Published in final edited form as:
J Early Adolesc. 2014 June 1; 34(5): 638–666. doi:10.1177/0272431613507498.

Developmental Change and Time-Specific Variation in Global and Specific Aspects of Self-Concept in Adolescence and Association with Depressive Symptoms

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Abstract

Previous research has demonstrated that adolescents make differential self-evaluations in multiple domains that include physical appearance, academic competence, and peer acceptance. We report growth curve analyses over a seven year period from age 9 to age 16 on the six domains of the Harter Self-Perception Profile for Children. In general, we find little change in self-concept, on average, but do find substantial individual differences in level, rate of change, and time-specific variation in these self- evaluations. The results suggest that sex differences and adoptive status were related to only certain aspects of the participants' self-concept. Depressive symptoms were found to have significant effects on individual differences in rate of change and on time-specific variation in general self-concept, as well as on some of the specific domains of self-concept.

Keywords

Adolescence; Self-Concept; Depressive Symptoms; Adoption

Self-concept occupies a prominent role in numerous theories of human development, and researchers have underscored the importance of its role in child and adolescent well-being (Robinson, Garber, & Hilsman, 1995; Dubois & Tevendale, 1999). Self-competence beliefs constitute the fundamental components of child self-concept that underlie the construction of self-esteem (Harter, 1990). Self-concept is a broad construct that involves individuals'

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perceptions of their abilities and includes the affective component of self-esteem in terms of beliefs and emotions about themselves (Harter, 1985).

While adolescence has been considered a period of developmental instability and formation of self-concept, research findings have been mixed in this regard. Given that previous research was often based on some (e.g., 2–3) repeated occasions of measurement, on a limited range of years during the adolescent period, or on a global index of self-concept, rather than on more specific dimensions, we attempt to resolve some of these uncertainties by analyzing a dataset with yearly measures of multiple dimensions over nine years. As the data we use are part of the Colorado Adoption Project (CAP), we control for adoptive status in our analyses, although it is not a specific focus. Here, we briefly review some of the mixed findings.

Young & Mroczek (2003) have suggested that the lack of consistent findings is due to the focus on the global self - concept rather than distinct aspects of self-concept. If there is the differential change in different aspects of self-concept, aggregating these into a global self-concept factor may lead to an incorrect conclusion of stability in self-concept early in life (Harter, 1990). Recently, research has focused on multidimensional models of self-concept (Van den Bergh & De Rycke, 2003). The multidimensional assessment of self-concept assumes that an individual makes important evaluative distinctions about competency in different domains of life. Thus, it has been claimed that only multidimensional profiles of domain-specific competencies are capable of capturing the complexity and specificity of the self-concept (Harter, 1990; Marsh, 1989). Consistent with this argument, studies show that self-concept cannot be adequately understood if its multidimensionality is ignored (Van den Bergh & De Rycke, 2003; Marsh & Ayotte, 2003). A unidimensional approach to the study of mental health problems in adolescents cannot adequately reflect the diversity of specific self-concept domains and their relation to mental health (Marsh, Parada & Ayotte, 2004). Differential rates and patterns of change across distinct aspects of self-concept may be masked by a one-dimensional approach to self-concept.

Indeed, investigations into dimensional aspects of self-concept have found that adolescents make differential self-evaluations in multiple domains such as physical appearance, academic competence, and peer acceptance (Harter, 1999) and that these distinctions become less correlated (more independent or differentiated) from childhood through late adolescence (Marsh & Ayotte, 2003). As children mature, they become increasingly self-critical (Eccles, Wigfield, Harold, & Blumenfeld, 1993). In midadolescence, the transition to middle or junior high school can be stressful, especially for girls, increasing psychological symptoms and negatively impacting global self-worth (Wigfield, Eccles, MacIver, Reuman, & Midgley, 1991). Theoretical accounts of adolescent development (Harter, 1999) predict that self-concept may decline during the transition from childhood to early adolescence and may be related to the numerous physical, social, and cognitive changes that occur during this period.

Studies addressing the question of changes in self-concept over time have produced apparently conflicting results. Some longitudinal studies of self-concept has found a gradual increase in self-concept during *middle and late* adolescence (Moneta, Schneider, &

Csikszentmihalyi, 2001; Erol & Orth, 2011; Cairns, McWhirter, Duffy, & Barry, 1990; Birkeland, Melkevik Holsen & Wold, 2012). Contrary to these conclusions some studies found that *as preadolescent children become older*, their perceptions of self tend to decrease (Harter, 1985; Marsh, 1989). Others using a multidimensional scale found that *some of the domains remained stable while others changed* (Bolognini, Plancherel, Bettscart, & Halfon, 1996; Young & Mroczek, 2003). However, regardless of whether they used global (Chubb, Fertman & Ross, 1997) or multidimensional self-concept measures (Bolognini et al., 1996) others have found that self-concept remains stable during adolescence. Cairn et al. (1990) argued that adolescence is not developmentally as turbulent as initially suspected and that developmental changes in self-perception appear to be relatively small in size. Some of the inconsistencies in the results from longitudinal studies may stem from focus on either global or multidimensional self-concept (Marsh, 1989; Moneta, Schneider, & Csikszentmihalyi, 2001; Shapka & Keating, 2005) or from measurement during either earlier or later adolescence. Questions regarding changes in self-concept during the adolescent period remain poorly understood.

In addition to age-related differences, sex differences in self-concept have been a topic of considerable interest for at least two decades. Sex differences in preadolescent and adolescent self-concept have been found by several researchers using measures of global self-concept (e.g. Block & Robins, 1993; Quatman & Watson, 2001). In many studies boys rated themselves significantly higher than did girls on the global self - concept (Marsh, 1989; Block & Robins, 1993; Quatman & Watson, 2001; Chubb et al., 1997). Entering adolescence, girls experience significant decreases in self-concept (Knox, Funk, Elliott, & Bush 2000) and self-concept trajectories of adolescent girls show decreases more than those of boys (Zimmerman et al., 1997). In some results from multidimensional self-concept, boys reported higher athletic competence, physical appearance (Cole, Jacquez, & Tracy, 2001; Cole et al., 2001; Bolognini et al., 1996; Young & Mroczek, 2003; Shapka & Keating, 2005) global self-worth (Bolognini et al., 1996; Cairns et al., 1990; Quatman & Watson, 2001) and math competence (Wigfield et al., 1991; Hergovich, Sirch & Fellinger, 2004), whereas girls reported higher behavioral competency (Cole, Jacquez, & Tracy, 2001; Cole et al., 2001), social competency (Shapka & Keating, 2005) and verbal competency (Marsh, 1989; Wigfield et al., 1991; Hergovich et al., 2004). Although, findings from studies of sex differences in multidimensional self-concept provide some common results, no clear answer with respect to developmental changes has emerged. In general, few studies (e.g. Young & Mroczek, 2003; Hay & Ashman, 2003; Cole et al., 2001) have examined sex differences in the development of distinct features of self-concept in both boys and girls over time and little is known about the differences and changes of self-concept domains (Van den Bergh & De Rycke 2003).

Together with age and sex, another discussion in the literature is whether adopted children and adolescents show lower self–concept than their nonadopted counterparts. The question of how adoption affects mental health has interested mental health professionals for a long time. Adopted children have to cope with difficulties connected with the lack of genetic relatedness (Brodzinsky, Schechter, & Henig, 1992). They may feel rejected by their birth parents (Juffer, 2006), and suffer from damaged or delayed physical growth (Mul, Oostdijk,

& Drop, 2002). Secure attachment with a primary caregiver is protective (Werner, 2000), and securely attached children have a higher self - concept (Cassidy, 1988). For adopted children, secure attachments and related self-concept may be more difficult to develop than in nonadopted children (Juffer and Van IJzendoorn, 2007). Another problem is whether adoptive parents manage to stimulate the feelings of being a unique and valued self in their adopted children (Van IJzendoorn, & Juffer, 2006). Stereotypes and theories predicting psychological maladjustment persist despite a lack of convincing evidence (Feigelman, 2005). In contrast to the theoretical literature; empirical research has produced an inconsistent picture of the effects of adoption on emotional adjustment. Some report no difference between adoptees and nonadoptees (Lansford, Ceballo, Abbey, & Stewart, 2001; Van IJzendoorn, & Juffer, 2006) others have found lower self-concept in adoptees than in nonadopted children (Passmore, Fogarty, Bourke, & Baker–Evans, 2005; Lanz, Lafrate, Rosnati, & Scabini, 1999). Although it has been discussed since the 1970's, research findings on this question remain contradictory and these conflicting results motivate further investigation of the effect of adoption status on self-concept across adolescence.

Many studies have investigated the development of self-concept and its relationship to mental health (Bolognini et al., 1996). High self-concept has been found to be related to life satisfaction (Ye, Yu, & Li, 2012) and happiness (Miller, 2000); low self-concept has been associated with aggression (Taylor, Davis-Kean & Malanchuk, 2007) and depression (Harter, 1986). Depression is the most common form of emotional problem experienced during adolescence (Peterson et al., 1993). Since 1980, studies have examined the self-concept and depression relationship in different life stages (Montague, Enders, Dietz, Dixon, & Cavendish, 2008; Cole, Jacquez, & Tracy, 2001). DSM-IV criteria for depressive disorders incorporate low self-worth as a key symptom (American Psychiatric Association, 2000). Low self-concept and depression are highly associated such that they may show different sides of the same construct (Harter, 1999). Beck (1972) suggested that the negative feelings of depressed persons contribute to their negative self-views and that their negative self-views intensify their negative feelings.

According to Montague et al. (2008), there is a negative and strong correlation between depression symptoms and both initial status and growth across time in self-concept: depressive symptoms decreased, whereas self-concept increased. There is disagreement in the childhood depression literature as to whether negative self-perceptions may lead to depression or whether depression causes a negative view of the self (Garber, Quiggle, & Shanley, 1990). From childhood and preadolescence to the adolescent years there are longitudinal studies that report either that depression predicts self-concept (McGrath & Repetti, 2002; Hoffman et al., 2000) or that self-concept predicts depression (Cole, Jacquez, & Tracy, 2001; Tram & Cole, 2000; Crocker & Hakim-Larson, 1997; Orth, Robins, Trzesniewski, Maes &Schmitt, 2009; Roberts, 2008). There are some models which attempt to explain the relation between self-concept and depression. The vulnerability model claims that low self-concept is a risk factor for depression (Roberts & Monroe, 1992). Negative events predicted changes in self-perceived competence, and self-perceived competence predicted changes in depressive symptoms (Tram & Cole, 2000). The scar model, on the other hand, suggests that depression may leave scars in the individual's self-concept, and, because of this, low self-concept might be an outcome of depression rather than a cause

(Rohde, Lewinsohn, & Seeley, 1990). Negative self-perceptions are believed to make one vulnerable to depression, but it is also possible that depressive symptoms influence one's negative self-perceptions (Teasdale, 1983). Analysis of longitudinal studies can provide stronger evidence of the association between negative self-concept and depression. The purpose of the present paper is to describe the pattern of change, and individual differences in change, in dimensions of self-concept from childhood to adolescence. Differences in developmental patterns of change are evaluated across boys and girls with adoptive and nonadoptive status. In addition, we focus on individual differences in developmental patterns of change and variation in self-concept and evaluate these dynamics in relation to depressive symptoms in adolescence.

Method

Sample

Data for this research come from the Colorado Adoption Project (CAP), a longitudinal study initiated in 1975 (Plomin, DeFries, &Fulker, 1988). Initial recruitment occurred over a period of seven years, when 245 adopted children, their biological parents, and their adoptive families were recruited through two adoption agencies in Denver, Colorado. Adoptive children were adopted into their adoptive homes within 5 weeks of birth (the mean was 29 days and the range was 2 to 172 days).

Adoptive and non-adoptive families were matched in terms of age, education, occupational status of the father, sex of the adopted child, and the number of children in the family (see Plomin & DeFries, 1985). The assessment was performed approximately every year during the summer months. Analyses in this current report were limited to participants aged nine to sixteen years, yielding 464 individuals (250 male and 214 female) assessed at ages 9, 10, 11, 12, 13, 14, 15 and 16. Details of the CAP design, including demonstrations of the representativeness of the sample and little or no evidence for selective placement, are provided in Plomin and DeFries (1985) and DeFries et al. (1994). All protocols were reviewed and approved by the University of Colorado-Boulder IRB. Parent consent and child assent/consent were obtained as appropriate.

Measures

Harter Self-Perception Profile for Children (SPPC; Harter, 1983)—The original questionnaire included 6 items in each domain, but the CAP study used only the four highest loading items (given in the published structure) for each of the six (following) domains: Scholastic Competence (SC; items 1, 15, 19, 30), Social Acceptance (SA; 2, 16, 45, 58), Athletic Competence (AC; 3, 17, 31, 55), Physical Appearance (PA; 4, 32, 69, 71), Behavioral Conduct (BC; 42, 56, 70, 72), and Self-Acceptance (GSA; 14, 29, 43, 57). The particular items used to identify the SPPC domains are shown in table1. Individuals were presented with the items and asked if this was "really true for you", "sort of true for you", "only a little true for you", or "not at all true for you". Each item was coded on a four-point scale with higher values indicating higher self-esteem. Items were reverse coded as necessary for computation of unit-weighted summary scores for each domain. The response set utilized in this study is conceptually equivalent to the 4-level response set used on

Harter's test form. Harter specified a two-step process of first asking the child to decide if their competence is low or high for an item, and then if that judgment is "sort of true" or "really true."

Reliability estimates in the current data supported the use of these 4-item subsets and modified response formats. Reliability coefficients did vary by subscale and by year. Published reliability values for the Harter subscales would have been calculated on age-heterogeneous cross-sectional data. The picture is more complex in longitudinal data. Our subscale reliabilities were lower for the youngest ages, especially for Athletic Self-Esteem. Later years were more consistent, with little difference between year 12 and year 15 coefficients. Table 2 shows the Chronbach Alpha reliability coefficient obtained for each subscale at year 12 (where our models were centered) alongside published values from the Harter SPPC manual (Harter, 2012). A trend for lower reliability at younger ages is also seen in the published reliability data. Consistent with using only the 4 highest loading items from each 6-item subscale, we do see lower reliability coefficients for our abbreviated form. For illustrative purposes, using the Spearman-Brownadjustment (see the 3rd column in Table 2) to facilitate comparison with the published 6-item alphas, greater alignment is seen.

Depressive Mood Inventory (Kandel & Davies, 1982)—Self-reports of depressive symptoms were obtained using the 6-item Depressive Mood Inventory ("trouble sleeping", "too tired to do things", "feel unhappy-sad depressed'', "feel hopeless about future", "feel nervous-tense'', and "worry too much"), which has been validated against both the depression scale from the 90-item Symptom Checklist (Derogatis, 1972) (r=72) and a diagnosis of major depression (r=43) (Kandel & Davies, 1982). Children were presented with these statements, and were asked to respond using the following scale: really true for me (1), just sort of true for me (2), right in the middle if I can't make up my mind (3), not really true for me (4), not at all true for me (5). A unit-weighted sum score was computed so that higher scores represented greater depressive symptomatology.

Statistical Analysis

Growth curve modeling was used to estimate individual change patterns in each Harter self-perception domain. Conceptually, these models involve estimating individual regressions of the Harter domains on time and adding, simultaneously, predictors of the regression parameters of individual trajectories (i.e., each participant's intercept and slope). Maximum likelihood estimation was used to make full use of available data, providing unbiased estimates under the assumption that the data are "missing at random" (i.e., missing is accounted for by covariates and prior values in a longitudinal study; Little & Rubin, 1987).

These models were estimated using Stata's *xtmixed* procedure (StataCorp, 2009) and based on an age-based data structure which is identical to a time-in-study model because of the study design and agehomogeneous sampling. Although measurement intervals were quite consistent across children, models were fit allowing individual-varying intervals between assessments. The time scores (age) were centered at 12 years to specify the intercept in the model at this age. This was done for two reasons: first, to avoid collinearity between linear and quadratic slopes and second to center at an age when measurement of self-concept was

more reliable. Predictors included sex (with boys as the reference) and adoptive status (with nonadopted as reference). Time-specific residual variances were constrained to equality across the measurement occasions. This within-person residual variance component reflects, in addition to unexplained variance, the state-like variability of individuals from their predicted values at each measurement occasion.

We report linear effects of age because models that included quadratic effects of age yielded no or small negative, quadratic effects. In the fully conditional model only two domains (Scholastic, Appearance) had a significant (but small) quadratic effects, and these, unexpectedly, produced lower (not higher, as the previous literature suggested) predictions at the earlier and later ages. There was evidence of individual differences, and we decided to pursue departures from linearity in subsequent work more focused on individual differences. We therefore report results from an unconditional linear slope model and contrast these with a model conditioning level (i.e., intercept) and linear slope on sex and adoptive status. We then provide results from a model that adds depressive symptoms as a between-person (nontime varying) effect at the intercept (i.e., how the children differ from each other at age 12) and as a within-person (time-varying) effect on all other occasions (i.e., how a child's value at different ages differs from their depressive symptoms score at age 12). This model will provide information regarding the degree to which a) depressive symptoms at age 12 are related to self-concept at age 12 (level), b) change in depressive symptoms (i.e., deviation from age 12 value) is related to change in self-concept (linear slope), and c) individual variation in depressive symptoms over and above the individual change trajectory is related to time-specific individual variation in self-concept around the expected individual trajectory of self-concept.

Growth models are useful for addressing average trajectories and individual differences and to decompose the variance into between-person and within-person variation. Fixed effects of time and other covariates provide group-average trajectories. Simultaneously, the variance of individual trajectories around the group average trajectories is estimated. This permits consideration of how effective additional predictors account for the individual differences in change. The variance parameters in multi-level models do not precisely recover the total variance of the dependent variable; however pseudo-R^2 coefficients have been used to describe an overall model-explained variance and percent reduction in between-person (BP) and within-person (WP) variance parameters (Singer & Willett, 2003).

Results

Descriptive analyses were conducted for each of the five time points. Table 3 provides the means and standard deviations for the all domains for the entire sample at ages 9 through 16. Prior to the sequence of models described below, an empty model (not tabulated) for each domain was estimated to permit ICC calculations. Between-person (individual differences) are pronounced for each sub-domain. ICCs obtained were Scholastic Competence (.46), Social Acceptance (.37), Athletic Competence (.44), Physical Appearance (.39), Behavioral Conduct (.35), and Global Self-Worth (.27).

Unconditional models

Unconditional growth models of domain scores, in which the only predictor is TĐME, were used to examine average growth in the population, as well as between-person variability in growth for each of the self-concept domains. Statistically significant variation was found for the intercept (level) and slope as well as for all time-specific residuals of the domains.

The fixed effects estimate the average level of self-concept at age 12 and the slope of the population average change trajectory (i.e. rate of change). The fixed effect estimates of the intercepts were significantly different from zero at age 12 in all domains (see Table 4). Five of the self-concept domain slopes were significantly different from zero, indicating a significant increase in perceived competency in scholastic competence (0.019), social acceptance (0.025), athletic competence (0,017) and a decrease in perceived physical appearance (−0.025) and behavioral conduct (−0,015) over the course of the study. The fixed effect estimate of the slope was not significantly different from zero for global selfworth, suggesting a lack of change in this more general domain over the course of the study.

Pseudo-R^2 statistics, computed from the variance components, quantify how much outcome variation is explained by the multilevel model (Singer & Willett, 2003).The unconditional growth model accounted for more variance than did the empty (unconditional means) model. Specifically 15% of the total variability (within–person variation; RWP-E) in scholastic competence, 17% in social acceptance, 14% in athletic competence, 18% in physical appearance, 16% in behavioral conduct and 11% in global self-worth is associated with linear time. The linear change trajectory predicted the observed outcome data better than did the empty (unconditional means) model.

Conditional models

Table 5 provides the coefficients for the conditional growth curve analyses of all the domains. We added person level covariates of sex, adoptive status, and a sex by adoptive status interaction term, allowing these covariates to shift portions of unexplained variance into model-explained variance. Since these are person-level covariates, there is no reduction in the occasion specific (within person) variance.The reduction in unexplained variance is primarily reflected in between person (BP) variance components.

Statistically significant unexplained individual variation remained for the intercept (level) and rate of change (slope) for all domains (see a random effects portion of Table 5). The slope mean remained significant only for athletic competence (see fixed effects in Table 5). Girls rated themselves lower on athletic competence and physical appearance, and higher on behavioral conduct. Changes in the girls' self-ratings over time did not differ from those of boys. Adoption status was a significant predictor of the intercept for social acceptance (b= −0.14) but did not predict change in any of the domains. The adoption by female interaction had a significant effect on the intercept for behavioral conduct (b=0.157; the adopted girls rated themselves higher than boys and non-adopted girls) but did not predict slope.

Adding the between person covariates, the level-2 variance components decreased. The pseudo-R^2 statistics indicate that intercept variance declined by 2.82% from the

unconditional model for scholastic competence, 3.24% for social acceptance, 5.71% for athletic competence, 9.49% for appearance, 10.23% for behavioral conduct, and 0.94% for global self-worth. Because they are still statistically significant, potentially explainable variations in age 12self-concept remain. Slope variances changed little and are still significant for each of the domains. They suggest the presence of additional potentially explainable residual variance in the rates of change. These variance components emphasize that further between-person differences in change remained unexplained by the model predictors.

Association with Depressive Symptoms

The statistically significant within-person variance component is a sign of the need to also model the effects of time varying predictors. The next growth model, therefore, included the between- person (BP) and within-person (WP) effect of depression. Person-mean centering was used for depression. Each person's mean level of depression across the 7 year span was used to model the effect of BP differences in level of depression during the study. A time-varying (occasion-level) deviation from the person's mean depression level was included to model the effect of WP Depression. Selected interactions of both BP and WP depression with other covariates were also added. This constitutes our final model. Because both BP and WP predictors are added, reductions in both BP and WP variance components are possible.

Table 6 provides the coefficients for growth curve analyses of the Harter and separate domains adding BP and WP effects of depressive symptoms. BP depression accounted for statistically significant individual variation in initial status (intercept) for all individual domains. While, in general, endorsing the depressive symptomatology items was associated lower scholastic competence (b=−0.084), this association was weaker for the girls (b=0.024). BP differences in depression accounted for significant slope variance only in athletic competence.

WP depression accounts for a significant amount of predicted individual self-concept variation around the modeled linear trajectories: regression of WP differences in self-concept on WP differences in depression were significant for behavioral conduct (b= −0.068), global self-worth (b=−0.057), physical appearance (b=−0.069), scholastic competence (b=−0.068) and social acceptance domains (b=−0.061), but not for athletic competence (b=−0.017). The significant BP x WP Depression interactions for scholastic competence (b=.002), physical appearance (b=.003), and behavioral Conduct (b=.003) indicate that the association between occasion specific variation in depression and self-concept was weaker for individuals with greater average endorsement of depression items in these domains. Slope and time specific residual variances remained significant for global self-worth and for all specific domains.

Altogether, person level predictors (sex, adoptive status, sex by adoptive status and BP differences in depressive symptomatology) explain 33.07% of the intercept variation for scholastic competence, 27.31% for social acceptance, 15.08% for athletic competence, 31.74% for appearance, 23.85% for behavioral conduct, and 39.68% for global self-worth. These predictors also explain 22.14 % of the variation in rates of change for scholastic

competence, 13.52% for social acceptance, 6.8% for athletic competence, 20.82% for appearance, 18.56% for behavioral conduct and 43.47% for global self-worth. Time-varying predictors (time and WP time variations in depression) account for 14–26% of within person variation (see RWP-E in Table 6).

Comparing the random effects for the final model to those in the conditional model without depression, we found decreases in the level-1 (within person) variance components and level-2 (between person, both status at the age 12 and rate of change) variance components indicating that depressive symptomatology accounted for previously unexplained outcome variation. Time varying depression accounted for level 1 variance and between-person depression differences accounted for level 2 variances. When BP and WP depression were added to the model, the pseudo R^2 statistics increased.

Compared to the first conditional model, the within-person variance component (unexplained within-person variance) was reduced for all domains except athletic competence. In other words, a greater proportion of the within person variance was accounted for when both time and time-varying depressive symptomatology were included in the model (Table 6), relative to the model including only time (Table 5). Comparing RWP-E for the two models, the reductions related to within the person fluctuation in depressive symptomatology were: scholastic competence6. 91% (22.50% − 15.59%= 6.91%), social acceptance 4.8%,athletic competence .34%physical appearance 4.7%, behavioral conduct 4.1 %, and global self-worth 14.35%.

The between-person variance components (unexplained between-person variance) also changed markedly relative to the conditional model that did not contain depressive symptomatology. Intercept variance decreased by (RBP-L Table5 – RPB-L Table 4=) 30.25% for scholastic competence, 24.07% for social acceptance, 9.37% for athletic competence, 21.68% for appearance, 13.62% for behavioral conduct, and 38.7% for global self-worth. Slope variances (unexplained between-person linear slope variance) decreased by 22.13% for scholastic competence, 10.48% for social acceptance, 3.78% for athletic competence, 12.71% for appearance, 16.77% for behavioral conduct and 40.61% for global self-worth.

Discussion

Four main topics of discussion in the self-concept literature are whether to use global or multidimensional self-concept scales (Crain, 1996; Harter, 1990; Young & Mroczek, 2003), whether to use cross-sectional or longitudinal methods (Shapka & Keating, 2005; Chubb et al., 1997), whether to focus on group level changes or intra-individual changes over time (Young & Mroczek, 2003; Baldwin & Hoffmann, 2002; Block & Robins, 1993), and whether the observed time period is long enough to detect changes (Harter, 1986; Shapka & Keating, 2005). Many studies examining age and sex differences have used global self-concept (Whitesell et al., 2006; Rhodes, Roffman, Reddy, & Fredriksen, 2004; Chubb et al., 1997), which may have masked important fluctuation within specific domains of self-concept (Marsh, 1989) and which are not able to provide a complete picture of self-concept(Cairns et al., 1990). Compared to cross sectional studies, longitudinal data provide a

basis for estimating within-person developmental trends, both on average and in terms of individual differences (Shapka & Keating, 2005). Focusing on group level change risks hiding changes in a youth's self-concept (Baldwin & Hoffmann, 2002) and whether variables "behave" consistently over time rather than whether people are behaviorally consistent is shown by focusing on mean-level changes (Block & Robins, 1993). The measurement period should be long enough to determine changes and a longer period shows a better picture of the biological, cognitive and school transition effects on self-concept (Harter, 1986).

In the current study, we considered average and individual-level change in dimensions of self-concept changes over time. We used long term data from 9 to 16 years of age which included both puberty and school transitions (middle and high school). Sample sizes were relatively large enough to show individual differences in longitudinal trajectories. We also used the multidimensional self-perception measure, Harter's SPPC, in longitudinal perspective using individual growth modeling techniques.

To describe the pattern of change in domains of self-concept from childhood to adolescence, differences in developmental change were evaluated across sex, adoptive status and depressive symptoms. The results suggest that sex and adoptive status were related to only certain aspects of the participants' self-concept. Age (time) and depression have significant effects on general self-concept as well as some of the more specific domains of self-concept.

Changes from Childhood to Adolescence

Our findings provide support for the general principle that individuals tend to build and maintain positive self-conception (Harter, 1990). However, some studies of multidimensional self-concept suggest that many dimensions decrease during early adolescence and rebuild during later adolescence (Marsh, 1989; Cole et al., 2001). Some previous research on children's self-conception has found increasing differentiation of self-concept with age (Wigfield et al., 1991) whereas other research shows mixed findings (Shapka & Keating, 2005; Young & Mroczek, 2003).

There is some evidence that different domains of self-concept change at different rates from early life through adolescence and so become more differentiated by age (Cantin & Boivin, (2004). Consistent with these results, we found small but statistically significant changes from childhood to adolescence in all domains of self-concept except global self-worth. While three of the self-concept domains increased (athletic competence, social acceptance, scholastic competence), two of them decreased (physical appearance and behavioral conduct).

The findings of global self-worth in this study are compatible with the literature (Young & Mroczek, 2003; Shavelson et al., 1976, Shapka & Keating, 2005), showing that global self-worth did not change significantly over the course of the study. Consistent with other findings, we found that athletic competence increased (Bolognini et al., 1993; Mars, 1989) and this result has been explained by the possibility that individuals may select types of sports and competition levels that maintain positive self-perception (Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002). We found a decrease in physical appearance self-concept,

supporting other findings that physical self-perceptions become more negative during adolescence (Wigfield et al., 1991; Marsh 1989; Maiano, Ninot, & Bilard, 2004). According to the Bolognini et al. (1993), decreases in the domain of physical appearance might be related to physical development which involves some negative experiences during these years. In self-perceived academic competence, we found an increase during the study, inconsistent with some results (Cantin & Boivin, 2004; De Fraine et al., 2007) but consistent with other (Bolognini et al., 1993). Some other longitudinal results showed first a decrease during the transition time from elementary to middle school and then an increase during adolescent years (Marsh, 1989; Cole et al., 2001). Studies which found a reduction explain their result as negative effects of the school transition period (Eccles et al, 1993; Wigfield et al., 1991). We found that perceived social competence also increased. Increases in children's perception of scholastic competence correlate with increases in their perception of social acceptance and these domains may affect each other. Although the participants in this sample transitioned from elementary to middle and then high school, which has been associated with risk for reduction in many domains, our data show increases in scholastic competence and social acceptance. Unfortunately, data on the timing of school transitions were not available.

Differences between Boys and Girls

We did not find statistically significant differences in rates of changes in self-concept between girls and boys from childhood to adolescence and these findings are consistent with some previous research which reported no difference between genders (e.g. Kling, Hyde, Showers, & Buswell, 1999) and inconsistent with others reporting differences (e.g. Marsh, 1989; Cole et al., 2001).

According to the meta-analysis of Gentile et al. (2009), it is more accurate to say that the differences vary depending on the specific domain. However, in their meta-analysis of multidimensional studies of sex differences in self-concept among children and adolescents, Wilgenbusch & Merrell's (1999) findings are consistent with the idea that sex differences in self-concept may often be overinterpreted or unduly magnified in importance. Although their results indicate that there are numerous significant differences in domains of self-concept based on sex, these differences are generally small, and do not support a unified conclusion on this topic (Wilgenbusch & Merrell, 1999). Kling et al.'s (1999) meta-analysis of sex differences in global but not domain specific self-concept provides evidence that males score higher on standard measures of global self-concept than females, but the difference is small. Similarly, a review on sex and self-concept by Crain (1996) concluded that the differences in self-concept among boys and girls are small and have little practical or clinical impact.

In the current study we found significant differences between boys and girls on some aspects of multidimensional self-concept at age 12 (girls scored higher on behavioral conduct, boys were higher on athletic competence and psychical appearance), but there were no significant differences in patterns of change over time.

Differences related to Adoptive Status

We did not find statistically significant differences in change in self-concept between adopted and nonadopted subjects across childhood and adolescence, and these findings are consistent with some previous research which reported no difference between adoptees and nonadoptees (Lansford et al., 2001; Juffer & Van IJzendoorn, 2007). Especially, in Juffer and Van IJzendoorn's (2007) comprehensive meta-analysis of 88 studies, no difference in global self-concept was found between more than 10,000 adoptees and more than 33,000 nonadopted comparisons.

The findings may be explained by the characteristics of the adoptive families; since studies reported more similarities than differences in adoptive and nonadoptive family interactions (Rueter & Koerner, 2008; Lanzet al., 1999). Parental behavior is similar across adopted and nonadopted children (Rueter, Keyes, Iacono, & McGue, 2009) and adoptive parents are able to offer the child secure parent– child attachment relationships (Juffer, Bakermans–Kranenburg, & Van IJzendoorn, 2005). For adopted and nonadopted alike, both positive self-control and moral self-approval were connected to being brought up in expressive families that encouraged close and good communication (Kelly, Towner-Thyrum, Rigby,& Martin, 1998). In the frame of these results, it would be relevant in future research to measure parent child relationship quality to assess whether it, specifically, has an important and deterministic role in child and adolescent self-concept regardless of whether they are adopted or not.

Effect of Depressive Symptoms

We tested whether depression was associated with self-concept and found that depression is an important predictor for all domains from childhood to adolescence.

Some models have been developed which relate to these different results. Orth et al. (2008) summarized the main models that have been used to explain the relation between self-concept and depression. The vulnerability model states that low self-concept has a causal influence in the onset and maintenance of depression and is also a risk factor for future depression. In contrast to the vulnerability model, the scar model states that low self-concept might be a consequence of depression rather than a causal factor. In addition to these two models, some researchers have argued that self-concept and depression are essentially one construct and should be conceptualized as opposed endpoints on a continuum.

Using growth curve modeling, we found that depressive symptoms were a significant predictor of all domains of self-concept. Individual differences in both level and change in self-concept for all domains were partly accounted for by depressive symptoms. Within (intrapersonal) and between person (interpersonal) differences in depression predicted self-concept: within person differences in depressive symptoms predicted all domains (scholastic competence, physical appearance, behavioral conduct, social acceptance and global self-worth) except athletic competence and between person effects of depressive symptoms predicted all self-concept domains. In addition, individuals with higher average depression had lower associations between their occasion specific fluctuations in depression and self-concept. This indicates that not only did the developmental path of self-concept fluctuates

significantly, but that a great deal of variability in self-concept development existed between individuals. Changes in self-concept varied significantly among individuals for all domains. In addition, it can be said that self-concept is associated with the experience of depression. Depression might damage an individual's self-concept through both intrapersonal and interpersonal pathways. One of the possible intrapersonal explanations is that depression might influence self-concept in all domains, except apparently, athletic competence, by changing processes of self-related information.

There is evidence that depression predicts more negative perceptual biases over time (Cole, Jacquez, & Tracy, 2001) and depressive person is more likely to remember negative personal information than a non-depressive individual (Teasdale, 1983). In other words, depression might lead to a negative view in many self-concept domains, though it is difficult, if not impossible, to confidently determine directionality based on data from observational studies.

The experience of depression may decrease an individual's self-concept because depression is implicated in impaired functioning and negative attitudes toward the self and the world (Shahar & Davidson, 2003). Indeed, depressive symptoms increase individuals' negative evaluation of self and reduce self-esteem by altering the process of self-relevant information, even if it does not reach a level that meets criteria for major depressive disorder (Coyne, Gallo, Klinkman, &Calarco, 1998). Depressive people also appraised their personal projects in terms of negative emotions, stress and difficulty, rather than in terms of a high level of accomplishment, progress and capability (Salmela-Aro & Nurmi, 1996).

An interpersonal explanation is that depressive episodes may damage important sources of self-concept such as close relationships or social networks. Because depression may cause more isolation, less social competence and a depressed approach to the life, depressed people described fewer positive aspects not only of themselves, but also of parents and significant (Gara et al., 1993). Having been depressed is that individuals view themselves as less socially skilled. Social incompetence most likely is attributable to a more negative self-appraisal (Rohde, Lewinsohn, & Seeley, 1990). Depressed adolescents report fewer social resources, including fewer supportive social relationships (Daniels & Moos, 1990). Perception of others during depression is not well understood, but dissimilarities have been found between a depressed person's perception of self and their views of other persons (Ashworth, Blackburn, & Mc Pherson, 1982).

One explanation for the current study's result is that depressive symptoms and dimensions of self-concept have reciprocal effects. In their review study; Dubois & Tevendale (1999) emphasized bidirectional, recursive effects of self-concept and youth adoption. Whereas individual research reports have often focused on only one or the other direction of causal influence, an integrative framework that accommodates both possibilities could be more consistent with available findings in the literature.

Limitations

This study utilized a relatively large sample which was large enough to investigate individual differences and included long term data which spanned both puberty and school

transitions. Additionally, we utilized a multidimensional measure that was able to provide a more complete picture of self-concept, and we used important analytic techniques for examining change within individuals. However several limitations to the study need to be addressed. The current study is based on nonclinical samples, thus our findings do not generalize to depressive symptoms or episodes in clinical populations. The measure of self-concept used in this study was based on self-reports of how an individual felt about his/her own value or worth. Future research in this area would benefit from using multiple informants (e.g., parents, teachers, and peers).

Acknowledgments

Funding: The first author was supported by TUBİTAK funding and second author was supported by NIH P30 DC005803 funding. Funding for this study was also supported by the Colorado Adoption Project grant HD-010333 and grant HD-036773 from the National Institute of Child Health and Human Development (NICHD).

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Table 1

Items from the Harter Self-Perception Profile for Children used to Identify Domains

Domains	Selected Items
1. Scholastic Competence	
	Very good at their school work
	As smart as other kids their age
	Forget what they learn
	Pretty slow in finishing their school works
2. Social Acceptance	
	Hard to make friends
	Wish that more kids like them
	Doing things with a lot of kids
	Have a lot of friends
3. Athletic Competence	
	Do well just about any new outdoor activity
	Do well all kinds of sports
	Better than others their age at sports
	Wish they could be a lot better at sports
4. Physical Appearance	
	Happy with the way I look
	Wish their body was different
	Attractive and good looking
	Wish something about their face or hair looked different
5. Behavioral Conduct	
	Get in troubles because of things they do
	Usually act the way they know they are supposed to
	Very kind to others
	They know they should not do
6. Global Self-Worth	
	Happy with themselves as a person
	Get mad at them-self
	Don’t like the way they are leading their life
	Happy being the way they are

Table 2

Current 4-item reliability coefficients, Harter's published 6-item coefficients, and Spearman-Brown corrected comparisons.

Domains	Year 12 4-items	Harter 3rd–5th (ages 8–10) 6-items[1]	Harter 6th–8th (ages 11–13) 6-items[1]	Year 12 SB correction
Scholastic Competence	.63	.80–.82	.80–.85	.72
Social Acceptance	.70	.75	.80	.78
Athletic Competence	.53	.80–81	.84–.86	.63
Physical Appearance	.69	.76–.80	.81–.82	.77
Behavioral Conduct	.67	.71.73	.75–.77	.76
Global Self-Worth	.68	.78	.80–.84	.76

[1]Based on four 1980s samples in the Harter SPPC Manual, before Social scale was revised.

Table 3

Means and Standard Deviations for Scores of All Domains

	Year 9		Year 10		Year 11		Year 12		Year 13		Year 14		Year 15		Year 16	
	N	**Mean (SD)**	**N**	**Mean (SD)**	**N**	**Mean (SD)**	**N**	**Mean (SD)**	**N**	**Mean (SD)**	**N**	**Mean (SD)**	**N**	**Mean (SD)**	**N**	**Mean (SD)**
Scholastic Competence	406	2.91 (.66)	420	3.06 (.60)	420	3.16 (.61)	421	3.10 (.59)	406	3.13 (.58)	344	3.14 (.57)	350	3.1 (.58)	410	3.06 (.58)
Social Acceptance	406	3.13 (.61)	420	3.18 (.66)	420	3.25 (.66)	421	3.22 (.66)	408	3.28 (.56)	346	3.30 (.49)	350	3.28 (.53)	410	3.30 (.58)
Athletic Competence	401	2.55 (.63)	420	2.58 (.61)	420	2.64 (.65)	421	2.64 (.65)	409	2.64 (.63)	345	2.69 (.57)	350	2.61 (.61)	410	2.67 (.61)
Physical Appearance	399	3.04 (.61)	416	3.07 (.66)	420	3.17 (.58)	421	3.06 (.66)	408	3.06 (.58)	346	3.03 (.61)	350	2.99 (.64)	410	2.75 (.65)
Behavioral Conduct	406	3.00 (.59)	415	3.05 (.58)	420	3.08 (.54)	420	2.92 (.65)	410	3.01 (.59)	345	2.99 (.56)	350	2.96 (.58)	410	2.93 (.61)
Global Self -Worth	404	3.38 (.52)	421	3.46 (.49)	420	3.58 (.42)	421	3.49 (.49)	411	3.51 (.45)	346	3.47 (.46)	350	3.43 (.50)	410	3.42 (.50)
Kandel's Depressive Mood Inventory	413	4.01 (5.0)	417	12.61 (4.3)	420	11.36 (4.3)	420	11.7 (4.4)	411	11.49 (4.2)	345	11.62 (4.3)	350	11.71 (4.7)	405	11.49 (4.4)

Table 4

Fixed and Random Effects Estimates for Unconditional Growth Models

	Scholastic Competence	Social Acceptance	Athletic C ompetence	Physical Appearance	Behavioral Conduct	Global Self - Worth
Fixed Effects	**Est**	**Est**	**Est**	**Est**	**Est**	**Est**
Level	3.077**	3.225**	2.616**	3.59**	3.006**	3.475**
Slope	0.019**	0.025**	0.017**	−0.025**	−0.015**	0.002
Random Effects						
Level Variance	0.1602*	0.1483*	0.1704**	0.1571*	0.1253**	0.063*
Slope Variance	0.0058*	0.0068*	0.0055**	0.0081*	0.007**	0.0037*
Level x Slope Covariance	−0.08	−0.26*	0.14**	0.04	0.05	−0.02
Residual Variance	0.1825*	0.1937*	0.1882**	0.2046*	0.1942**	0.1536*
Pseudo R^2 Statistics						
R^2 y, y’	0.46%	0.83%	0.26%	0.97%	0.29%	0.00%
RWP-E	15.59%	17.16%	14.19%	18.30%	16.92%	11.37%
Log-Likelihood	−2333.44	−2408.93	−2384.95	−2450.30	−2394.83	−1916.83

Note:

* p<0.05:

** p<0.01;

R^2 y, y’= the proportion of model explained variance for each domain; RWP-E = the proportion of explaining within-person variance

Table 5

Fixed and Random Effects Estimates for Conditional Growth Models

	Scholastic Competence	Social Acceptance	Athletic Competence	Physical Appearance	Behavioral Conduct	Global Self - Worth
Fixed Effects	**Est**	**Est**	**Est**	**Est**	**Est**	**Est**
Level	3.03**	3.276**	2.737**	3.217**	2.914**	3.504**
Slope	0.011	0.017	0.026**	−0.003	−0.02	0.012
Female x Level	−0.017	0.039	−0.2**	−0.283**	0.116**	−0.034
Adopted x Level	0.044	−0.14**	−0.068	−0.094	0.001**	−0.071
Female x Adopted x Level	0.131	0.022	0.019	0.083	0.157**	0.095
Female x Slope	0.006	0.028	−0.018	−0.013	−0.009	−0.001
Adopted x Slope	0.014	−0.006	0.004	−0.012	0.009	−0.014
Adopted x Female x Slope	−0.011	−0.008	−0.011	−0.038	0.021	−0.01
Random effects						
Level Variance	0.1557*	0.1435*	0.1606**	0.1422*	0.1125**	0.0624*
Slope Variance	0.0058*	0.0066*	0.0053**	0.0075*	0.0069**	0.0036*
Level x Slope Covariance	−0.08	−0.28*	0.11	−0.02	0.02	−0.02
Residual Variance	0.1824*	0.1938*	0.1882**	0.2046*	0.1942**	0.1535*
Pseudo R^2 Statistics						
R^2 y, y’	1.80%	2.61%	3.39%	5.88%	4.45%	0.49%
RWP-E	15.62%	17.13%	14.18%	18.30%	16.90%	11.41%
RBP-L	2.82%	3.24%	5.71%	9.49%	10.23%	0.94%
RBP-S	0.01%	3.04%	3.02%	8.11%	1.79%	2.86%
Log-Likelihood	−2327.57	−2397.97	−2371.15	−2421.78	−2373.99	−1911.95

Note:

*p<0.05:

**p<0.01;

R^2 y, y’= the proportion of model explained variance for each domain, RWP-E = the proportion of explaining within-person variance; RBP-L = the proportion of explained between-person level variance; RBP-S = the proportion of explained between-person linear slope variance

Table 6

Fixed and Random Effects Estimates for with Time-Varying Depressive Symptoms

	Scholastic Competence	Social Acceptance	Athletic Competence	Physical Appearance	Behavioral Conduct	Global Self - Worth
Fixed Effects	**Est**	**Est**	**Est**	**Est**	**Est**	**Est**
Level	4.03**	4.132**	3.255**	4.078**	3.44**	4.223**
Slope	−0.015	−0.025	0.086**	−0.039	−0.089**	0.006
Female × Level	−0.290	−0.183	−0.202	−0.531**	0.129	−0.169
Adopted × Level	0.049	−0.139**	−0.066	−0.09	0.00	−0.072**
Female-Adopted × Level	0.136	0.029	0.021	0.092	0.165**	0.095**
BP Depression	−0.084**	−0.071**	−0.043**	−0.072**	−0.044**	−0.06**
Female × BP Depression	0.024**	0.002	0.002	0.022	0.00	0.013
Female × Slope	−0.009	0.046	−0.065	0.017	0.038	0.004
Adopted × Slope	0.02	0.001	0.006	−0.006	0.016	−0.005
Adopted × female × Slope	−0.006	−0.007	−0.01	−0.036	0.023	−0.004
BP Depression × Slope	0.001	0.002	−0.005**	0.002	0.005	−0.001
Female × BP Dep. × Slope	0.001	−0.001	0.004	−0.003	−0.004	−0.001
WP Depression	−0.068**	−0.061**	−0.017	−0.069**	−0.068**	−0.057**
Female × WP Depression	0.005	0.007	−0.007	0.026	0.011	0.008
BP Depression × WP Dep.	0.002**	0.002	0.00	0.003**	0.003**	0.001
Female × WP Depression	−0.001	0.001	0.001	−0.002	−0.001	0.00
Random effects						
Level Variance	0.1072*	0.1078*	0.1447**	0.1073*	0.0954**	0.038*
Slope Variance	0.0045*	0.0059*	0.0051**	0.0064*	0.0057**	0.0021*
Level × Slope Covariance	0.04	−0.27*	0.07	0.02	0.16**	0.04
Residual Variance	0.1676*	0.18.25	0.1875**	0.1928*	0.1845**	0.1286*
Pseudo R^2 Statistics						
R^2 y, y’	19.69%	15.90%	8.76%	18.36%	12.53%	24.48%
RWP-E	22.50%	21.96%	14.52%	23.00%	21.04%	25.76%

	Scholastic Competence	Social Acceptance	Athletic Competence	Physical Appearance	Behavioral Conduct	Global Self - Worth
RBP-L	33.07%	27.31%	15.08%	31.17%	23.85%	39.68%
RBP-S	22.14%	13.52%	6.8%	20.82%	18.56%	43.47%
Log-likelihood	−2124,08	−2252,32	−2334,15	−2277,18	−2254,48	−1554,25

Note:

* p<0.05:

** p<0.01

R^2 y, y'= the proportion of model explained variance for each domain, RWP-E = the proportion of explaining within-person variance

RBP-L = the proportion of explained between-person level variance, RBP-S = the proportion of explained between-person linear slope variance

J Early Adolesc. Author manuscript; available in PMC 2014 August 18.