

The effects of Autonomy and Relatedness
On Internalizing and Externalizing During adolescence
: Concurrent and longitudinal effects within family context

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Abstract

This study examined the concurrent and longitudinal effects of autonomy and relatedness in family context on internalizing and externalizing during adolescence with two waves. From an ongoing longitudinal study of adolescents, the Maryland Adolescent Development in Context study--- (MADICS), the data of 1,482 adolescents and their parental reports with different backgrounds from one state of the U.S was used for secondary analysis. The present study examined whether the effect of autonomy on internalizing and externalizing increases from earlier wave to later wave while the effect of relatedness on internalizing externalizing decreases from earlier wave to later wave. Also, we examined whether autonomy produces a larger effect than relatedness both on internalizing and externalizing within either wave of adolescence or longitudinally. The current study used the answers of parents and adolescent's' self-administered questionnaire and interview in regard to autonomy, relatedness, internalizing and externalizing from two age groups, or waves. The adolescents were in grade 7 at wave 1 and grade 11 at wave 4. Multiple regressions were used for analysis. The result showed that while support for autonomy had a larger impact on internalizing at wave 4 than at wave 1, for externalizing, the impact of autonomy was smaller at wave 4 than wave 1. There was no evidence that supports the claim that autonomy has a larger impact on internalizing and externalizing than relatedness at any wave. There was a difference between the effect of support for autonomy and relatedness only on internalizing. We also found that there was one interaction effect of autonomy and relatedness on internalizing and externalizing problems only at wave 4 with concurrent effect.

Keywords: autonomy, relatedness, internalizing, externalizing, adolescence, family

The Effects of Autonomy and Relatedness on Internalizing and Externalizing

In 1990, Connell (1990) argued, based on many empirical studies, that healthy psychological development is maximized in contexts in which the following three fundamental human needs are met: feelings of relatedness, feelings of personal efficacy or competence, and feelings of autonomous control over one's life (e.g., Badura, 1994, Ryan & Deci, 2000, Erikson, 1963; Eccles 1997 for a review). Connell (1990) contends that healthy development is likely to occur when these three fundamental needs are met within the context of one's family (Connell, 1990; Ryan & Deci, 2000; Skinner, 1995, see also Eccles, 1997; Barber, 1997)

Support for Autonomy, Relatedness, and Competence During Adolescence

Many researchers have specifically focused on the developmental patterns of these three components during adolescence because many adolescents experience age-related changes in each component, as they experience the transition from childhood to adolescence (Jodl, 1997). Living in multiple contexts, adolescents will choose those contexts that provide them the best opportunities to experience support for these three components and thus may increase their psychological investments in the best fitting contexts (Eccles & Midgley, 1993). For example, adolescents may decrease their psychological investments in those contexts, such as school, that do not provide them with increasing opportunities for autonomous decision-making (see also Eccles, 1997). Thus, optimizing each of the three components may be a very important basis for psychological well-being for adolescents.

Support for Autonomy and Relatedness in the Family Context

Based on the assumption that these three needs play an essential role in adolescents' psychological development, several scholars have argued that autonomy and relatedness in particular may have significant effects on adolescents' psychological functioning, including internalizing and externalizing, within their family context because parents must adjust their parenting strategies to accommodate the adolescent's increasing need for autonomy as they move towards adulthood and are given greater control over their own behaviors due to shifts in school and peer contexts (Jodl, 1997; Eccles, et al., 1993; Allen, Hauser, Eickholt, Bell, & O'Connor, 1994).

Jodl (1997) examined the relationship of autonomy and relatedness in adolescents aged 9 to 17 years as it was expressed in family interactions with measures of adolescent adjustment. She found that difficulties in constructing autonomy and, to a lesser degree, maintaining relatedness were linked to concurrent measures of externalizing behaviors (Jodl, 1997).

Allen and his colleagues (1994) also examined the longitudinal connection between adolescents' internalizing and externalizing and their establishing autonomy and relatedness in their interactions with their parents. They coded family interaction tasks with adolescents aged 14 and 16 years and assessed their depressive affect at age 16 through personal interviews and self-reported internalizing and externalizing behavior at age 17 (Allen et al., 1994). They found that difficulties establishing autonomy and relatedness with one's parents were correlated with both subsequent depressed affect and externalizing behaviors (Allen et al., 1994). More specifically, depressed affect was more closely related to difficulties initiating autonomy while externalizing behaviors were more closely linked to difficulties maintaining a feeling of relatedness (Allen et al., 1994).

Age-Related Changes in the Effects of Support for Autonomy and Relatedness

Even though previous research has documented the association of relatedness and autonomy with indicators of internalizing and externalizing during adolescents in the context of family, there is little evidence regarding age-related changes in the relative strength of these associations over time or in the degree of the interactive predictive effect of the support for relatedness and autonomy on psychological functioning within family context during adolescence. However, Hill and Holmbeck (1986) argued that an increasing need for autonomy is one of the key developmental characteristics of adolescence. As a child goes through the transition into adolescence, his/her increasing desire for autonomy should become increasingly noticeable within the family context (Hill & Holmbeck, 1986). If it is true that the importance of autonomy starts to increase at the beginning of adolescence, there should be observable changes in the strength of the association between support for autonomy within the family and the adolescents' psychological well-being over time.

Furthermore, based on psychoanalytic and neo-analytic theories of autonomy in adolescence, autonomy is defined as separation from parents (Beyer, Goossens, Vansant, & Moors, 2003). This definition of autonomy emphasizes the relational distance between the adolescent and his or her parents, as perceived by the adolescent himself (Beyer et al., 2003). A drive towards separation from parents and desire for independence is believed to emerge at the onset of adolescence (Beyer et al., 2003). In classical psychoanalytical writings (Blos, 1962), adolescents' increased independence from parents is seen as disengagement from an earlier relationship with parents. Therefore, autonomy in this definition can be viewed as a move away from connectedness or relatedness to parents (Blos, 1962). If this is true, then the strength of the predictive association of the magnitude of relatedness to one's parents with adolescents' psychological well-being may decline during the adolescence.

Alternatively, both increasing relatedness and increasing autonomy may be critical for healthy development during adolescence. Allen et al (1994) found positive associations between both autonomy and relatedness, and different indicators of psychological well-being.

Furthermore within most contemporary theories of healthy development, including the work on the importance of authoritative versus authoritarian and laissez faire parenting (Baumrind, 1991; Darling & Steinberg, 1993) and the work by Connell, Deci and Ryan on Self Determination Theory (Connell, 1990; Ryan & Deci, 2000), adolescents should develop best when they have both strong positive relationships with their parents and strong support from their parents for their increasing autonomous control of their own lives. The goal of this study is to empirically evaluate which of these perspectives is better supported by empirical data.

The Present Study

In the present study, we extend prior work in two ways: (1) we compare the predictive effects of autonomy and relatedness on internalizing and externalizing across two different adolescent age groups, and (2) we add a longitudinal perspective on the association between earlier autonomy and relatedness with later internalizing and externalizing. More specifically, the current study includes two waves of data collected from the same group of adolescents during their 7th and 11th grade school years. Using the data from these two waves, we compare the predictive associations between autonomy and relatedness with adolescents' self-reports of internalizing and externalizing for each wave so that we can investigate the age-related changes in the predictive associations between autonomy and relatedness, and internalizing and externalizing across adolescence. In addition, using the two waves of data allows us to investigate the longitudinal associations between autonomy and relatedness in one's family during early adolescence with self-report measures of internalizing and externalizing during

middle adolescence.

We have two main hypotheses. First, we will compare the associations between autonomy and relatedness, and internalizing and externalizing over time in order to compare the predictions based on a neo-analytic framework with those of the parenting style frameworks based on Baumrind's work (1991). Based on theoretical writings from a neo-analytic framework, which contend that the need for autonomy will increase as a child becomes an adolescent while the need for relatedness to parents will decrease as autonomy develops (Beyer et al., 2003), one would predict that autonomy will have an increasing impact on both externalizing and internalizing, while relatedness will have an attenuating impact on those outcomes particularly during later adolescence, or wave 4.

In contrast, the theoretical framework in the parenting style literature leads one to predict that adolescents will fare best if the support they receive for relatedness remains high over both waves and the support for autonomy increases from wave 1 to wave 4. This means that there will be a significant interaction between these two family supports with the association of effect of autonomy on well-being depending on the level of relatedness. Based on these two different predictions, we will examine whether the predictive effect of autonomy on internalizing and externalizing increases from wave 1 to wave 4 while the predictive effect of relatedness on internalizing and externalizing decreases from wave 1 to wave 4.

Second, based on these two different frameworks of autonomy and relatedness, we will also compare the effect of autonomy compared to relatedness on internalizing and externalizing. From psychoanalytic and neo-analytic views on autonomy and relatedness, we can assume that the strength of association of autonomy with externalizing and internalizing will increase while that of relatedness decreases at the beginning of adolescence (Blos, 1962). Also, the importance

of autonomy will start to increase at the onset of adolescence (Beyer et al., 2003). If this is true, autonomy should have a larger impact than relatedness both on internalizing and externalizing during both waves. However, the opposing view holds that adolescents will fare best if the support they receive for relatedness remains high over both waves and the support for autonomy increases from wave 1 to wave 4. If this is true, autonomy should not necessarily have a greater impact on internalizing and externalizing than relatedness at any wave. Thus we will examine whether autonomy produces a larger effect than relatedness both on internalizing and externalizing within either wave of adolescence or longitudinally.

Method

Participants

Families and schools participated in an ongoing longitudinal study of adolescents (the Maryland Adolescent Development in Context Study---MADICS). The initial data were collected in the fall of 1991 from 1,482 families with adolescent children. Each family had a seventh grader attending a public seventh and eighth-grade junior high school. The sample was drawn from a county near Washington DC in the U.S that consists of several different socioeconomic settings including low income, a high-risk urban neighborhood, a middle class suburban neighborhood, and rural, farm-based neighborhoods. The sample was broadly representative of different SES levels. The sample also included a large proportion (61%) of African-American families and families from a wide range of socio-economic backgrounds for both African-American and European-American families.

Letters were sent to the homes of 1,700 seventh graders of selected schools in the county in the fall of 1991. The letters asked parents' permission for their seventh grader, or the target

youth, her parent, and older sibling(s) and secondary caregiver(s), if applicable, to participate in the study. As a result, 1,482 families agreed to participate in the study. The first four waves of data were collected from the adolescents, primary caregivers, secondary caregivers, older siblings, school records, and the 1990 census data banks through in-home and telephone interviews and self-administered questionnaires when the target youth were in middle and high school. Two additional waves were collected one year and three years after the youth had finished high school, respectively. These were self-administered questionnaires and these were completed only by the target youth.

As a whole, the primary caregiver and the target youth were asked to participate in a face-to-face interview that lasted approximately 50 minutes and to complete a self-administered questionnaire which was about 30-minutes in duration. If the seventh grader had an older sibling or secondary caregiver who wished to participate, they were also asked to fill out a self-administered questionnaire similar to that of the target youth.

Although most of the questions were pre-coded, the face-to-face interview also included open-ended questions in order to elicit more information about parental aspirations for their children and the youth's own aspirations. The questionnaires included a broad range of items about family dynamics, family and peer relationships, resources, well-being and stressors, as well as a broad array of indicators of adolescent development. The interviewees were paid \$20.

The male to female ratio of the 1,482 adolescents was approximately 51: 49. There were 1480 primary caregivers, 92% of whom were female, 431 older siblings (50% female), and 789 secondary caregivers, 85% of whom were male in Wave 1 of the study.

The present study used wave 1 and wave 4 data on the adolescents who were in grade 7 during wave 1 and grade 11 during wave 4. Out of the original sample, 1057 adolescents and

their families (71% of the wave 1 sample) participated in face-to-face interviews and completed self-administered questionnaires during wave 4.

Predictor Variables

The predictor variables are the youth's perceived support for autonomy and relatedness from their parents. The scale for support for autonomy captured the degree of parents' intrusiveness with higher values indicating less support for autonomy. It was measured using five items at wave 1 with a 5-point Likert response scale. An example item is "your parent always tells you what to do and how to act". The same set of items was administered during wave 4. The wording of items across waves was identical except that adolescents answered the items separately for both primary care giver (PCG) and secondary care giver (SCG). That is, the example item from wave 1 was asked in two contexts during wave 4: "your (PCG) always tells you what to do and how to act" and "your (SCG) always tells you what to do and how to act", making eight items in total at wave 4. Using a Cronbach alpha indicates acceptable internal consistency for both waves. Alphas were .61 for wave 1 and .69 for wave 4. The table shows example items and their descriptive features (See Table 9).

Adolescents' perceived relatedness with parents was measured with two sets of items for both waves: physical closeness and affection. A set of 3 items of physical closeness tapped into frequencies of activities adolescents engaged in with their parents. An example item is "how often do you and your parent do things together that you enjoy?" The response scale of physical closeness was a 6-point Likert scale. The same items were used again at wave 4 with the same response scale. The affection scale tapped into perceived emotional closeness and support with both PCG and SCG. A set of 10 items operationalized aspects such as sharing and talking about friends and future plans, and parents taking interest in their children's activities with items such

as “My mother takes an interest in my activities”. We used the mean score of these 13 items for relatedness, including both physical closeness and affection scales for wave 1. Similar items were used in Wave 4 but some items were asked for PCG and SCG separately. Thus, there were 17 items on relatedness, including physical closeness and affection scales for wave 4.

Since all items of both wave 1 and wave 4 originally had 6-point Likert response scales for physical closeness, we modified the response scales at the response level with SPSS by multiplying $5/6$ to render those scales comparable to 5-point Likert scales. For the affection scales of wave 1, 3 items originally had 4-point Likert response scales, 4 had 6-point Likert scales, and 3 items had 5-pont Likert scales. For the affection scales of wave 4, 6 items originally had 4-point Likert response scales, 4 had 6-point Likert scales and 4 had 5-point Likert scales. For the affection scales of wave 1 and wave 4, all responses that originally had different response scales have been converted into 5-point Likert response scales for the sake of comparison. Since some were thus modified, the current research used this variable on analysis with careful consciousness of those modifications.

Even though there were two subscales within the variable of relatedness, physical closeness and affection were combined as one scale of relatedness for analysis. Since all affection items were scored on a 5-point Likert scale, all physical closeness items were also scored using 5-point Likert scales when they were combined as one scale. Alphas were .83 for relatedness of wave 1 and .88 for wave 4. The table shows example items and their descriptive features (See Table 9).

Outcome Variables

The outcome variables are the scores for the internalizing and externalizing scales. The scale for internalizing differed across the two waves. For wave 1 there were no items assessing a

youth's view of her own internalizing. Rather, the primary care giver reported about her children's depression (e.g., has sudden changes in mood or feelings); 6 items were employed using a 5-point Likert response scale. For assessment of internalizing at wave 4, we used the youth's responses to the Children's Depression Inventory (CDI), which is a 26 items, symptom-oriented instrument (e.g., in the past two weeks, things bothered me) with 3-point Likert response scale. CDI is often used for assessment of depression in children (Helsel & Matson, 1984). Alphas of internalizing were 0.78 for wave1 and 0.87 for wave 4. The table shows description of each scale of internalizing scale (See Table 9).

The scale of externalizing shows the frequency of youth's externalizing behaviors with higher values indicating more frequent externalizing behaviors. For wave 1 externalizing was assessed using both primary giver's reports about the youth's behaviors and youth's reports about their own behaviors. The items from the primary giver's reports were about anti-social behavior (e.g., has trouble getting along with teachers) and anger (e.g., has a very strong temper and loses it easily), with three items respectively. The items for the youth's reports consist of 4 items of youth anger (e.g., During the last month, including today, how often have you felt so angry you wanted to smash or break something). The total number of items of externalizing at wave 1 was 10 with 5-point Likert response scale. Alphas of externalizing were 0.78 for wave 1. The scale of externalizing of wave 4 consists of two groups of items reported only by the youth: antisocial behavior and delinquent behaviors in school. Antisocial behavior indicates the youth's frequency of doing antisocial behavior (e.g., In the last 6 months, how often have you hit someone because you didn't like something they said or did?) these measures used a 6-point Likert response scale. It had 6 items in total. The delinquent behavior measure asks the youth's frequency of doing delinquent behaviors in school (e.g., In the last 6 months, how often have you

got sent to the principal's office because you had done something wrong?) using a 6-point Likert response scale. This scale had 4 items in total. Alphas of these two scales were 0.74 for antisocial behavior and 0.65 for delinquent behaviors. The table indicates the description of the scales of externalizing at each wave (see Table9).

For the analysis, these two scales were converted into categorical variables with three categories at the response level with SPSS. For the antisocial behavior, the mean score of response was changed into four categories. 0 was coded into 1, from 0 through 0.17 into 2, 0.17 through 0.50 into 3, and 0.75 through the highest score was coded into 4. Likewise, the mean score of response of delinquent behaviors in school was recoded into four categories. 0 was coded into 1, from 0 through 0.40 as 2, from 0.40 through 0.75 into 3, and 0.75 through highest score was coded into 4. Thus, the externalizing behaviors of wave 4 including antisocial behaviors and school delinquent behaviors are analyzed as categorical variables with 4 categories.

Demographic Control Variables

Family socioeconomic status. Because previous research has shown a strong correlation between socioeconomic status and a child's psychological development (McLoyd, 1990), family socioeconomic status was used as a controlling variable. Family socioeconomic status (SES) was estimated using a system of occupational statuses. Socioeconomic status (SES) was categorized into four group; semi-skilled, skilled, professional, and advanced professional in order of 1, 2, 3 and 4. 9.4 % were included in the semi-skilled group, 37.4% were skilled, 24.4% were professional and 15.9% were advanced professional and the rest 12.9% were unspecified.

Marital status. Since past research has shown that marital status could be a predictor of children's development (McLanahan & Sandefur, 1994), it also was used as a control variable for the current research. It had five different family types; biologically intact families, stepfamilies, live-in families, separated/divorced families, and never-married families. 45% were intact families, 41.5% were non-intact families and no family information was available for 13.5% of the families. For the purpose of analyses, marital status was dichotomized into biologically intact families and others. Intact families were coded as 1 and others were coded as 2.

Gender. Past research has provided evidence that there is a gender-based difference in psychological problems (Nolen-Hoeksema & Girgus, 1994; Hankin & Abramson, 2001). Thus the sex of target adolescents was also controlled with males being coded as 1 and females as 2.

Results

To investigate the predictive association of support for autonomy and parent relatedness on dependent variables, multiple regression analyses with controlling variables of sex of target child, socioeconomic status, marital status of parents and interaction factors of autonomy and relatedness were used. At step one child sex, SES and marital status were entered as control variables. At step two, autonomy and relatedness were entered as predictors. In step three, interaction terms between autonomy and relatedness, auto-relatedness interaction was entered.

Autonomy and Relatedness of Wave 1 on Internalizing and Externalizing of Wave 1

From the regression of autonomy and relatedness of wave 1 on internalizing of wave 1, only one control variable, marital status was statistically significant($\beta = .12, p < .001$): Children in

non-intact families reported higher internalizing level (see Table 1). In step two, both autonomy and relatedness significantly predicted internalizing behavior problems. The standardized coefficient of autonomy was .07 ($p = .015$) and that of relatedness was $-.14$ ($p < .001$) (see Table 1). Because the scale of autonomy consisted of all reversed items, the coefficient indicates that the youth who reported lower support for autonomy showed higher internalizing problems. Also, the coefficient of relatedness shows that the youth with weak relatedness showed higher level of internalizing. In step three, the interaction term between autonomy and relatedness did not significantly predict the outcome.

The next set of regression model was set up to predict externalizing behavior problem during wave 1. For the regression of autonomy and relatedness of wave 1 on externalizing of wave 1, the identical order for the regression of autonomy and relatedness of wave 1 on internalizing of wave 1 was used. In step one, variables of child gender, SES and marital status were entered as control variables. In step two, autonomy and relatedness were entered as predictors. In step three, interaction terms between autonomy and relatedness, auto-relatedness interaction was entered.

From the regression of autonomy and relatedness of wave 1 on internalizing of wave 1, all three control variables were statistically significant (see Table 2). Boys reported higher level of externalizing behaviors ($\beta = -.11$, $p < .001$); students living in less-skilled professional showed higher level of externalizing problems ($\beta = -.07$, $p = .013$); and students living in non-intact families reported higher externalizing behaviors ($\beta = .12$, $p < .001$). In step two, both autonomy and relatedness significantly predict externalizing behavior problems. The standardized coefficient of autonomy was .26 ($p < .001$) and that of relatedness was $-.24$ ($p < .001$). Because the scale of autonomy consists of all reversed items, the coefficient indicates that the youth who

reported lower support for autonomy showed more frequent externalizing problems. Also, the coefficient of relatedness shows that the youth with weaker relatedness showed more externalizing behaviors. In step three, the interaction term between autonomy and relatedness did not significantly predict the outcome.

The two regression models for the effect of autonomy and relatedness of wave 1 on internalizing and externalizing of wave 1 reveal that one control variable: marital status, had a significant effect on internalizing, while all three control variables: sex, socioeconomic status and marital status had a significant effect on externalizing.

More importantly, the standardized coefficients of support for autonomy and relatedness when predicting externalizing behaviors are only slightly different ($\beta = .26$, versus $-.24$ with a standard error of $.02$). In contrast, relatedness showed a larger standardized coefficient on internalizing ($\beta = -.14$, with a standard error of $.03$) level than autonomy ($\beta = .07$, with a standard error of $.02$). Thus, there was only a significant difference between coefficients of autonomy and relatedness on internalizing, with relatedness having the larger difference considering the size of standard errors.

Autonomy and Relatedness of Wave 4 on Internalizing and Externalizing of Wave 4

Similarly, two sets of regression analyses of autonomy and relatedness at wave 4 predicting internalizing behavior problems and externalizing behavior problems at wave 4 were conducted. From the regression of autonomy and relatedness of wave 4 on internalizing of wave 4, only one control variable, marital status was statistically significant. More specifically, adolescents living in non-intact families reported higher internalizing level ($\beta = .09$, $p = .018$). At Step two, both autonomy and relatedness significantly predicted internalizing behavior problems. One control variable appeared as another significant control variable in step two: the sex of the target child

became statistically significant ($\beta = .09, p = .008$), meaning that girls reported higher levels of depressed affect (see Table6). From the results of the main effects of autonomy and relatedness, the standardized coefficient of autonomy was .18 ($p < .001$) and that of relatedness was -.26 ($p < .001$). Because the scale of autonomy consists of reversed items, the coefficient indicates that the youth who reported lower support for autonomy showed higher internalizing problems. Also, the coefficient of relatedness showed that the youth with weak relatedness showed higher level of internalizing. In step three, the interaction term between autonomy and relatedness was statistically significant ($\beta = -.08, p = .018$).

To look for more specific patterns of interaction, we divided the continuous variable of autonomy and relatedness into categorical variables with three categories. Based on standardized values, we categorized from the lowest to -1 of z score into -1 and from -1 to 1 into 0, and from 1 to the highest value into 1. Since the autonomy variable has reversed items in it, -1 means the youth reported higher support for autonomy whereas 1 means the youth reported lower support for autonomy. On the other hand, for the relatedness variable, -1 means the target youth has a lower relatedness level while 1 indicates that the target youth has a higher level of relatedness. A scatterplot was constructed in order to look for specific interactive relationships.

The scatter plot of autonomy on internalizing of wave 4 with lines for our three categorical variables of relatedness (see Figure 1), reveals that effect of autonomy on adolescents' internalizing was greater when relatedness was low than when relatedness was higher level. Also the effect of relatedness on internalizing was more pronounced when autonomy was low than when autonomy was higher (see Figure2).

From the regression of autonomy and relatedness of wave 4 on one externalizing behavior: delinquent behaviors in school of wave 4, one control variable, sex of the target youth

was statistically significant: Boys reported higher level of delinquent behaviors in school at wave 4 ($\beta = -.13, p < .001$). In step two, both autonomy and relatedness significantly predicted school delinquent behaviors. The standardized coefficient for support for autonomy was .11 ($p = .002$) and that of relatedness was $-.15$ ($p < .001$) (see Table 7). Because the scale of autonomy is reversed, this coefficient indicates that the youth who reported lower support for autonomy showed more school delinquent behaviors. Also, the coefficient of relatedness shows that the youth with weaker relatedness showed higher level of school delinquent behaviors at wave 4. In Step three, the interaction term between autonomy and relatedness did not significantly predict the outcome.

From the regression of autonomy and relatedness of wave 4 on antisocial behaviors of wave 4, only one control variable, sex of the target youth, was statistically significant: Boys reported higher level of antisocial behaviors at wave 4 ($\beta = -.17, p < .001$). At step two, both autonomy and relatedness significantly predicted antisocial behaviors. The standardized coefficient of autonomy was .14 ($p < .001$) and that of relatedness was $-.10$ ($p = .003$) (see Table 8). The support for autonomy coefficient indicates that the youth who reported lower support for autonomy showed more antisocial behaviors. Also, the coefficient of relatedness showed that the youth with weaker relatedness showed higher level of antisocial behaviors at wave 4. In Step three, the interaction term between autonomy and relatedness did not significantly predict the outcome.

From the three regressions for the effect of autonomy and relatedness of wave 4 on internalizing and externalizing of wave 4, one control variable, sex of target youth, had a significant effect on all dependent variables, although sex appeared significant from second model of internalizing. Although sex variable was a significant control variable for all dependent

variables, it predicted different relationships for internalizing and externalizing. For the internalizing problems, girls reported higher level of internalizing than boys ($\beta = .09, p = .008$) (see Table 6). On the other hand, for the externalizing behaviors, boys showed higher level of school delinquent behaviors ($\beta = -.13, p < .001$) (see Table 7) and more antisocial behaviors ($\beta = -.17, p < .001$) than girls (see Table 8). Marital status was a significant control variable only on internalizing variables.

In terms of the main effects of autonomy and relatedness of wave 4 on internalizing of wave 4 (see Table 6), the standardized coefficient of autonomy was $.18 (p < .001)$ and that of relatedness was $-.26 (p < .001)$. For the delinquent school behaviors (see Table 7), the standardized coefficient of autonomy was $.11 (p = .002)$ and that of relatedness was $-.15 (p < .001)$. Predicting antisocial behaviors (see Table 8), the standardized coefficient of autonomy was $.14 (p < .001)$ and that of relatedness was $-.10 (p = .003)$. Thus, relatedness has a larger coefficient than support for autonomy on internalizing ($\beta = -.26$ versus $\beta = .18$ with a standard error of 0.01). Although relatedness has a larger coefficient than support for autonomy on one of the externalizing behaviors, school delinquency ($\beta = -.15$ versus $\beta = .11$ with standard error of $.06$ and $.05$), the gap was very small considering the standard error. Also, the support for autonomy ($\beta = .14, p < .001$) produced a greater coefficient than relatedness ($\beta = -.10, p = .003$) for the other on externalizing behavior, or antisocial behaviors. However, the standard error of autonomy was $.05$ and that of relatedness was $.07$ so that this gap was also not very large. Thus, there was only a significant difference between the coefficient of autonomy and relatedness on internalizing.

Comparison on the effects of autonomy and relatedness on internalizing and externalizing at wave 1 and wave 4

Based on two sets of regression models for the two waves, we found that the standardized

coefficient of autonomy on internalizing at wave 1 was .07 ($p = .015$) and that on externalizing at wave 1 was .26 ($p < .001$) (see Table 10). For wave 4, the coefficients of autonomy on internalizing was .18 ($p < .001$), on one of the two externalizing behaviors, delinquent school behavior, was .11 ($p = .002$) and on antisocial behavior was .14 ($p < .001$). Thus the support for autonomy at wave 4 ($\beta = .18, p < .001, SE = .01$) produced a greater coefficient than that of wave 1 ($\beta = .07, p = .015, SE = .02$) on internalizing. In contrast, support for autonomy on externalizing behaviors at wave 4 revealed a lower coefficient both for delinquent school behavior ($\beta = .11, p = .002, SE = .05$) and antisocial behavior ($\beta = .14, p < .001, SE = .05$) than wave 1 ($\beta = .26, p < .001, SE = .02$) (see Table 10).

We also found that the standardized coefficient of relatedness on internalizing at wave 1 was $-.14$ ($p < .001$) and that on externalizing at wave 1 was $-.24$ ($p < .001$) (see Table 9). For wave 4, the coefficients of relatedness on internalizing was $-.26$ ($p < .001$), on delinquent school behavior was $-.15$ ($p < .001$) and on antisocial behavior was $-.10$ ($p = .003$). Thus the predictive coefficient for relatedness on internalizing at wave 4 ($\beta = -.26, p < .001, SE = .01$) was higher than the comparable coefficient at wave 1 ($\beta = -.14, p < .001, SE = .03$) (see Table 9). In contrast, the predictive coefficient for relatedness on externalizing at wave 4 was lower both for delinquent school behavior ($\beta = -.15, p < .001, SE = .06$) and antisocial behavior ($\beta = -.10, p = .003, SE = .06$) than at wave 1 ($\beta = -.24, p < .001, SE = .02$) (see Table 10).

Support for Autonomy of Wave 1 Predicting Internalizing and Externalizing at Wave 4

Similarly, three sets of longitudinal regression analyses of support for autonomy and relatedness at wave 1 predicting internalizing behavior problem and externalizing behavior problem at wave 4 were conducted with a similar order of concurrent multiple regression models with two more steps. At step one sex of target youth, SES and marital status were entered as

control variables. At step two, autonomy and relatedness were entered as predictors. In step three, internalizing or externalizing of wave 1 variables were entered as control variables. At step four, interaction term of wave 1 between autonomy and relatedness, auto-relatedness interaction was entered. At step five, autonomy and relatedness of wave 4 were included as family variables.

From the first step of the regression of support for autonomy and relatedness of wave 1 on one of internalizing of wave 4, one control variable, marital status, was statistically significant: Adolescents living in non-intact families reported higher internalizing level ($\beta = .09$, $p = .016$). In step two, however, marital status lost its significance (see Table3). In step two, both support for autonomy and relatedness significantly predict internalizing. The standardized coefficient of support for autonomy was $.10$ ($p = .006$) and that of relatedness was $-.10$ ($p = .009$) (see Table 3). Because the scale of autonomy consists of all reversed items, the coefficient indicates that the youth who reported lower support for autonomy showed more frequent externalizing problems. The coefficient for support for autonomy indicated that the youth who reported lower support for autonomy at wave 1 showed higher levels of internalizing problems at wave 4. Also, the coefficient of relatedness revealed that the youth with weaker relatedness at wave 1 showed more internalizing at wave 4. In step three, internalizing of wave 1 had a significant effect on internalizing in wave 4 ($\beta = .12$, $p = .001$). Thus the youth who reported lower levels of internalizing at wave 1 showed lower levels of internalizing at wave 4. In addition, support for autonomy yielded a larger predictive coefficient ($\beta = .09$, $p = .011$) than relatedness ($\beta = -.07$, $p = .040$) when internalizing of wave 1 was controlled (see Table3). Considering their standard error of $.01$, the difference between the two coefficients was significant. In step four, the interaction term between autonomy and relatedness did not significantly predict the outcome. Also, one control variable, sex appeared as statistically

significant ($\beta = .09, p = .009$). Thus girls demonstrated more internalizing and this variable showed stable significance through step five (see Table 3).

More importantly, in step five, as the support for autonomy and relatedness of wave 4 were added and shown as statistically significant, both support for autonomy and relatedness of wave 1 lost its significant. The coefficient of autonomy of wave 4 was $.16 (p < .001)$, and that of relatedness was $-.26 (p < .001)$.

At the first step of the regression of wave 1, support for autonomy and relatedness on school delinquent behaviors of wave 4, one variable, sex of the target youth, was statistically significant: Boys showed higher levels of school delinquent behaviors ($\beta = -.13, p < .001$). At step two, only support for autonomy of wave 1 significantly predicted wave 4 delinquent behaviors. ($\beta = .07, p = .034$). Because the scale of autonomy consists of all reversed items, the coefficient indicates that the youth who reported lower support for autonomy showed more frequent externalizing problems. This coefficient indicates that the youth who reported lower support for autonomy at wave 1 showed higher levels of school delinquent behaviors at wave 4. In step three, support for autonomy of wave 1 was no longer a significant predictor of W4 school delinquency when Wave 1 externalizing was included as control variable (see Table 4). Instead, wave 1 externalizing was a significant predictor ($\beta = .14, p < .001$). Thus the youth of wave 1 who reported low levels of externalizing showed lower levels of school delinquent behavior at wave 4. In step four, the interaction term between autonomy and relatedness did not significantly predict the outcome (see Table 4). In step five, both wave 4 support for autonomy and relatedness significantly predicted school delinquency. The coefficient for wave 4 support for autonomy was $.09 (p = .014)$, and that of relatedness was $-.14 (p < .001)$.

The regression of autonomy and relatedness of wave 1 on Wave 4 antisocial behaviors

revealed that the sex of the target youth was a statistically significant variable; Boys showed higher levels of antisocial behaviors ($\beta = -.17, p < .001$). At step two, only wave 1 support for autonomy significantly predicted wave 4 antisocial behaviors ($\beta = .08, p = .025$). Because the scale of autonomy consists of all reversed items, the coefficient indicates that the youth who reported lower support for autonomy showed more frequent externalizing problems. This coefficient indicates that the youth who reported lower support for autonomy showed more antisocial behaviors. In step three, wave 1 support for autonomy was no longer a significant predictor of wave 4 antisocial behavior when Wave 1 antisocial behavior was included as a control variable (see Table5). Instead, wave 1 antisocial behavior was a significant predictor ($\beta = .20, p < .001$): Youth of wave 1 who reported low levels of externalizing showed lower levels of antisocial behavior at wave 4. In step four, the interaction term between autonomy and relatedness did not significantly predict the outcome. In step five, wave 4 autonomy and relatedness significantly predicted antisocial behavior with significant coefficients. The standardized coefficient of autonomy of wave 4 was $.11 (p < .001)$, and that of relatedness was $-.09 (p = .016)$.

From the three regression models, the gender of target youth did significantly predict three outcomes, although sex was shown as a significant variable from the fourth model of internalizing (see Table3). Also, internalizing and externalizing of wave 1 had significant effects on internalizing and externalizing of wave 4. There were no interaction terms for these three dependent variables longitudinally. More importantly, the three regression models supported the longitudinal predictive effects of support for autonomy and relatedness only for internalizing once the wave 1 equivalent measure was added as a control. Here, support for autonomy showed ($\beta = .09, p = .011$) a larger coefficient than relatedness ($\beta = -.07, p = .040$), with a standard error

of .01. However, both effects lost their significance when wave 4 support for autonomy and relatedness were added as family variables (see Table3). Finally, based on these models, we found no support for the longitudinal effects of support for autonomy and relatedness on either measure of externalizing behavior.

Discussion

This study investigated the concurrent and longitudinal effects of autonomy and relatedness on internalizing and externalizing. Results showed that: a) adolescents of wave 4, or 11th graders produced larger coefficients of support for autonomy in internalizing than wave 1 while adolescents of wave 4 reported lower coefficients for support for autonomy in both externalizing problems (school delinquent behaviors and antisocial behaviors) than wave 1. Also, the support for relatedness at wave 4 showed a larger coefficient than wave 1 only on internalizing; in contrast it showed a lower coefficient than wave 1 on both externalizing factors; b) there was one interaction effect between support for autonomy and relatedness at wave 4 on internalizing; c) there was a significant difference between the predictiveness of support for autonomy and relatedness on internalizing at wave 1, with relatedness at wave 1 showing a larger coefficient than support for autonomy on internalizing. There was also a significant difference between the predictiveness of support for autonomy and relatedness on internalizing at wave 4 with relatedness at wave 1 yielding a larger coefficient than support for autonomy on internalizing of wave 4; and d) there was one significant difference between the longitudinal predictiveness of Wave 1 autonomy and relatedness on internalizing of wave 4 with support for autonomy of wave 1 yielding a larger longitudinal coefficient than relatedness on internalizing even after internalizing of wave 1 was added as a control variable. However, there were no significant longitudinal effects of autonomy and relatedness of wave 1 even on internalizing once

support for autonomy and relatedness of wave 4 were added as predictors.

The facts that adolescents at wave 4 showed a larger coefficient for support for autonomy than at wave 1 on the internalizing, and a lower wave 4 coefficient than that of wave 1 on externalizing provide partial support for our predictions that the effect of autonomy and relatedness on psychological functioning differs across internalizing and externalizing, with the impact of support for autonomy increasing for both externalizing and internalizing over the course of adolescence.

However, combined with the finding that the relatedness at wave 4 produced a larger coefficient than at wave 1 on internalizing but a lower coefficient than at wave 1 on externalizing, no support was found for predictions based on the psychoanalytic and neo-analytic assumption that support for autonomy would increase its effect on both internalizing and externalizing across adolescence. First, support for autonomy did not yield a larger coefficient for externalizing at wave 4 than at wave 1. Also, both support for autonomy and relatedness yielded a larger coefficient at wave 4 than at wave 1 for predicting internalizing. Thus, there was no decrease in the impact of relatedness on internalizing at wave 4. These results do not corroborate the idea that as support for autonomy increases in its predictive influence on both internalizing and externalizing, the impact of relatedness on internalizing and externalizing should decrease (Blos, 1962).

Also, there was a significant interactive effect of support for autonomy and relatedness at wave 4 on internalizing. Integrating all three findings supports the prediction that these two aspects of support should interact in their influence on adolescent development as Baumrind (1991) argued for effective parenting for adolescents. However this prediction only held for internalizing of later wave. The results suggested that having either good relatedness or high

support for autonomy buffers the negative impact of the other parental characteristic on internalizing symptoms only for older adolescents.

The third set of findings that there was a significant difference in the impact of support for autonomy and relatedness on internalizing at both waves but not on externalizing and that relatedness showed a larger coefficient than support for autonomy on internalizing for both waves fails to support the prediction that support for autonomy will have a greater influence on both internalizing and externalizing than relatedness during adolescence. Similarly, although there were also significant impacts of support for autonomy and relatedness on externalizing at both waves, there were no significant differences between the impacts of autonomy and relatedness on externalizing in either wave. Thus, the results do not support the psychoanalytic and neo-analytic views of the differential importance of support for autonomy and relatedness on development during adolescence (Beyers et al., 2003). The findings also failed to support the idea that as the need for autonomy increases the importance of relatedness should decrease (Blos, 1962). Instead the importance of relatedness remains high and even increases throughout adolescence. Moreover, we could find that relatedness has a larger effect than autonomy on internalizing at both time points during adolescence.

The fourth finding provided even stronger evidence of such effects. The longitudinal regression showed that during wave 1, support for autonomy and relatedness showed a significant effect on internalizing even after internalizing of wave 1 was added as a control variable, indicating that wave 1 family practices predict change over time in internalizing. As would be expected, however, those effects lost their significance when wave 4 indicators of support for autonomy and relatedness were added. Thus, wave 1 family predictors primarily had indirect effects on change in internalizing through their association with wave 4 family

predictors. Additionally, this pattern provides further evidence that support for autonomy does not have a larger impact than relatedness on internalizing and externalizing since the result could not show the significant values after family variables were added.

At the beginning of the study, we tried to examine the association between autonomy and relatedness based on two opposite views toward autonomy and relatedness in relationships. We found that while support for autonomy had a larger impact on internalizing at wave 4 than at wave 1, for externalizing, the impact of autonomy was smaller at wave 4 than wave 1. There was no evidence that supports the claim that autonomy has a larger impact on internalizing and externalizing than relatedness at any wave. There was a difference between the effect of support for autonomy and relatedness on internalizing but this difference was opposite from that predicted by the psychoanalytic perspective. There are some limitations with the current study that need to be considered. This study used different measures of internalizing and externalizing for the different waves. For the measurement of internalizing of wave 1, the report of primary caregiver was used whereas youth's response to the Children's Depression Inventory was used for internalizing of wave 4. Also, the study used both the answers of caregiver and the youth for externalizing of wave 1 but used only the answers of the youth for wave 4. Thus, although we tried to make the scales of different waves comparable, the findings must be considered with cautious notions of these measurements and further research into the questions driving this research should be entertained.

Also, even though the current study produced some results based on multiple regression models, it cannot be claimed that the relationships between autonomy and relatedness to internalizing and externalizing are causal. Because the data are correlational, the current study did not manipulate the predictor variables. Even though there were significant correlations

between predicting and outcome variables and the multiple regression models also supported significant predictive effects of autonomy and relatedness on internalizing and externalizing, it cannot be concluded that relatedness and autonomy are the causes of internalizing and externalizing at any rate.

Despite these limitations, the results from this study shed light on the concurrent and longitudinal effects of support for autonomy and relatedness on internalizing and externalizing during adolescence that was not aligned with some previous data on the effects of adolescent's autonomy and relatedness on psychological functioning. There was only a significant difference between the effects of relatedness and support for autonomy on internalizing at wave 4 with a larger effect for support for autonomy. Also, support for autonomy only increased its effect on internalizing while it decreased its impact on externalizing. In addition, there was only one interaction factor of autonomy and relatedness on internalizing at wave 4. Autonomy showed an increasing effect on internalizing but a decreasing effect on externalizing at the later wave. Relatedness showed the same pattern.

Based on the result of current research, future research should aim to use the same measurements of support for autonomy and relatedness at different waves for a more accurate study. Also, future research should focus more deeply on the interaction effect of support for autonomy and relatedness on internalizing and externalizing which was found only at wave 4 in the result of current study. Future research should focus more on the reasons that support for autonomy and relatedness show their interactive effects only at wave 4 and only for internalizing. Such studies will help uncover the true relationship between support for autonomy and relatedness.

One set of final findings that are of interest involve the fact that there was variance in the

impact of the various demographic variables on both our independent and dependent variables. Some demographic variables, such as marital status, had significant effects on one outcome but not on the other. Likewise some demographic variables, such as socioeconomic status, had significant effects in earlier age group, but not in later group. Future research could likewise more carefully explore the nature of the relationships between these demographic variables and the variables central to our model and inquiry.

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Table 1

Hierarchical Multiple Regression Analyses Predicting Internalizing Problem at Wave 1.

Predictor	Wave 1 Internalizing					
	Model 1		Model 2		Model3	
	B(β)	SE	B(β)	SE	B(β)	SE
Sex of Target youth	-.18(-.15)	.04	-.15(-.12)	.04	-.16(-.13)	.04
Socioeconomic status	-.04(-.05)	.02	-.03(-.05)	.02	-.03(-.05)	.02
Marital status	.15(.12)***	.04	.12(.10)**	.04	.12(0.10)**	.04
Autonomy Wave1			.06(.07)*	.02	.05(0.07)*	.02
Relatedness Wave1			-.13(-.14)***	.03	-.13(-.14)***	.03
Auto-relatedness interaction Wave 1					-.01(-.02)	.02
change of R ²			.03***		0	
Adjusted R ²	.02		.04		.04	

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

Table 2

Hierarchical Multiple Regression Analyses Predicting Externalizing Behavior Problem at Wave 1.

Predictor	Wave 1 Externalizing					
	Model 1		Model 2		Model3	
	B(β)	SE	B(β)	SE	B(β)	SE
Sex of Target youth	-.13(-.11)***	.03	-.12(-.11)***	.03	-.12(-.10)***	.03
Socioeconomic status	-.05(-.07)*	.02	-.04(-.06)*	.02	-.04(-.06)*	.02
Marital status	.13(.12)***	.03	.07(.06)*	.03	.07(.06)*	.03
Autonomy Wave1			.19(.26)***	.02	.19(.26)***	.02
Relatedness Wave1			-.20(-.24)***	.02	-.20(-.24)***	.02
Auto-relatedness interaction Wave 1					.006(.01)	.02
change of R ²			.15***		0	

Adjusted R² .03 .18 .18

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

Table 3

Hierarchical Multiple Regression Analyses Predicting longitudinal effect on Internalizing Problem at Wave 4.

Predictor	Wave 4 Internalizing									
	Model 1		Model 2		Model3		Model 4		Model5	
	B(β)	SE	B(β)	SE	B(β)	SE	B(β)	SE	B(β)	SE
Sex of Target youth	.03(.06)	.02	.03(.06)**	.02	.04(.06)**	.02	.03(.06)**	.02	.05(.09)**	.02
Socioeconomic status	.01(.05)	.01	.02(.06)	.01	.02(.06)	.01	.02(.05)	.01	.02(.06)	.01
Marital status	.05(.09)*	.02	.04(.06)*	.02	.03(.06)	.02	.03(.05)	.02	.03(.06)	.02
Autonomy Wave1			.03(.10)**	.01	.03(.10)*	.01	.03(.08)*	.01	.01(.03)	.01
Relatedness Wave1			-.04(-.10)**	.01	-.03(-.07)*	.01	-.03(-.07)*	.01	.01(.03)	.02
Internalizing Wave1					.05(-.12)*** ($p = .001$)	.02	.05(.11)*** ($p = .001$)	.02	.04(.10)**	.02
Auto-related interaction Wave 1							-.01(-.05)	.01	-.01(-.05)	.01
Autonomy Wave4									.06(.16)***	.01
Relatedness Wave4									-.10 (-.26)***	.02
change of R ²			.02***		.01***			.00		.09***
Adjusted R ²	.0		.03		.04		.04		.13	

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

Table 4

Hierarchical Multiple Regression Analyses predicting longitudinal effect on school delinquent Problem at Wave 4.

Predictor	Wave 4 Delinquent behavior									
	Model 1		Model 2		Model3		Model4		Model5	
	B(β)	SE	B(β)	SE	B(β)	SE	B(β)	SE	B(β)	SE
Sex of Target youth	-.31(-.13)***	.08	-.30(-.13)***	.08	-.27(-.12)***	.08	-.27(-.12)***	.08	-.24(-.10)**	.08
Socioeconomic status	-.03(-.03)	.04	-.03(-.02)	.04	-.01(-.01)	.04	-.01(-.01)	.04	-.009(-.007)	.04
Marital status	.02(.009)	.08	-.02(-.008)	.08	-.03(-.01)	.08	-.03(-.01)	.08	-.01(-.006)	.08
Autonomy Wave1			.11(.07)*	.05	.05(.04)	.05	.05(.04)	.05	.02(.01)	.05
Relatedness Wave1			-.10(-.06)	.06	-.05(-.03)	.06	-.05(-.03)	.06	.05(.03)	.07
External Wave1					.29(.14)***	.08	.29(.14)***	.08	.27(.13)***	.08
Auto-relatedness interaction Wave 1							-.003(-.003)	.04	-.002(-.002)	.04
Autonomy Wave4									.13(.09)*	.05
Relatedness Wave4									-.24(-.14)***	.06
change of R ²			.01*(p= .01)		.02***		.00		.03***	
Adjusted R ²	.02		.02		.04		.04		.06	

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

Table 5

Hierarchical Multiple Regression Analyses Predicting longitudinal effect on antisocial behavior Problem at Wave 4.

Predictor	Wave 4 Antisocial behavior									
	Model 1		Model 2		Model3		Model4		Model5	
	B(β)	SE	B(β)	SE	B(β)	SE	B(β)	SE	B(β)	SE
Sex of Target youth	-.38(-.17)***	.08	-.37(-.16)***	.08	-.32(-.14)***	.08	-.31(-.14)***	.08	-.29(-.13)***	.08
Socioeconomic status	-.02(-.02)	.04	-.02(-.01)	.04	0(0)	.04	.003(.003)	.04	.006(.005)	.04
Marital status	-.08(-.04)	.08	-.12(-.05)	.08	-.14(-.06)	.08	-.14(-.06)	.08	-.11(-.05)	.08
Autonomy Wave1			.11(.08)*	.05	.04(.03)	.05	.05(.03)	.05	.008(.005)	.05
Relatedness Wave1			-.08(-.05)	.06	-.003(-.002)	.06	-.005(-.003)	.06	.05(.03)	.06
External Wave1					.41(.20)***	.08	.41(.20)***	.08	.39(.19)***	.07
Auto-relatedness interaction Wave 1							.05(.04)	.04	.05(.04)	.04
Autonomy Wave4									.17(.11)***(p =.001)	.05
Relatedness Wave4									-.15(-.09)*	.06
change of R ²			.01*		.03***		.002		.02***	
Adjusted R ²	.03		.03		0.07		.07		.09	

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

Table 6

Hierarchical Multiple Regression Analyses Predicting internalizing problem at Wave 4.

Predictor	Wave 4 Internalizing					
	Model 1		Model 2		Model3	
	B(β)	SE	B(β)	SE	B(β)	SE
Sex of Target youth	.03(.06)	.02	.05(.09)**	.02	.05(-.08)*	.02
Socioeconomic status	.01(.05)	.01	.02(.06)	.01	.02(.06)	.01
Marital status	.05(.09)*	.02	.04(.07)*	.02	.04(.07)*	.02
Autonomy Wave4			.07(.18)***	.01	.07(.18)***	.01
Relatedness Wave4			-.11(-.26)***	.01	-.10(-.26)***	.01
Auto-relatedness interaction Wave 4					-.02(-.08)*	.01
change of R ²			0.11***		0.006*	
Adjusted R ²	0.007		0.12		0.12	

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

Table 7

Hierarchical Multiple Regression Analyses Predicting school delinquent behavior problem at Wave 4.

Predictor	Wave 4 Delinquent behavior					
	Model 1		Model 2		Model3	
	B(β)	SE	B(β)	SE	B(β)	SE
Sex of Target youth	-.31(-.13)***	.08	-.27(-.12)***	.08	-.26(-.12)*** ($p=0.001$)	.08
Socioeconomic status	-.03(-.03)	.04	-.02(-.02)	.04	-.02(-.02)	.04
Marital status	.02(0.009)	.08	.01(.006)	.08	.01(0.004)	.08
Autonomy Wave4			.16(.11)**	.05	.17(.11)**	.05
Relatedness Wave4			-.25(-.15)***	.06	-.25(-.15)***	.06
Auto-relatedness interaction Wave 4					.04(.04)	.04

change of R ²		0.04***	0.001
Adjusted R ²	0.02	0.05	0.05

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

Table 8

Hierarchical Multiple Regression Analyses Predicting antisocial behavior problem at Wave 4.

Predictor	Wave 4 Antisocial behavior					
	Model 1		Model 2		Model3	
	B(β)	SE	B(β)	SE	B(β)	SE
Sex of Target youth	-.38(-.17)***	.08	-.35(-.15)***	.08	-.34(-.15)***	.08
Socioeconomic status	-.02(-.02)	.04	-.02(-.01)	.04	-.02(-.01)	.04
Marital status	-.08(-.04)	.08	-.08(-.03)	.08	-.08(-.04)	.08
Autonomy Wave4			.21(.14)***	.05	.21(.14)***	.05
Relatedness Wave4			-.17(-.10)**	.06	-.17(-.10)**	.06
Auto-relatedness interaction Wave 4					.03(.02)	.04
change of R ²			0.03***		0.001	
Adjusted R ²	0.03		0.06		0.06	

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

Table 9

Descriptions of predictor and outcome variables of wave1 and wave 4.

	Number of items	N (Valid)	Mean	SD	Alpha
Autonomy-wave1 Example: Your parent always tells you what to do and how to act Response scale: 1= almost never through 5= almost always	5	1481 (1444)	2.705	0.81	0.61
Autonomy-wave4 Mean of eight youth items: Your (PCG) is always telling you what to do and how to act 1=Almost never through 5=almost always	8	1054 (616)	2.64	0.75	0.69
Relatedness-wave1(physical) Mean of three youth items: Do something active together like playing sports/ going for walks with your immediate family? 1=almost never through 6=almost every day, (affection) Mean of ten youth items: My mother takes an interest in my activities? 1= almost never through 5= almost always	13	1480 (1278)	3.46	0.68	0.83
Relatedness-wave4 (physical) Mean of three youth items: Do something active together like playing sports or going for a walk with your immediate family? 1= almost never through 6=almost every day, (affection) Mean of fourteen youth items: How close do you feel to your (PCG)? 1=Not very close through 4= Extremely close	17	1055 (606)	3.24	0.70	0.88
Internalizing-wave1 W1 depression Mean of six PCG items: Has sudden changes in mood or feelings 1=almost never through 5=almost always	6	1460 (1438)	1.82	0.62	0.78
Internalizing-wave4	26	989	1.37	0.28	0.87

EFFECTS OF AUTONOMY AND RELATEDNESS ON INTERNALIZING AND EXTERANLIZING

Mean of 26 Children's Depression Inventory (CDI) items:

I am sad 1= once in a while through 3= All the time

Externalizing-wave1	10	1482	1.90	0.56	0.78
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Mean of four youth items:

(1440)

During the last month, including today, how often have you felt so angry you wanted to smash or break something?

1= almost never through 5=almost always,

Mean of three PCG items:

Has trouble getting along with other children 1=almost never through 5=almost always

Antisocial behavior-wave4	6	1046	0.38	0.57	0.74
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Mean of 6 youth items:

In the last 6 months, how often have you done something pretty risky because it was a real kick? 0=never through 5=more than 20 times

Delinquent behavior in school – wave4	4	1040	0.66	0.75	0.65
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Mean of 4 youth items:

In the last 6 months, how often have you skipped a class without a valid excuse?

0= never through 5= more than 20 times

Table 10

Multiple Regression Analyses over the effect of autonomy and relatedness on internalizing and externalizing both at wave1 and wave 4 and longitudinal effects on outcome variables.

Predictor	W1	W1	W4	W4	W4
	Internalizing	Externalizing	Internalizing	Delinquent	Antisocial
W1 Autonomy	.07* (.02)	.26***(.02)	.10**(.01)	.07*(.05)	.08*(.05)
W1 Relatedness	-.14***(.03)	-.24***(.02)	-.10**(.01)	-.06(.06)	-.05(.06)
W4 Autonomy	-	-	.16**(.01)	.09*(.05)	.11***(.05)
W4 Relatedness	-	-	-.26**(.02)	-	-.09*(.06)
W1 Auto-relate interaction	-.02(.02)	.01(.02)	-.05(.01)	.14***(.06)	.04(.04)
W4 Auto-related Interaction	-	-	-.08*(.01)	.04(.04)	.02(.04)
Sex of target youth	-.15(.04)	-.11***(.03)	.06**(.02)	-.13*** (.08)	-.17**(.08)
W1 Autonomy with W1 Internal or External	-	-	.10*(.01)	.04(.05)	.03(.05)
W1 Relatedness with W1 Internal or External	-	-	-.07*(.01)	-.03(.06)	-.002(.06)
W1 Autonomy With W4 Autonomy& Relatedness	-	-	.03(.01)	.01(.05)	.005(.05)
W1 Relatedness with W4 Autonomy and relatedness	-	-	.03(.02)	.03(.07)	.03(.06)
Adjusted R square	.04	.18	.13	.06	.09

Figure 1. Scatterplot of autonomy and internalizing of wave 4 with lines for three categorical variable of relatedness of wave 4

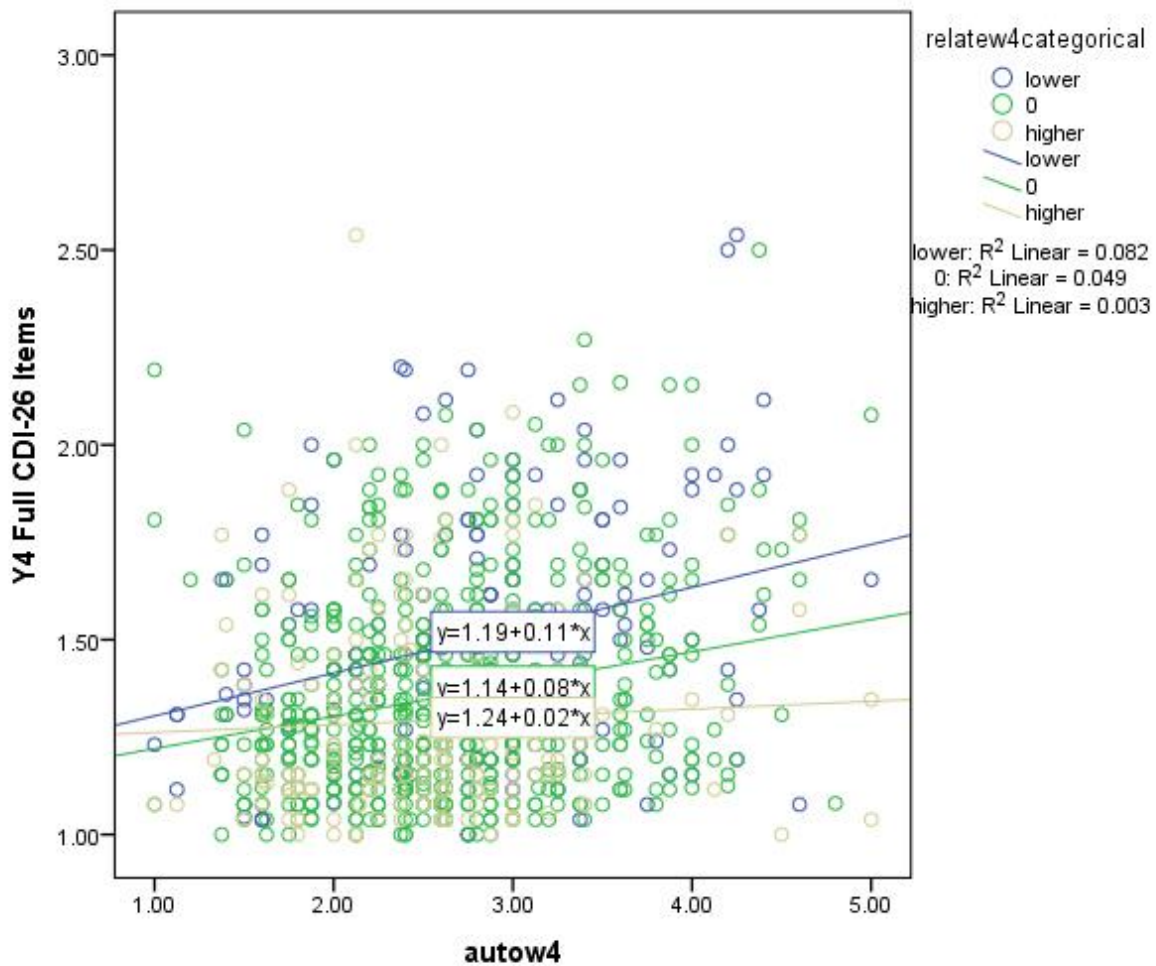


Figure 1. The scatter plot of autonomy on internalizing of wave 4 with lines for our three categorical variables of relatedness reveals that effect of autonomy on adolescents' internalizing was greater when relatedness was lower than when relatedness was higher level.

Figure 2. Scatterplot of relatedness and internalizing of wave 4 with lines for three categorical variable of autonomy of wave 4

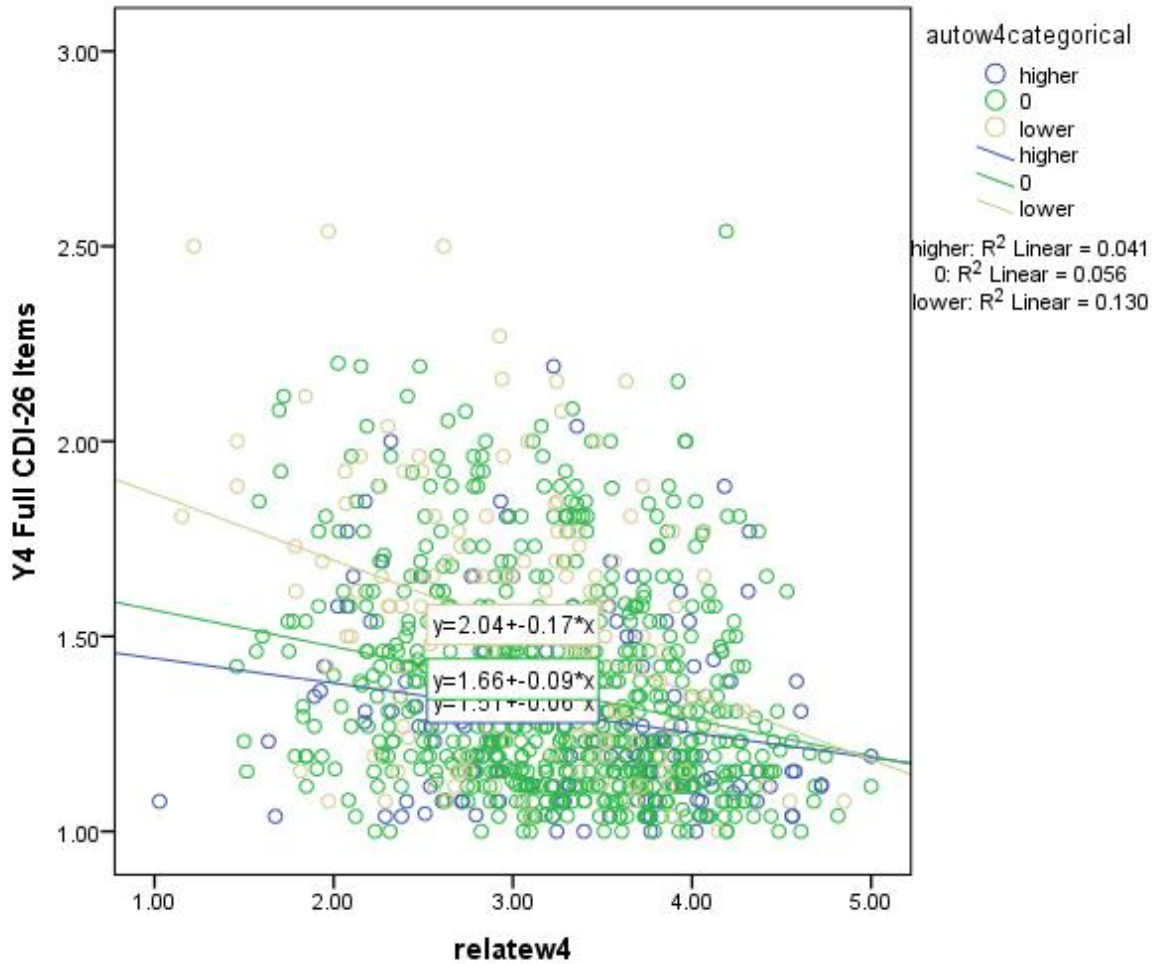


Figure 2. The scatter plot of relatedness on internalizing of wave 4 with lines for our three categorical variables of autonomy reveals the effect of relatedness on internalizing was more pronounced when autonomy was lower than when autonomy was higher.