with a chronic disease in the transition to adulthood [3,4]. Consequently, it is important to examine antecedent factors that influence identity formation. Despite the fact that peers are hypothesized to play a considerable role [5,6], peer relationships have not gained much attention. Hence, the present study examined prospective associations between peer relationship quality and identity formation in adolescents with congenital heart disease (CHD). CHD, compromising a wide spectrum of simple, moderate, and complex structural heart lesions, is the most common birth defect (9:1000 births) [7]. Over the past decades, life expectancy has increased substantially [8]. However, some patients are struggling with the many medical, psychosocial, and behavioral challenges on the road to adulthood. As a result, studies are increasingly focusing on quality of life and psychological functioning [9].

Identity Formation and Peer Relationships in Adolescence

Based on Erikson [1] and Marcia [2], Luyckx and colleagues have proposed an identity model that includes both the formation and the evaluation of identity commitments [10]. Commitment formation may be described in terms of two processes: exploration in breadth of alternatives and commitment making, which correspond to Marcia's dimensions of exploration and commitment. Commitment evaluation comprises two new processes, that is, exploration in depth and identification with commitment. Exploration in depth refers to the gathering of information about current commitments to evaluate them. Identification with commitment represents the extent to which one feels certain about and identifies with current commitments. More recently, a fifth dimension was defined, that is, ruminative exploration, typical of individuals who keep on postponing identity-related decisions and get stuck in worrying about alternatives [10].

In community samples, identification with commitment was positively related and ruminative exploration was negatively related to well-being [10]. In emerging adults with Type 1 diabetes, these identity dimensions were differentially related to diabetes-related problems and coping [4]. Similarly, differential relationships were reported between the way adolescents with CHD addressed identity issues and depressive symptoms, loneliness, quality of life, and treatment anxiety [3]. In sum, developing a strong identity could function as an internal resource to tackle some of the challenges accompanying chronic disease.

A potentially important antecedent of patients' identity development is the quality of their peer relationships, as the importance of the peer group steadily increases through adolescence [11]. Although Erikson [1] already pointed out the importance of peers for identity formation, few studies have examined these associations. However, peer relationship quality has been found to be more strongly related to identity formation than parent-adolescent relationships [6]. Because identity development requires adolescents to shape their lives in a way that fits their own goals and values, relationships which rely on adolescents' autonomy, such as peer relationships [12], could indeed have a greater impact than relationships characterized by asymmetry (e.g., relationships with parents) [6]

The Present Study

The aims of the present longitudinal study were twofold. First, similarities and differences in peer relationship quality and identity were compared between adolescents with CHD and community adolescents. Group differences in identity dimensions were expected to be small and, if any, to be mainly situated at the level of identity exploration [4], possibly because patients feel restricted with respect to future possibilities and perceive fewer opportunities to explore because of illness constraints. We expected patients and controls to score similarly on peer relationship quality because patients are generally found to report favorable social outcomes [14]. Recent studies even found a higher quality of life in patients with CHD, including less social worries [9].

Second, we examined longitudinal associations between peer relationship quality and identity in adolescents with CHD. Peer relationship quality was expected to positively predict all identity dimensions [6], except for ruminative exploration which would be negatively predicted by peer relationship quality. Further, we expected reciprocal associations to emerge [15]. Low quality peer relationships might both influence and be influenced by ruminative exploration, with ruminative exploration having a potentially detrimental effect on peer relationships. Finally, in examining these relationships, we accounted for the role of sex and age because both variables have been demonstrated to relate to identity and peer relationship quality. Girls have been shown to score higher on peer relationship quality and identity exploration than boys [10,16]. With respect to age, increases in peer relationship quality and identity dimensions have been found through adolescence [10,17].

METHOD

Participants and Procedure

As part of the i-DETACH (Information technology Devices and Education program for Transitioning Adolescents with Congenital Heart disease) project, patients were selected from the database of pediatric and congenital cardiology of the University Hospitals Leuven (Belgium) using the following criteria: confirmed CHD, defined as structural abnormalities of the heart and/or great intrathoracic vessels that are actually or potentially of functional significance [18]; aged 14-18 years; last heart outpatient visit at our tertiary care center performed ≤ 5 years ago; being able to read and write Dutch; and the availability of contact details. Exclusion criteria were: cognitive and/or physical limitations inhibiting filling out questionnaires; prior heart transplantation; and absence of consent to participate by patients or parents. The study was approved by the Institutional

Review Board of the University Hospitals Leuven and performed according to the 2002 Declaration of Helsinki.

On September 2, 2009, 498 adolescents with CHD met these criteria, of which 429 (86%) participated at T1. Mean age was 16.3 years (*SD*=1.15; range 14.1-18.3). Participants did not differ on sex and age from non-participants (*n*=65). Differences were found on disease complexity ($\chi^2(2)=8.64$; $p<.05$; Cramér's $V=.13$), with non-participants having relatively more simple and less moderate heart defects. The primary heart defect was obtained from medical records and categorized using a modified version of the scheme developed by the CONCOR (CONgenital COR Vitia) project [19]. The complexity of heart lesions was determined based on Task Force 1 of the 32nd Bethesda conference as simple, moderate, or complex [20]. Patients with a simple, moderate, and complex lesion differed in self-reported frequency of follow-up, with patients with more complex lesions receiving more frequent follow-up ($F(2,418)=24.25$, $p<.001$, $\eta^2=.10$). No differences were found in self-reported school attendance.

At T1, a control group was recruited at four secondary schools. Parents were again asked for their consent for the adolescent to participate. Matching (1:1) was performed based on sex and age, resulting in 401 patients being matched with a control subject (93.5%). Demographic and clinical sample characteristics are summarized in Table 1. No significant between-sample differences were obtained on sex, age, and family structure. More control individuals were involved in a romantic relationship, and 25 adolescents with CHD were post-high school as compared to none of the control individuals.

Nine months after T1, 382 adolescents with CHD participated again at follow-up. Participants with and without complete data were compared using Little's [21] Missing Completely At Random (MCAR) test. A non-significant MCAR test statistic, $\chi^2(87)=32.77$, suggested that missing values could be reliably estimated at T1-2. Further, univariate analyses of variance (ANOVA) at T1 found no differences on any of the study variables between the 382 longitudinal participants and those who dropped-out after T1, except for a somewhat higher score on treatment anxiety in drop-outs

(*F*(1,406)=4.31, $p<.05$, $\eta^2=.01$). Accordingly, to deal with missing values, we used the full information maximum likelihood (FIML) procedure provided in MPLUS 4.0 [22,23].

Questionnaires

Identity and peer relationship quality was assessed at T1-2 in patients and at T1 in control adolescents.

Identity Dimensions. Participants completed the Dimensions of Identity Development Scale (DIDS), which was originally developed in Dutch and proved to be a highly reliable instrument with a clear factor structure [10]. This instrument has also been validated in an ethnically diverse sample of American college-students [24]. Identity dimensions were measured by five items each on a 5-point Likert-type scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A sample items reads: "I have decided on the direction I want to follow in my life" (commitment making). Cronbach's alphas ranged between .85 and .94 in the patient sample and .82 and .92 in the control sample at T1, and between .84 and .94 in the patient sample at T2.

To assess the factorial validity of the DIDS, confirmatory factor analysis (CFA) on the combined patient and control samples at T1 was conducted. To evaluate model fit, we used the chi-squared index, which should be as small as possible; the Root Mean Square Error of Approximation (RMSEA), which should be less than .08 (< .05 is excellent); and the Comparative Fit Index (CFI) and Tucker Lewis Index (TLI) which should both exceed .90 (> .95 is excellent) [25]. The model with five identity dimensions provided an adequate fit to the data ($\chi^2(265)=1347.60$, $p<.001$; RMSEA=.07; CFI=.92; TLI=.91).

Peer Relationship Quality. The peer subscales of the short form of the Inventory of Parent and Peer Attachment (IPPA) were used [26]. These subscales tap into the quality of communication, the degree of trust, and alienation in peer relationships (4 items each). A sample item reads: "My friends stimulate me to talk about my problems". Adolescents responded using a 4-point scale, from 1 (*never*) to 4 (*always*). Cronbach's alphas were .81 and .83 at T1 and T2, respectively, in the patient sample, and .83 at T1 in the control sample.

Statistical Analysis

Cross-lagged analysis with Structural Equation Modelling (SEM) was used to test directionality of effects. In the cross-lagged models being tested, all within-time associations, auto-regressive paths, and cross-lagged paths were included. Within-time associations refer to the associations between different variables at both time points; auto-regressive or stability paths refer to the prediction of a variable at T2 by its level at T1; and cross-lagged paths refer to the prediction of a variable at T2 by other variables measured at T1, controlling for the T1 level of the predicted variable. Hence, cross-lagged coefficients can be interpreted as variable *X* assessed at T1 predicting relative changes (i.e., relative increases or decreases) in variable *Y* assessed at T2. Sex and age were controlled for by estimating paths from these variables to each construct in the model. To assess whether cross-lagged paths were invariant across different categories of disease complexity, a multi-group analysis was performed. We compared a constrained model (with all cross-lagged coefficients set as equal across the different categories of disease complexity) against an unconstrained model (with all cross-lagged coefficients allowed to vary across the different categories). The cross-lagged paths were considered to be invariant if the difference in χ^2 ($\Delta\chi^2$), relative to the degrees of freedom, between both models would be non-significant ($p>.05$).

RESULTS

Mean-Level Differences with Control Sample at T1

Table 2 presents mean scores for patient and control samples. With respect to identity, paired-samples *t*-tests indicated that both groups differed on exploration in breadth and ruminative exploration, with adolescents with CHD scoring lower than controls. Further, adolescents with CHD scored higher on peer relationship quality than controls.

Mean-Level and Correlational Analyses at T1 and T2

Two multivariate analyses of variance (MANOVA) with sex as independent variable and the study variables at T1-2, respectively, as dependent variables were conducted in patients. At T1-2, based upon Wilks' Lambda, statistically significant multivariate sex differences were found.

Follow-up univariate analyses indicated that girls scored higher than boys on peer relationship quality (T1: $F(1,427)=13.49$, $p<.001$, $\eta^2=.03$; T2: $F(1,427)=8.31$, $p<.01$, $\eta^2=.02$). Additional MANOVAs with disease complexity as independent variable revealed no significant multivariate differences for the study variables at T1 ($F(12, 842)=0.69$, *ns*, $\eta^2=.01$) and T2 ($F(12, 842)= 0.73$, *ns*, $\eta^2=.01$).

Table 3 presents all associations among the study variables at T1-2. Peer relationship quality was positively related to commitment making and negatively to ruminative exploration at T1, and positively to all identity dimensions except for a negative association with ruminative exploration at T2. Finally, at T1, age was positively related (all ps<.001) to commitment making ($r=.18$), identification with commitment ($r=.16$), exploration in breadth ($r=.23$), and exploration in depth ($r= .27$).

Cross-Lagged Analyses Linking Identity and Peer Relationship Quality

Model 1 including all cross-lagged paths between peer relationship quality and the identity dimensions was saturated (i.e., zero degrees of freedom). Eight cross-lagged paths were found to be significant. Non-significant paths were trimmed from the model, resulting in the more parsimonious Model 2, which had a good fit to the data ($\chi^2(90)=2456.56$, $p<.001$; RMSEA=.04; CFI=.99; TLI=.97). All significant cross-lagged paths are displayed in Figure 1. Of specific relevance towards our hypotheses, peer relationship quality positively predicted identification with commitment and negatively predicted ruminative exploration. Ruminative exploration also negatively predicted peer relationship quality. These relationships were not moderated by disease complexity ($\Delta\chi^2(30)=29.25$; $p=.50$).

DISCUSSION

Previous research has shown that identity development was related to psychosocial and disease-specific functioning in adolescents with chronic diseases [3,4]. Hence, examining antecedent factors of identity formation is urgently needed. The present study examined longitudinal associations between peer relationship quality and identity formation in adolescents with CHD.

Similarities and Differences Between Patients and Controls

First, mean identity differences between both samples were limited. Patients scored somewhat lower on exploration in breadth and ruminative exploration compared to community adolescents [4]. Possibly, some of these patients perceived fewer opportunities to explore identity-related issues when dealing with the challenges accompanying their disease [13]. Despite these challenges, adolescents with CHD generally seemed to be as competent as their peers in establishing a strong identity.

Second, patients were found to report higher peer relationship quality than controls. This finding is partially in line with previous studies in which patients with CHD reported favorable social outcomes [14] as well as a good quality of life [9]. Moreover, these studies found patients' quality of life to be strongly affected by the quality of their peer relationships [27]. However, Kovacs, Sears, and Saidi [14] pointed out that the denial of disease-related problems by patients with CHD may partially explain the favorable social outcomes identified with self-reports. Studies using interviews generally found patients with CHD to report some negative social experiences, with many patients feeling different because of their illness [28].

Another possible explanation for the higher quality of peer relationships in adolescents with CHD is the notion of response shift. This notion refers to changes in the subjective meaning of quality of life that result from changes in internal standards and values, induced by having a chronic disease [29]. In this view, adolescents who grew up with a heart defect could have developed internal standards that are substantially different from their peers in evaluating the quality of their relationships. This might explain why patients report peer relationships of higher quality, despite school absences and physical limitations that might prevent full participation with peers. Similarly, Claessens and colleagues [28] point out the importance of normalisation, that is, the process during which patients and their families strive for a normal life, in spite of the disease. Peer relationships could play an important role in this normalisation process.

Longitudinal Associations Between Peer Relationship Quality and Identity

With respect to the associations between peer relationship quality and identity, longitudinal evidence was found for the energizing role of peer relationships in achieving an integrated identity [5,6]. More specifically, peer relationship quality was found to positively predict identification with commitment and negatively predict ruminative exploration over time. Ruminative exploration, in turn, was found to negatively predict the quality of adolescents' peer relationships. This finding confirms once again that ruminative exploration is a dysfunctional type of exploration, in which the tendency to mull over current choices affects adolescents' psychosocial functioning [10].

The precise mechanisms by which high quality peer relationships foster adolescents' identity development are in need of further research. Peer relationships are generally characterized by mutual reciprocity, cooperation, and negotiation [12]. Consequently, supportive peer relationships can stimulate adolescents in finding commitments that fit their self-endorsed beliefs and goals [6]. Moreover, peers can provide a safe haven in which adolescents can experiment with minimal risk for their self-concept [26]. In this view, peers may foster identity development by enhancing feelings of self-worth and by affirming adolescents' self-definition, a process called social validation [1]. The present study indeed demonstrated that experiencing the peer group as a supportive and validating community could be beneficial for reinforcing the identity commitments made and could protect against chronic identity worry, processes which have been shown to be substantially related to disease-specific functioning [3].

Practical Implications

Provided that these results are replicated in adolescents with diverse chronic diseases, they can have important practical implications. As the present study suggests, adolescents' identity formation can be improved by enhancing the quality of their peer relationships. Consequently, transition programs should also focus on the peer context because peers can provide an important supportive context for adolescents with chronic diseases, substantially influencing their quality of life and psychosocial adjustment as well as facilitating their process of normalization [16,27,28]. School reintegration programs exist that are aimed at reintegrating the adolescent with a chronic disease into the school setting [30]. These programs focus on eliciting support from peers by means of knowledge dissemination, using different kind of formats (e.g., question and answer rounds, a demonstration of medical procedures, or a discussion with adolescents about their disease experiences). They are aimed at dispelling myths about chronic diseases and reducing disease-related prejudices in peers. Both newly diagnosed patients and patients with cumulative disease-related stressors can be referred to such programs by the medical team, which then closely monitors each participant's needs, goals, and progress. However, despite the fact that such programs seem promising, their effectiveness remains to be investigated [30].

Limitations and Suggestions for Research

The present study has some limitations. First, data were gathered through self-report questionnaires. Although questionnaires are most appropriate to gather information about identity and perceived peer relationship quality, future studies should use multiple informants (e.g., peers) and methods (e.g., interviews).

Second, the current study measured the study variables over a relatively short period of time. Assessing these variables on multiple time points would allow us to examine their developmental trajectories and interplay. Moreover, such research should investigate how changes in peer relationship quality and identity relate to psychosocial outcomes.

Third, participants' heart defect varied from simple to complex. Because these categories differ in the impact they have on daily functioning, lumping these different categories together could have resulted in an important loss of information. Indeed, in contrast to those with moderate and complex CHD, many patients with a simple defect are asymptomatic with no exercise or lifestyle limitations throughout adolescence [14]. However, the present study found patients with a complex defect to show similar peer relationship quality and identity development as those with a simple defect. Moreover, the relationships between peer relationship quality and identity were not moderated by disease complexity. As such, disease complexity seems to be rather unrelated to the outcomes assessed in the present study.

Fourth, some factors might compromise the generalizability of the present findings. A total of 14% of the eligible patients did not participate in the present study, which could very well be related to adjustment problems. Hence, a potential selection bias could not be fully excluded. Moreover, the present sample consisted of Caucasian European participants only. Although previous research found substantial consistency in identity constructs across ethnic groups [24], it remains to be investigated how the variables assessed interrelate in these different groups. Hall and Brassard [5] have demonstrated that the relative contribution of family and peer support to identity development differs by ethnicity and that peer support can have differential influences on identity formation in different ethnic groups. In addition to cultural differences, differences between countries in the long-term management of chronic disease exist. Perhaps the favorable outcomes identified in Belgian patients can be partially explained by the quality of the Belgian health care system, which is characterized by universal access and long-term provision of care [14]. Future research should clarify the role of different health care systems in explaining patients' psychosocial outcomes.

Fifth, the presence of chronic diseases in adolescents belonging to the community sample was not assessed, thereby potentially confounding the current mean-level comparisons. However, our findings were generally in line with previous research on individuals with chronic disease [4,9,14]. Hence, we conclude that such confounding would have been minimal.

Despite these limitations, the present study demonstrated the importance of peer relationships for identity formation in adolescents with CHD. We hope that our findings will encourage researchers to study identity development and peer support in individuals with chronic diseases in order to design more developmentally sensitive treatment programs [13].

REFERENCES

[1] Erikson EH. *Identity, Youth and Crisis*. New York: Norton; 1968.

[2] Marcia JE. Development and validation of ego-identity status. *J Pers Soc Psychol.* 1966;3:551-558.

[3] Luyckx K, Goossens E, Van Damme C, et al. Identity formation in adolescents with congenital heart disease: A forgotten issue in the transition to adulthood. *Cardiol Young.* 2011;21:411-420.

[4] Luyckx K, Seiffge-Krenke I, Schwartz SJ, et al. Identity development, coping and adjustment in emerging adults with a chronic illness: the sample case of type 1 diabetes. *J Adolesc Health.* 2008;43:451-458.

[5] Hall SP, Brassard MR. Relational support as a predictor of identity status in an ethnically diverse early adolescent sample. *J Early Adolesc.* 2008;28:92-114.

[6] Meeus W, Iedema J, Maassen G, et al. Relaties met ouders en leeftijdsgenoten en identiteitsontwikkeling in de adolescentie [Relationships with parents and peers and identity development in adolescence]. *Ned Tijdschr Psychol.* 2002;57:42-57.

[7] van der Linde D, Konings EEM, Slager MA, et al. Birth prevalence of congenital heart disease worldwide. *J Am Coll Cardiol*. 2011;58:2241-2247.

[8] Moons P, Bovijn L, Budts W, et al. Temporal trends in survival to adulthood among patients born with congenital heart disease from 1970 to 1992 in Belgium. *Circulation.* 2010;122:2264-2272.

[9] Moons P, Van Deyk K, De Bleser L, et al. Quality of life and health status in adults with congenital heart disease: A direct comparison with healthy counterparts. *Eur J Cardiovasc Prev and Rehabil.* 2006;13:407-413.

[10] Luyckx K, Schwartz SJ, Goossens L, et al. A process-oriented model of identity formation and evaluation. In: Schwartz SJ, Luyckx K, Vignoles VL, ed. *Handbook of Identity Theory and Research*. Vol 1, ch. 4. New York: Springer; 2011: 77-98.

[11] Laible DJ, Carlo G, Raffaelli M. The differential relations of parent and peer attachment to adolescent adjustment. *J Youth Adolesc.* 2000;29:45-59.

[12] Hartup WW. Social relationships and their developmental significance. *Am Psychol.* 1989;44:120-126.

[13] Seiffge-Krenke I. *Diabetic Adolescents and Their Families: Stress, Coping, and Adaptation.* Cambridge, UK: Cambridge University Press; 2001.

[14] Kovacs AH, Sears SF, Saidi AS, et al. Biopsychosocial experiences of adults with congenital heart disease: Review of the literature. *Am Heart J*. 2005;150:193-201.

[15] Vernberg EM. Psychological adjustment and experiences with peers during early adolescence: Reciprocal, incidental, or unidirectional relationships? *J Abnorm Child Psychol.* 1990;18:187-198.

[16] La Greca AM, Bearman KJ, More H. Peer relations of youth with pediatric conditions and health risks: Promoting social support and healthy lifestyles. *J Dev Behav Pediatr.* 2002;23:271-280.

[17] Gallego ID, Delgado AO, Sanchez-Queija I. Peer attachment during adolescence and emerging adulthood. *An Psicol*. 2011;27:155-163.

[18] Mitchell SC, Korones SB, Berendes HW. Congenital heart disease in 56,109 births. Incidence and natural history. *Circulation.* 1971;43:323-332.

[19] Van der Velde ET, Vriend JWJ, Mannens MMAM, et al. CONCOR, an initiative towards a national registry and DNA-bank of patients with congenital heart disease in the Netherlands: Rationale, design, and first results. *Eur J Epidemiol.* 2005;20:549-557.

[20] Warnes CA, Liberthson R, Danielson GK, et al. Task force 1: The changing profile of congenital heart disease in adult life. *J Am Coll Cardiol.* 2001;37:1170-1175.

[21] Little RJA. A test of missing completely at random for multivariate data with missing values. *J Am Stat Assoc.* 1988;83:1198-1202.

[22] Muthén LK, Muthén BO. *Mplus user's guide.* Los Angeles, CA: Muthén & Muthén; 2002.

[23] Schafer JL, Graham JW. Missing data: Our view of the state of the art. *Psychol Methods.* 2002;7:147-177.

[24] Schwartz SJ, Beyers W, Luyckx K, et al. Examining the light and dark sides of emerging adults' identity: A study of identity status differences in positive and negative psychosocial functioning. *J Youth Adolesc*. 2011;40:839-859.

[25] Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct Equ Modeling.* 1999;6:1-55.

[26] Armsden GC, Greenberg MT. The inventory of Parent and Peer Attachment: Individual differences and their relationship to psychological well-being in adolescence. *J Youth Adolesc.* 1987;16:427-454.

[27] Moons P, Van Deyk K, Marquet K, et al. Individual quality of life of adults with congenital heart disease: A paradigm shift. *Eur Heart J*. 2005;26:298-307.

[28] Claessens P, Moons P, Dierckx B, et al. What does it mean to live with a congenital heart disease? A qualitative study on the lived experiences of adult patients. *Eur J Cardiovasc Nurs*. 2005;4;3-10.

[29] Rapkin BD, Schwartz CE. Toward a theoretical model of quality-of-life appraisal: Implications of findings from studies of response shift. *Health Qual Life Out.* 2004;2:14.

[30] Worchel-Prevatt FF, Heffer RW, Prevatt BC, et al. A school re-entry program for chronically ill children. *J Sch. Psychol.* 1998;36:261-279.

Table 1

Demographic and Clinical Characteristics of Participants at Time 1

	Patient sample	Control sample	Test statistic
Sex (combined *n* = 832)			$\chi^2(1) = 0.52$; $p = .47$; Cramér’s $V = .03$
Boys	229 (53.4%)	205 (50.9%)	
Girls	200 (46.6%)	198 (49.1%)	
M age (*SD*) (combined *n* = 832)	15.75 (1.14)	15.67 (1.13)	$F(1,830) = 1.05$, $p = .31$, $\eta^2 < .01$
Educational level (combined *n* = 814)			$\chi^2(3) = 25.81$; $p < .001$; Cramér’s $V = .18$
General secondary	180 (43.6%)	194 (48.4%)	
Technical secondary	128 (31.0%)	134 (33.4%)	
Vocational secondary	80 (19.4%)	73 (18.2%)	
Other	25 (6.1%)	0 (0.0%)	
Relationship (combined *n* = 813)			$\chi^2(1) = 18.64$; $p < .001$; Cramér’s $V = .15$
Yes	70 (16.5%)	114 (29.2%)	
No	353 (83.5%)	276 (70.8%)	
Family structure (combined *n* = 822)			$\chi^2(4) = 4.59$; $p = .33$; Cramér’s $V = .08$
Married/living together	323 (77.1%)	301 (74.7%)	
Divorced	64 (15.3%)	70 (17.4%)	
Parent deceased	5 (1.2%)	5 (1.2%)	
Stepparent	24 (5.7%)	18 (4.5%)	
Other	3 (0.7%)	9 (2.2%)	
Complexity of primary CHD diagnosis			
Simple	174 (40.6%)		
Moderate	204 (47.6%)		
Complex	51 (11.9%)		
Prior heart surgery for CHD			
Yes	200 (46.6%)		
No	229 (53.4%)		
Frequency follow-up (*n* = 421)			
Twice a year	35 (8.3%)		

Every year	126 (29.9%)
Every 2 years	77 (18.3%)
Every 3 years	63 (15.0%)
Every 4 years	24 (5.7%)
Every 5 years	66 (15.7%)
Every 6 years	6 (1.4%)
Less frequently	24 (5.7%)

Note. With respect to educational level, standardized residuals indicated that the patient and control sample differed only on the category “Other”. With respect to the other three categories, there were no differences between both samples.

Table 2

Paired-Samples t-Tests for Mean Differences on the Study Variables at Time 1

	Patients	Controls		
Variable	*M* (*SD*)	*M* (*SD*)	95% CI of difference	*t*-value
Peer relationship quality	3.20 (0.45)	3.03 (0.49)	(0.10 – 0.23)	4.86***
Commitment making	3.24 (1.09)	3.31 (1.01)	(-0.07 – 0.22)	-1.06
Identification commitment	3.21 (0.94)	3.26 (0.95)	(-0.08 – 0.89)	-0.73
Exploration in breadth	3.20 (0.98)	3.33 (0.83)	(0.01 – 0.26)	-1.99*
Exploration in depth	2.87 (0.99)	2.97 (0.92)	(-0.04 – 0.23)	-1.44
Ruminative exploration	2.36 (0.95)	2.59 (0.93)	(0.10 – 0.37)	-3.42***

Note. CI = Confidence Interval; *M* = Mean; *SD* = Standard Deviation. All variables have a possible range of 1 – 5.

p* < .05. ** *p* < .01. * *p* < .001.

Table 3

Correlations Among Study Variables at Times 1 and 2

Variable	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Peer relationship quality T1	.05	.09*	.12*	.07	-.16**	.68***	.07	.18***	.09	.10*	-.25***
2. Commitment making T1		.68***	.47***	.49***	-.28***	.06	.46***	.41***	.30***	.32***	-.16**
3. Identification commitment T1			.54***	.64***	-.18***	.10*	.39***	.46***	.35***	.35***	-.14**
4. Exploration in breadth T1				.71***	.19***	.13**	.32***	.29***	.53***	.46***	.08
5. Exploration in depth T1					.15**	.09	.30***	.28***	.42***	.44***	.06
6. Ruminative exploration T1						-.18***	-.16***	-.19***	.11*	.13**	.45***
7. Peer relationship quality T2							.15**	.23***	.14**	.15**	-.33***
8. Commitment making T2								.69***	.46***	.48***	-.34***
9. Identification commitment T2									.48***	.55***	-.29***
10. Exploration in breadth T2										.62***	.11*
11. Exploration in depth T2											.09*
12. Ruminative exploration T2											--

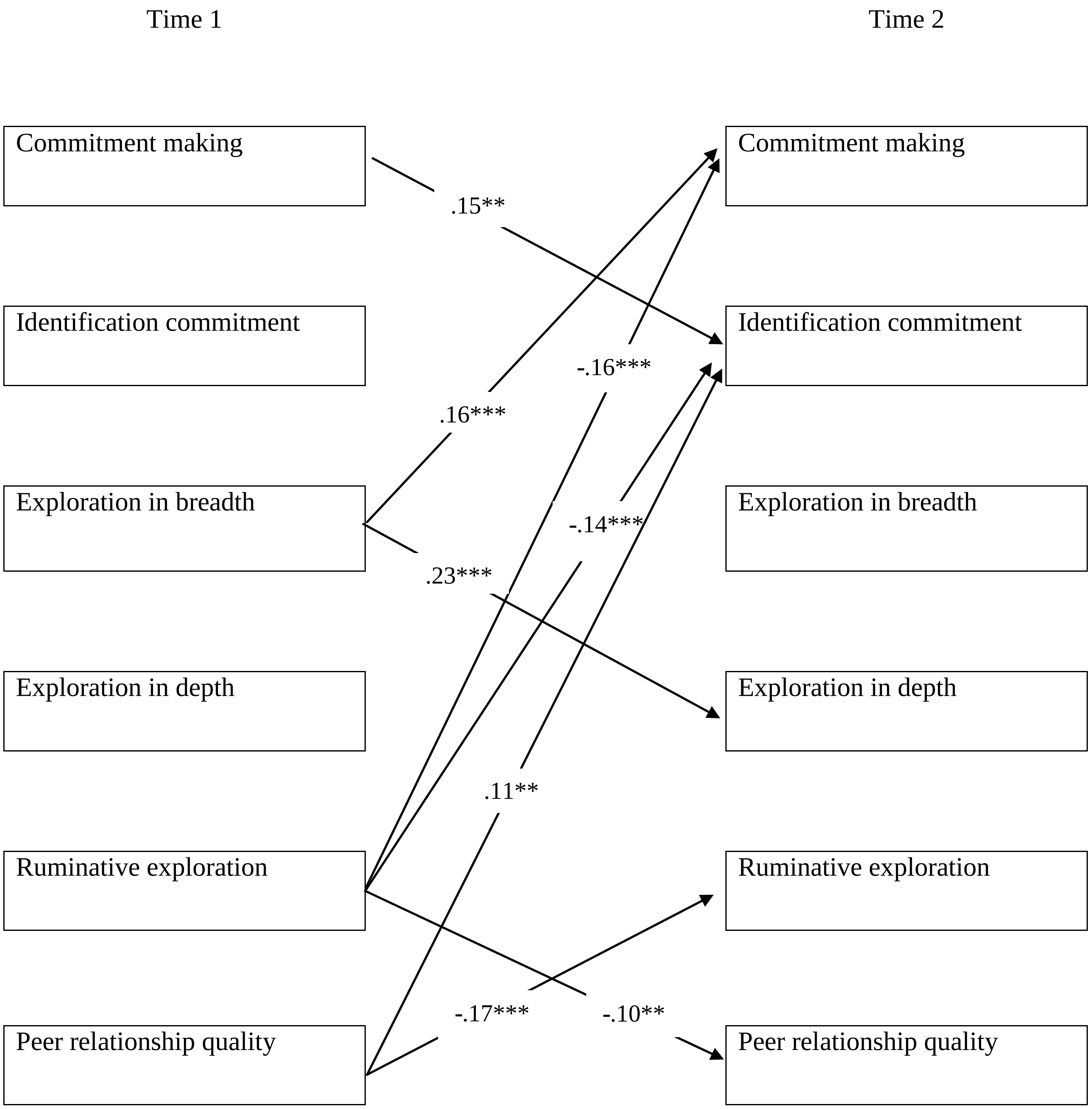
p* < .05. ** *p* < .01. * *p* < .001.

Figure captions.

Figure 1

Final cross-lagged path model (i.e., Model 2) with all significant cross-lagged paths between the identity dimensions and peer relationship quality. Within-time associations, auto-regressive paths, and paths from sex and age are not presented for reasons of clarity. All path coefficients are standardized. Auto-regressive paths ranged between .23 and .63 (all ps < .001).

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


Time 1
Time 2
Commitment making
Identification commitment
Exploration in breadth
Exploration in depth
Ruminative exploration
Peer relationship quality
Commitment making
Identification commitment
Exploration in breadth
Exploration in depth
Ruminative exploration
Peer relationship quality
.15**
-.16***
.16***
-.14***
.23***
.11**
-.17***
-.10**