Published in final edited form as:

Pers Soc Psychol Bull. 2012 April ; 38(4): 415–428. doi:10.1177/0146167211427149.

Agentic and Communal Traits and Health: Adolescents with and without Diabetes

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Abstract

We examined whether agentic and communal traits are associated with relationship and health outcomes among adolescents with and without diabetes. We interviewed 263 teens (average age 12; 132 type 1 diabetes; 131 healthy) on an annual basis for five years. We measured agency, communion, unmitigated agency, unmitigated communion as well as parent and peer relationship quality, psychological distress, and diabetes health. In concurrent and lagged multi-level models, unmitigated communion and unmitigated agency were associated with poor relationship outcomes and greater psychological distress for those with and without diabetes. In lagged analyses, unmitigated communion predicted deterioration in diabetes health. Communion and agency were associated with positive relationship and health outcomes, with the former being stronger than the latter. These results underscore the need to focus on unmitigated agency and unmitigated communion when studying the implications of personality for health during adolescence.

Keywords

Gender Roles; Agency; Communion; Adolescence; Health; Diabetes

Two areas of research in which sex differences are pervasive are relationships and health. In terms of relationships, women are more likely than men to perceive that support is available from network members (Barry, Madsen, Nelson, Carroll, & Badger, 2009; Kendler, Myers, & Prescott, 2005) and are more likely than men to have someone available to talk to when they are distressed (Matthews, Manor, & Power, 1999). These findings generalize across many cultures (Okamoto & Tanaka, 2004). In terms of health, males have higher rates of mortality than females at every age, but females have higher rates of morbidity compared to males (Case & Paxson, 2005). These findings also extend across many cultures.

Many of these sex differences in relationships and health first appear during adolescence. Starting in middle school, girls report that their friendships are closer and more satisfying than boys do (Linden-Andersen, Markiewicz, & Doyle, 2009; Swenson & Rose, 2009). As adolescents, girls also perceive relationships as more supportive than boys (Rueger, Malecki, & Demaray, 2010). In terms of mental health, the sex difference in depression first emerges during adolescence (Twenge & Nolen-Hoeksema, 2002). Chronic illnesses, such as asthma and migraine headaches, as well as general physical symptoms, such as stomach problems, emerge more frequently among girls than boys during adolescence (Sweeting & West, 2003). The emergence of sex differences in physical health during adolescence extends across cultures (Torsheim et al., 2006).

There are a variety of explanations for these sex differences, one of which has to do with the way that females and males are socialized. Females are socialized to be relationship-oriented or communal, and males are socialized to be self-oriented or agentic (Bem, 1974; Spence, Helmreich, & Stapp, 1974). Agency and communion are terms that were originally developed by Bakan (1966) to reflect two fundamental modalities of human existence. Agency reflects one's existence as an individual, and communion reflects the participation of an individual in a larger organism of which he or she is a part. Bakan tied these constructs to gender, referring to agency as the male principle and communion as the female principle. Indeed, there is a wealth of evidence that women score higher than men on measures of communion, and men score higher than women on measures of agency (see Helgeson & Fritz, 1999, for a review).

A great deal of research has examined the implications of agency and communion for health. When agency and communion have been examined as dimensions of interpersonal behavior via the Interpersonal Circle (Wiggins & Trapnell, 1996), higher scores on the agency or dominance dimension have been linked to greater risk of physical illness, whereas higher scores on the communion or affiliation dimension have been linked to reduced risk (Smith et al., 2008; Smith, Traupman, Uchino, & Berg, 2010). Regarding relationships, higher scores on agency have been associated with marital conflict, whereas higher scores on communion have been linked to higher marital quality and greater perceived support (Smith et al., 2010). When agency and communion are measured by the scales first considered to reflect gender roles (Bem, 1974; Spence et al., 1974) but later renamed to reflect the personality traits that are associated with masculinity (agency) and femininity (communion; Spence, 1993), communal traits are related to positive relationship outcomes, even when sex is statistically controlled (Helgeson, 1994; Helgeson & Fritz, 1998; Reevy & Maslach, 2001), but relations to mental or physical health outcomes are less clear (Helgeson & Fritz, 1998; Hirokawa & Dohi, 2007). By contrast, agentic traits are consistently related to better mental and physical health, but associations to relationship outcomes are less clear (Helgeson & Fritz, 1999; Helgeson & Lepore, 2004; Priess, Lindberg, & Hyde, 2009).

Some of these inconsistencies have been reconciled by distinguishing the broad traits of agency and communion from two more specific traits that have implications for relationships and health—unmitigated agency and unmitigated communion. Bakan (1966) argued that it was important for agency to be mitigated by communion and that “unmitigated agency” would be associated with a wide range of health hazards. Unmitigated agency is characterized by arrogance, cynicism, and greed and is defined as a focus on the self to the exclusion of others (Helgeson, 1994; Spence, Helmreich, & Holahan, 1979). Unmitigated agency is higher in males than females, positively correlated with agency, negatively correlated with communion, but cannot be reduced to a combination of agency and communion when predicting relationship and health outcomes (Helgeson & Fritz, 1999). In terms of the Big Five personality traits, unmitigated agency is most strongly related to low agreeableness but also with low conscientiousness and high neuroticism (Helgeson & Fritz, 2000). In terms of the Interpersonal Circle, unmitigated agency is best represented by the quadrant reflecting high agency and low communion, labeled as arrogant and calculating (Wiggins & Broughton, 1985). Interpersonally, unmitigated agency is related to being domineering, cold, and vindictive, to having conflictual interactions with others, and to antisocial behavior (Fritz & Helgeson, 1998; Helgeson & Fritz, 1999; Spence et al., 1979). Unmitigated agency also has been described as narcissistic self-assertion (Buss, 1990), and is compatible with the key traits of narcissism—exaggerated self-importance and lack of empathy. In studies of men with prostate cancer and persons with heart disease, unmitigated agency is related to greater adjustment difficulties (Helgeson, 1993; Helgeson & Fritz, 1999; Helgeson & Lepore, 1997; 2004).

Although Bakan never used the term “unmitigated communion,” he also suggested that communion ought to be mitigated by agency but did not discuss the health consequences. It was Spence et al. (1979) who introduced the construct of unmitigated communion which was then elaborated by Helgeson (1994; Helgeson & Fritz, 1998). Unmitigated communion is defined as a focus on others to the exclusion of the self and is characterized by an overinvolvement in others’ problems and self-neglect. Unmitigated communion is higher in females than males, positively correlated with communion, inversely correlated with agency, but cannot be reduced to a combination of agency and communion (Helgeson & Fritz, 1999). Unmitigated communion also is not reducible to the Big Five personality traits (Helgeson & Fritz, 1998). Its highest correlation is with agreeableness, but communion is more strongly associated with agreeableness and statistically accounts for the relation of unmitigated communion to agreeableness. The placement of unmitigated communion on the Interpersonal Circle is less clear. It appears to be most similar to the quadrant that reflects high communion and low agency, labeled unassuming-ingenuous, but relations of this quadrant to unmitigated communion have not been empirically examined. This quadrant does not capture the essence of unmitigated communion—the involvement in others at the expense of the self. One difficulty with locating unmitigated communion on the Interpersonal Circle is that the Interpersonal Circle reflects “interpersonal agency” whereas unmitigated communion implies a lack of personal agency (i.e., neglecting the self’s needs) but not necessarily a lack of interpersonal agency (i.e., control or influence over others). Interpersonally, unmitigated communion is related to being intrusive, overly nurturant, exploitable, and to having difficulties with assertion in relationships (Fritz & Helgeson, 1998; Helgeson & Fritz, 1999), and to sociotropic vulnerabilities (Bruch, 2002). Unmitigated communion has been associated with poor adjustment to breast cancer (Helgeson, 2003) and heart disease (Helgeson, 1993; Helgeson & Fritz, 1999).

Much of the research on agency and communion, and their unmitigated counterparts, has focused on adults or college students. There is much less research on younger people. Sex differences in communal and agentic traits may increase during adolescence as gender-role socialization pressures increase. Adolescence has been referred to as a time of “gender intensification” (Hill & Lynch, 1983), which means that gender roles and their associated norms become more salient to females and males. Due to both external and internal pressures, girls become increasingly concerned with adhering to the female gender role to behave communally, and boys become increasingly concerned with adhering to the male gender role to behave in an agentic manner. However, the empirical evidence for gender intensification is not clear (Aube, Fichman, Saltaris, & Koestner, 2000; Fiebig, 2008; Priess et al., 2009).

If sex differences in relationships and health emerge or increase during adolescence, and adolescence is a time when agentic and communal traits become more salient, links of these traits to relationship and health outcomes should be observed during adolescence. One reason that the implications of agentic and communal traits for health among adolescents has not received much attention is that younger people are typically healthy. However, one group of adolescents for whom health concerns are prominent is adolescents with type 1 diabetes. Adolescents with type 1 diabetes have to execute a series of health behaviors on a daily basis (e.g., diet, administer insulin, monitor blood glucose) in order to prevent acute problems (hypoglycemia) as well as long-term disease complications (e.g., damage to eyes, kidneys, nerves and blood vessels; Diabetes Control and Complications Trial Research Group, 1993).

Some studies have examined sex differences in diabetes health but findings are not clear. Some studies have shown that girls have poorer diabetes outcomes than boys (e.g., Pinar, Arslanoglu, Isguven, Cizmeci, & Gunoz, 2003), some have shown no sex differences

(Greene, Mandleco, Roper, Marshall, & Dyches, 2010; Korbel, Wiebe, Berg, & Palmer, 2007), and yet others have mixed findings (Pereira, Berg-Cross, Almeida, & Machado, 2008). However, we argue that agentic and communal traits may be more strongly related than biological sex to diabetes outcomes. In two studies of adolescents with type 1 diabetes, we showed that unmitigated communion was related to increased psychological distress and poor metabolic control, whereas communion was not (Helgeson & Fritz, 1996; Helgeson, Escobar, Siminerio, & Becker, 2007). One of these studies employed two waves of data from the sample used in the present study (Helgeson et al., 2007). However, this report did not have the longitudinal perspective of the present research (5 years), did not include relationship outcomes, and did not include measures of agency and unmitigated agency.

Study Goals and Hypotheses

The primary goal of the study was to examine whether agentic and communal traits were associated with relationship and health outcomes both cross-sectionally and longitudinally over a 5-year period spanning early to middle adolescence. For those with diabetes, we examined whether agentic and communal traits also were associated with diabetes outcomes. We hypothesized that agency would be associated with less psychological distress and good diabetes health, communion would be related to good relationships, and both unmitigated agency and unmitigated communion would be related to poor relationships, more psychological distress, and poor diabetes health. We had two distinct measures of psychological distress—depressive symptoms and anger—hypothesizing that unmitigated communion would be most predictive of depressive symptoms and unmitigated agency would be most predictive of anger. We also statistically controlled for biological sex because we hypothesized that these traits would be predictive of relationship and health outcomes above and beyond sex. Because health is a more relevant outcome for those with diabetes than without diabetes, we hypothesized that agentic and communal traits would be more strongly related to health outcomes among those who had diabetes.

A secondary goal was to examine whether agentic and communal traits changed over the course of early to middle adolescence. Because the research on gender intensification theory is not clear, and we had data available on agentic and communal traits over the period of early to middle adolescence, we took the opportunity to test gender intensification. According to this theory, sex differences in agentic and communal traits should increase with age.

Method

Participants

We enrolled 132 adolescents with type 1 diabetes (70 girls, 62 boys) and 131 adolescents without diabetes (67 girls, 64 boys) into the study. Adolescents were eligible to participate in the study if they were in the 5th, 6th, or 7th grade. Ages ranged from 10.70 to 14.21, with a mean of 12.08 ($SD = .73$). The majority of children (80%) were ages 11 and 12 at study start. Males and females were of a similar age. The majority of participants were white (93% diabetes; 91% healthy). Household structure was the same for both groups with nearly three-quarters living with their biological mother and father (74% diabetes; 73% healthy). The four factor Hollingshead index (1975) of social status (mother and father education and occupation) revealed an average score of 41.97 ($SD = 11.05$), which reflects the lower end of technical workers, medium business, and minor professionals. Adolescents with diabetes had the illness between 1 and 13 years ($M = 4.91$; $SD = 2.97$).

Procedure

Adolescents with diabetes were recruited from a local Children's Hospital. Letters of invitation ($n = 307$) were sent to all adolescents with type 1 diabetes who were approximately 11 to 13 years of age. Of these, 20 families returned postcards refusing contact about the study. Of the remaining 287 families, we reached 261 and determined that 171 were eligible (diagnosed with type 1 diabetes for at least one year; no other major chronic illness). Of eligible families, 132 (77%) agreed and 39 refused.

Healthy adolescents were recruited from two sources: three health fairs at area malls ($n = 70$) and from a local pediatric physician network ($n = 61$). The physician network selected all families from their database in geographic areas that were comparable to where the diabetes group was located and within our age range. They divided that total number by the number of letters requested, and, using the quotient (n), sent letters to every n th family. Of the 156 letters sent, 33 people returned postcards refusing contact about the study without us being able to determine eligibility. Of the remaining 123 families, we reached 112 by phone and determined that 93 were eligible (had no major chronic illness). Of those, 61 (66%) agreed to be in the study.

The study was approved by the Institutional Review Boards of the involved institutions. Parental consent and child assent were obtained in person at the time of the initial (Time 1 [T1]) interview. Adolescents with diabetes were interviewed in the General Clinical Research Center immediately before or after their regular clinic appointment. Healthy adolescents were interviewed in their homes. Adolescents were interviewed on an annual basis for 5 years. Retention was excellent. Of those enrolled in the study at T1, participation rates were 96% diabetes and 98% healthy at Time 2 (T2); 95% diabetes and 98% healthy at Time 3 (T3); 96% diabetes and 99% healthy at Time 4 (T4); and 95% diabetes and 98% healthy at Time 5 (T5).

Instruments

All instruments were administered at each of the five waves of assessment and completed by adolescents, with the exception of pubertal status which was completed by parents.

Pubertal status—Parents completed the parent version of Carskadon and Acebo's (1993) self-report of pubertal status. The authors showed that parent ratings were strongly correlated with child and pediatrician ratings of Tanner stages. When parents did not complete the questionnaire, we used physician rating of Tanner stage. At T1, physician ratings were highly correlated with parent report, *Spearman's rho* = .71, $p < .001$.

Agentic and communal traits—Although the four agentic and communal traits have been distinguished by factor analysis among adults (Helmreich, Spence, & Wilhelm, 1981), there was not a single instrument that captured all four agentic and communal traits in children. Thus, we adapted items from related scales to conceptually reflect the traits under study. All items, shown in Appendix A, were statements for which respondents indicated their extent of agreement on a 5-point scale (1=strongly disagree; 5 = strongly agree).

Unmitigated communion was assessed with Helgeson's 9-item measure (1993; Fritz & Helgeson, 1998). The wording of some items was slightly modified to be more easily understood by younger adolescents. Previous research has shown that this scale demonstrates acceptable internal consistency, ranging from .7 to .8, and high test-retest reliability (Fritz & Helgeson, 1998; Helgeson & Fritz, 1999), including a study of adolescents with diabetes (Helgeson & Fritz, 1996). This scale taps placing others' needs

before one's own and distress over concern for others. Internal consistencies across the five waves of assessment ranged from .70 to .81.

Unmitigated agency was assessed with a modification of the Extended Personal Attributes Questionnaire subscale (Spence et al., 1979). The original subscale consists of adjective pairs that are rated on 5-point bi-polar scales (e.g., "not at all cynical"; "very cynical"). To facilitate comprehension for adolescents, these words were placed into sentences, as shown in Appendix A. Internal consistencies across the five waves of assessment ranged from .71 to .78.

Communion was assessed with a modified version of the 8-item subscale from the Personal Attributes Questionnaire (Spence et al., 1974). The items reflect a positive other-orientation. Like the unmitigated agency scale, items were modified from bi-polar scales ("not at all gentle"; "gentle") to sentences (e.g., "I am very gentle."). One item ("I am emotional") was removed from the scale after T1 because it detracted from the internal consistency. The final 7 items are shown in Appendix A. Internal consistencies ranged from .78 to .83.

Agency was assessed with 10 items from two versions of the Personal Attributes Questionnaire tailored for children (Spence & Hall, 1996; Hall & Halberstadt, 1980). Items were chosen that reflected a positive focus on the self. Because 3 items detracted from the internal consistency at T1, they were removed from successive waves of assessment. Internal consistencies of the remaining 7-item scale were somewhat lower than the other scales, ranging from .57 to .66.

Parent relationship—We measured parent relationship quality with Kerr and Stattin's (2000) 8-item measure. Adolescents rated the frequency of 8 items for mother and father separately on a scale from 1 (never) to 5 (very often). Items included "How often do you and your mom understand each other?" and "How often does your dad support and encourage you?" Internal consistencies ranged from .80 to .88 for mother relationship quality and .87 to .92 for father relationship quality. Because mother relationship quality and father relationship quality were correlated at each wave of assessment (r 's ranged from .38 to .48, all p 's < .001), we averaged the two to form an overall parent relationship quality index.

Friend relationship—We administered the 6 scales from the Berndt and Keefe (1995) friendship questionnaire: companionship, intimacy, instrumental support, self-esteem enhancement, conflict, and dominance. Principal components analysis of the 6 scales followed by varimax rotation at T1 revealed 2 distinct factors. The first factor accounted for 47% of the variance, reflected positive support (companionship, intimacy, instrumental support, esteem enhancement), with factor loadings ranging from .76 to .88. The second factor accounted for 28% of the variance, reflected negative aspects of friendship (conflict, dominance), with factor loadings of .90 and .91. Thus, we took the average of the four positive scales to create a friend support index and the average of the two negative scales to create a friend conflict index. Internal consistencies of the items on the friend support index ranged from .90 to .92, and internal consistencies of the items on the friend conflict index ranged from .77 to .82.

Psychological distress—Depressive symptoms were measured by the abbreviated form of the Children's Depression Inventory (Kovacs, 2001). Alphas ranged from .70 to .81. Anger was measured with the 3-item anger subscale from the Differential Emotions Scale (Izard, Libero, Putman & Haynes, 1993). Internal consistencies ranged from .76 to .79. Both instruments were completed with respect to feelings over the past 2 weeks.

Self-care behavior—We administered a modification of the widely used 14-item Self-Care Inventory (La Greca, Swales, Klemp, & Madigan, 1988). This instrument asks respondents to indicate how well they followed their physician's recommendations for glucose testing, insulin administration, diet, exercise, and other diabetes-related behaviors. Each item is rated on a 1 (never do it) to 5 (always do this as recommended) scale. This scale reflects domains of self-care that have been regarded as important by the American Diabetes Association, and it has been associated with metabolic control among adolescents (e.g., Delamater, Applegate, Eidson, & Nemery, 1998; Korbel et al., 2007). We updated this scale by adding 8 more contemporary items, as described in Helgeson et al. (2007). Our revised measure was correlated .94 with La Greca's original 14-item scale at T1. Internal consistencies ranged from .78 to .82.

Metabolic control—Metabolic control was measured with hemoglobin A1C (HbA1C) obtained at the clinic appointment measured by HPLC (Tosoh Instruments) with normal range of 4.6-6.1%. HbA1C values indicate the average blood glucose level over the past 2-3 months, with higher values indicating *worse* metabolic control. The average HbA1C for our sample was 8.04 at T1 ($SD = 1.31$) and 8.90 at T5 ($SD = 1.83$). Current HbA1C recommendations for 13 to 19-year-old adolescents are below 7.5% (American Diabetes Association, 2008).

Overview of the Analyses

First we examined the intercorrelations among the agentic and communal traits to ensure that they were consistent with the theory. Then, we examined sex and group differences in the four traits at baseline with two-way analyses of variance. Finally, we used multi-level modeling, sometimes referred to as longitudinal growth curve modeling (Singer & Willett, 2003), with HLM-6 (Raudenbush, Bryk, Cheong, & Congdon, 2004) to test whether agentic and communal traits predicted relationship and health outcomes.

Multi-level modeling has numerous advantages over ordinary least squares (OLS) regression. Multi-level modeling enables one to take advantage of all available data, including data from participants who missed an assessment¹; can be used when one expects variables to be correlated across time, a substantial improvement over OLS, which assumes that this autocorrelation is zero; and allows one to examine individual variability in rates of change. We have a two-level model, such that wave of assessment or time (level 1) is nested within person (level 2). With this model, we can examine two sources of change. First, we can examine changes over time within an individual, such as whether depressive symptoms increase or decrease over time (referred to as the Level 1 model). Second, we can examine whether individual difference variables (i.e., group, sex) influence these trajectories of change over time, such as whether the change in depressive symptoms is larger for females than males (referred to as the Level 2 model). Predictors that change over time, such as unmitigated communion, are in the level 1 model and referred to as time varying predictors. Predictors that do not change over time, such as group, are in the level 2 model and referred to as time invariant predictors. We had three relationship outcomes (parent relationship, friend support, friend conflict), two psychological distress outcomes (depressive symptoms, anger), and two diabetes outcomes (self-care index, metabolic control).

As suggested by Singer and Willett (2003), we began the analysis on all outcome variables by fitting the unconditional means model. The model tests whether or not there is variation in the outcome worth exploring. This was the case for all outcomes. Thus, we proceeded to

¹We used the Little chi-square statistic to determine if data were missing completely at random. The non-significant chi-square indicated that this was the case ($X^2=104.03$, $df=88$, $p=.12$).

the unconditional growth model in which we added the growth parameter to the Level 1 model. We chose to use the continuous variable of age rather than time as our growth parameter because it was more meaningful to examine whether outcomes changed with age than with wave of assessment, age was more precise than wave of assessment (i.e., age is a continuous variable measured in years and days), and age was a stronger predictor of outcomes than wave of assessment. There was significant variability due to age for all outcomes, and significant variability remained in the outcome that could be explained by additional parameters. Age was centered at the youngest age of participants at T1 in these analyses (10.7 years), so that 0 represented a meaningful number—the youngest participant in the study.

We examined whether social status, sex, race, household structure, body mass index and pubertal status were related to outcomes. Because sex, social status, puberty, and body mass index were related to one or more outcomes, we controlled for these variables in all analyses. Social status and sex were added to the Level 2 model because they were time invariant, measured once at baseline. Pubertal status and body mass index were added to the Level 1 model because they were time varying predictors measured at each wave of assessment. We examined the relation of agentic and communal traits at each wave of assessment to the outcome measured at the same time, an analysis that we refer to as the concurrent multi-level model, by adding the four traits to the Level 1 model. Agentic and communal traits were centered at the lowest value of the variable (1), so that 0 represented the lowest level of the trait. All four traits were entered simultaneously so that we could examine the unique predictive value of each trait. We wanted to examine the extent to which unmitigated agency and unmitigated communion predicted outcomes above and beyond the broader traits of communion and agency.

The equation for this model is listed below:

$$DV_{ti} = \beta_{00} + \beta_{01} * \text{social status}_i + \beta_{02} * \text{sex}_i + \beta_{10} * \text{body mass index}_{ti} + \beta_{20} * \text{age}_{ti} + \beta_{30} *$$

The intercept, β_{00} , represents the outcome for the youngest child in the study because age is scored so that 0 represents this person at the initial wave of data collection. β_{01} and β_{02} represent the slopes of the relation between the level 2 variables, social status and sex (0=female; 1=male), to the outcome. β_{10} through β_{70} represent the slope of the relations between the level 1 variables--body mass index, age, pubertal status, and the four agentic and communal traits--and the outcome. The remaining parameters reflect various error terms: r_{0i} reflects the between-person (level 2) residual in the initial rate of the outcome, r_{2i} reflects the between-person (level 2) residual in the rate of change associated with age; and e_{ti} represents the within-person (level 1) residual or variability.

To examine longitudinal relations, we conducted lagged analyses in which we examined the relation of agentic and communal traits at T_n to outcomes measured at T_{n+1} controlling for outcomes measured at T_n . The lagged analyses take into consideration four lags: T1 to T2; T2 to T3; T3 to T4; T4 to T5. We used the same multi-level model as described above, with the exception of adding a level 1 term for the previous level of the outcome so that changes are examined. We also examined whether the same demographic and background variables were related to changes in outcomes. Sex, social status, and puberty predicted changes in relationship and psychological outcomes over time, whereas sex, social status, and BMI predicted changes in diabetes outcomes over time. Thus, these variables were statistically controlled in their respective analyses.

For both concurrent and longitudinal analyses, we determined whether adolescent age, sex, and group (diabetes vs. healthy) influenced (i.e., moderated) the relation of agentic and communal traits to outcomes by computing interaction terms between each of these three variables and the traits. Age and sex were terms that were already included in the model. Group was entered as a level 2 time invariant predictor, as disease status was determined at study start. Across the concurrent and lagged multi-level models, there was only one interaction that involved group, two interactions that involved sex, and three interactions that involved age—which are roughly the number of interactions one would expect by chance. To avoid capitalizing on chance, we eliminated these interaction terms from the models.

We also used multi-level modeling to test the gender-intensification hypothesis; that is, whether the traits change over time differentially for males and females. Here, each of the four traits were outcome variables. For each trait, we entered age as a level 1 time varying predictor variable, sex and group as level 2 time invariant predictors, and examined the cross-level age by sex interaction term. Age by sex interactions (i.e., increasing sex difference with age) would provide evidence for gender intensification. Part of the age effect would be due to cohort but part would be due to actual age increasing over time.

Results

Background Analyses of Agentic and Communal Traits

Correlations—As shown in Table 1, unmitigated communion is positively correlated with communion at all five waves of assessment, and these correlations are moderate. However, unmitigated communion is not related to agency at any wave of assessment. Unmitigated agency is positively correlated with agency and negatively correlated with communion at all five waves of assessment. Agency and communion are uncorrelated, as are unmitigated agency and unmitigated communion. With the exception of the lack of correlation between unmitigated communion and agency, all relations are consistent with predictions and previous research on adults, substantiating the validity of these measures.

Sex comparisons at baseline—Means and standard deviations for each of the traits for males and females at each wave of assessment are presented in Table 2. We examined whether there were sex and group differences in the traits at T1 with two-way analyses of variance. Sex differences appeared, consistent with expectations. Males scored higher than females on unmitigated agency, $F(1, 259) = 6.70, p = .01; d = .32$, and agency, $F(1, 259) = 17.38, p < .001; d = .52$. Females scored higher than males on unmitigated communion, $F(1, 259) = 8.83, p < .005; d = .37$, and communion, $F(1, 259) = 27.94, p < .001; d = .65$. There was only one group difference on the four traits—healthy adolescents scored higher ($M = 3.77$) than those with diabetes ($M = 3.62$) on communion, $F(1, 259) = 3.96, p < .05; d = .25$.

Concurrent Multi-Level Models Predicting Relationships and Health

The final concurrent multi-level models are shown in Table 3.

Relationships—Each of the four traits was significantly associated with parent relationship quality. Unmitigated communion and unmitigated agency were related to poorer parent relationship quality, whereas agency and communion were related to better parent relationship quality. Sex remained a significant predictor such that males reported better parent relationships than females.

Both unmitigated communion and communion predicted more friend support, but the association with communion was stronger. Sex and age remained significant predictors, such

that females reported more support than males and older adolescents reported more support than younger adolescents. For friend conflict, unmitigated communion and unmitigated agency predicted more conflict, whereas communion was related to less conflict. Sex and age remained significant predictors, such that older participants and males reported more conflict.

Psychological well-being—Sex (female higher), higher unmitigated communion and lower levels of both agency and communion predicted more depressive symptoms. Unmitigated agency and unmitigated communion predicted higher levels of anger, as did sex (females higher), older age, and lower levels of communion.

Diabetes outcomes—Unmitigated agency predicted poorer self-care behavior. Older adolescents also exhibited poorer self-care. Demographic variables predicted metabolic control, such that older, lower social status, lower BMI, and higher pubertal status were associated with poor metabolic control. None of the traits was associated with metabolic control.

Longitudinal (Lagged) Multi-Level Models Predicting Relationships and Health

The final longitudinal or lagged models are shown in Table 4.

Relationships—Unmitigated communion predicted a decline in parent relationship quality, whereas communion predicted an increase in parent relationship quality over time. Unmitigated agency predicted a decline in friend support, whereas agency predicted an increase in friend support over time. Sex and age predicted changes in friend support such that females' support declined and older adolescents' support increased with time. Sex (males) and unmitigated communion predicted an increase in friend conflict, whereas communion predicted a decline in friend conflict over time.

Psychological well-being—Unmitigated communion predicted an increase in depressive symptoms, whereas agency predicted a decline in depressive symptoms. Unmitigated agency predicted an increase in anger, whereas communion predicted a decrease in anger. Sex remained a significant predictor of both depressive symptoms and anger such that females' psychological well-being deteriorated over time relative to males'.

Diabetes outcomes—Unmitigated communion predicted a decline in self-care behavior, whereas communion predicted an improvement in self-care behavior. Older adolescents showed a decline in self-care over time. Unmitigated communion predicted deterioration in metabolic control, whereas communion predicted improvement in metabolic control. Lower social status and higher BMI also predicted deterioration in metabolic control.

Ancillary Analyses

Even though we controlled for agency and communion in all analyses, we wanted to further demonstrate that unmitigated agency and unmitigated communion could not be reduced to a combination of agency and communion in predicting these outcomes. Thus, we created an agency by communion interaction term. This interaction was not significant in any of the concurrent or lagged analyses.

We also examined whether we could explain the relation of agentic and communal traits to diabetes outcomes via either relationship or psychological distress variables. In the concurrent analyses, one trait emerged as a significant predictor of a diabetes outcome--unmitigated agency was associated with poor self-care behavior. Because unmitigated agency was related to lower parent relationship quality, higher friend conflict, and more

anger, we examined each of these variables as potential mediators. We used the calculation of random indirect and direct effects developed by Bauer, Preacher, and Gil (2006) to examine mediation for multi-level models. Using this method, each variable significantly mediated the relation of unmitigated agency to poor self-care. When examined individually, parent relationship quality (indirect = $-.08$, $p < .001$) accounted for 40% of the effect, friend conflict (indirect = $-.08$, $p < .001$) accounted for 40% of the effect, and anger (indirect = $-.06$, $p < .001$) accounted for 31% of the effect. Together, the three variables explained 71% of the effect.

In the lagged analyses, unmitigated communion predicted poorer self-care and deterioration in metabolic control. Because unmitigated communion also predicted a decline in parent relationship quality, an increase in friend conflict, and an increase in depressive symptoms, we examined these three variables as potential mediators of the relations to diabetes outcomes. We found that neither friend conflict nor parent relationship quality mediated the relation of unmitigated communion to either outcome. However, the relation of unmitigated communion to self-care behavior was mediated by depressive symptoms (indirect = $.02$, $p < .05$), accounting for 25% of the relation.

Gender Intensification Hypothesis

We used multi-level modeling to determine whether agentic and communal traits changed with age as a function of sex. For agency, there was a main effect of sex ($.44$, $SE=.08$; $p < .001$) that was qualified by an interaction with age ($-.03$, $SE=.02$ $p < .05$), such that sex differences decreased with age—exactly opposite of gender-intensification predictions. Males' scores remained the same with age, whereas females' scores increased with age reducing the size of the sex difference in agency (see Table 2 for means). Agency also was predicted by the interaction between sex and group ($-.21$, $SE=.09$; $p < .05$), such that the sex difference in agency was larger among healthy adolescents than those with diabetes, largely because healthy males scored higher on agency than males with diabetes.

For communion, there was an effect of sex ($-.34$, $SE=.05$; $p < .001$), such that females scored higher than males across the assessments, but no interactions involving age or group.

For unmitigated communion, there was a main effect of sex ($-.18$, $SE=.08$; $p < .05$) that was qualified by an interaction with age ($-.04$, $SE=.02$; $p < .05$), such that the sex difference in unmitigated communion increased with age consistent with gender intensification theory. With increased age, unmitigated communion increased for females and decreased for males.

Sex and age predicted unmitigated agency ($.26$, $SE=.06$; $p < .001$; and $.04$, $SE=.01$; $p < .001$), such that males scored higher than females and unmitigated agency increased with age, but there were no interactions with age or group.

Discussion

Consistent with a great deal of research on adults, agentic and communal traits predicted relationship and health outcomes among adolescents—even when demographic variables including participant sex were statistically controlled. Also consistent with previous research, unmitigated agency and unmitigated communion were consistent predictors of these outcomes, suggesting that a focus on the broad traits of agency and communion is not sufficient when understanding the implications of gender-role socialization for health. Whereas agency and communion predicted positive relationship and health outcomes, unmitigated agency and unmitigated communion predicted negative relationship and health outcomes. More importantly, longitudinal analyses that controlled for previous levels of the

outcome showed that unmitigated agency and unmitigated communion predicted deterioration in relationship and health outcomes over time.

Although unmitigated communion involves a focus on relationships, that focus can become problematic in the context of ongoing relationships. Unmitigated communion was associated with problematic relationships with parents and friends and predicted an increase in relationship problems with parents and friends over time. To the extent that parental support is helpful to adolescents in terms of taking care of themselves and maintaining good diabetes health (Lewin et al., 2006; Naar-King, Podolski, Ellis, Frey, & Templin, 2006), this potential social resource may be less available to adolescents characterized by unmitigated communion.

Consistent with previous research (Dear & Roberts, 2002; Fritz & Helgeson, 1998), unmitigated communion was associated with more depressive symptoms and an increase in depressive symptoms over time. And, depressive symptoms explained part of the association of unmitigated communion to a decline in self-care behavior over time. Previous research also has linked depression to poor self-care behavior among children with diabetes (Kovacs, Goldston, Obrosky, & Iyengar, 1992).

Although unmitigated communion was not associated with self-care or metabolic control in concurrent analyses, it was associated with declines in self-care and deterioration in metabolic control in the lagged analyses. The latter has been documented in two previous studies (Helgeson & Fritz, 1996; Helgeson et al., 2007). Thus, the trait of unmitigated communion may be especially problematic in the face of a chronic illness that requires regular attention to the self. Other research has shown that unmitigated communion individuals fail to take care of themselves (Helgeson & Fritz, 1999), in part due to their excessive involvement with others, but this is the first study to document a link to self-care in the case of adolescents with diabetes. It is particularly alarming that over the course of early to middle adolescence this trait has the potential to influence how adolescents take care of themselves.

Unmitigated agency was also related to problematic relationships with parents and friends. In terms of psychological distress, unmitigated agency was associated with anger and predicted an increase in anger over time. It appeared that all three of these variables contributed to the relation of unmitigated agency to poor self-care. Unmitigated agency individuals may not have the social resources available to them to assist with self-care and their overall level of anger and hostility could interfere with taking care of themselves.

As expected, communion was consistently related to positive relationship outcomes. Unexpectedly, communion also was related to health outcomes—fewer depressive symptoms and less anger in concurrent analyses and a decline in anger, improvement in self-care, and improvement in metabolic control in lagged analyses. Research among adults has found inconsistent relations of communion to health (Fritz & Helgeson, 1998; Helgeson & Fritz, 1999). These findings among youth suggest an alternative focus for intervention in the case of diabetes. In addition to focusing on the problematic traits of unmitigated agency and unmitigated communion and their implications for self-care, one could also try to encourage greater adoption of communal traits—traits that promote good relationships. Among youth, relationships may play an especially large role in health promotion.

Of the four traits, agency revealed the fewest associations to relationship and health outcomes. Among the relations that did appear, the direction was a positive one consistent with previous research. Agency was related to better relationships with parents in concurrent analyses and an increase in friend support over time. Consistent with previous research (Fritz & Helgeson, 1998), agency was related to fewer depressive symptoms and a decline in

depressive symptoms over time. These results speak to the protective effect of having a positive focus on the self.

We hypothesized that these agentic and communal traits would be more strongly related to relationship and health outcomes among those with than those without diabetes. We did not find any support for that hypothesis. Thus, agentic and communal traits seem to have important implications for relationships and psychological health for adolescents in general—regardless of disease status. However, in one sense the traits are more potent for those with diabetes because youth with diabetes have health issues that adolescents without diabetes do not face. Whereas the failure to take care of oneself might take years to be realized among healthy adolescents, the consequences are more immediate among those with diabetes.

The mounting evidence for a relation of unmitigated communion to metabolic control and, now, self-care, suggests that intervention efforts aimed at adolescents ought to target the behaviors that are associated with this trait. Given the relations of unmitigated communion to problematic relationships and the relations of communion to good relationships, research among adolescents could focus on promoting the social skills that would help maintain high quality relationships with parents and peers.

According to gender intensification theory, pressures to adhere to traditional male and female roles increase during adolescence. Such a theory would predict that sex differences in the agentic and communal traits ought to intensify. However, our results were consistent with those of Priess et al. (2009), showing that sex differences in agency and communion appear during early adolescence but do not increase over time. The fact that we did not find increasing sex differentiation in traits over adolescence is consistent with Roberts, Walton, and Viechtbauer (2006)'s meta-analytic review of the literature on changes in personality traits across the lifespan. They found that personality traits (including those related to agency and communion) were more likely to change in young adulthood than any other period of time, including adolescence, and that traits did not interact with sex to predict change over time.

The increase in agency in females and the increase in unmitigated agency in both males and females is consistent with Twenge, Konrath, Foster, Campbell, and Bushman's (2008) research on the increase in narcissism between 1982 and 2006. Twenge (2009) argues that Western culture as a whole has become more self-focused which has led to an increase in agentic traits.

There was evidence for gender intensification for one trait—unmitigated communion. That is, the tendency to get overinvolved in others' problems and take on others' problems as one's own increased with age for females but not males. Adolescent females may be getting the message that it is acceptable to be assertive, but they also are getting the message that it is the female role to take care of others. This becomes a problem when taking care of others interferes with taking care of the self, especially in the face of a chronic illness.

Before concluding, we note some study limitations. First, the sample was relatively homogenous in terms of race and ethnicity. The extent to which these traits predict outcomes in a more diverse sample of youth is unknown. Second, the scale used to measure the trait of agency was less than optimal. The internal consistency was low, and it was not inversely related to unmitigated communion as expected. One explanation for both of these problems may be that the measure of agency confounded personal agency with interpersonal agency. Personal agency reflects a positive focus on the self, including self-confidence and independence, whereas interpersonal agency reflects one's sense of self in the context of relationships, including leadership and competition. When we examined the individual items

that comprised the agency scale, the items that reflected personal agency were more likely to be inversely related to unmitigated communion than the traits that reflected interpersonal agency. Thus, future research should attend to this distinction when considering the construct of agency.

We also acknowledge that the majority of our effects were quite small. Thus, we emphasize the overall pattern of findings rather than any individual finding. The overall pattern shows that unmitigated communion is a consistent predictor of problematic relationships, higher levels of depressive symptoms, and a deterioration in diabetes outcomes over time; that unmitigated agency is a consistent predictor of problematic relationships and anger; that agency is a consistent predictor of lower levels of depressive symptoms; and that communion is a consistent predictor of good relationships, lower levels of anger, and better diabetes outcomes over time. Given the size of the effects, one would certainly want to proceed with caution before developing any interventions based on these data. However, it is impressive that agentic and communal traits predicted outcomes when sex was statistically controlled, and that these traits predicted many of the outcomes over time when baseline levels were statistically controlled. As shown in Table 4, the strongest predictor of any outcome is its previous level. Given that the lag was one year, it is compelling that we obtained even small effects of traits on changes in outcomes over time.

One point of contention is the entry of all four agentic and communal traits into the analysis when the traits are correlated. We view this statistical procedure as more of a strength than a limitation for several reasons. First, this procedure enabled us to conduct one analysis of each outcome rather than four analyses. Second, this procedure enabled us to identify independent predictors of outcomes. Third, we wanted to distinguish unmitigated agency and unmitigated communion from their mitigated counterparts by examining their unique effects. The simultaneous examination of all four variables is one way to do this. It is more compelling to learn that unmitigated communion predicts an outcome independent of the related trait, communion, and sex. Lynam, Hoyle, and Newman (2006) caution readers that one should not partial out the effect of one variable on another without sufficient consideration. Here, we had a clear rationale. However, we also took Lynam et al. (2006)'s suggestion and examined the zero-order relations of each of the traits with the outcomes presented in this paper and found largely the same results.² One concern that we cannot avoid with the simultaneous entry of all four traits into a single analysis is that the correlations among predictor variables reduce the reliability of the residualized measures. Given the lower reliability of the agency measure in this study, we view this as limitation in our ability to obtain effects for this variable.

Study strengths include the enrollment of a large number of youth with and without diabetes, the longitudinal nature of the design spanning early to middle adolescence, and the high rate of retention. This study expands on the current literature in five ways. First, this is one of the few studies to examine the implications of agentic and communal traits for relationships and health during a time when these traits are salient—adolescence. Second, the study focuses on a group of youth who are at risk for health problems—those with diabetes. Third, and relatedly, this is one of the few studies in the area of diabetes to focus on personality factors as risk (or resilient) factors for health. Fourth, we were able to discern the importance of distinguishing unmitigated agency from agency and unmitigated communion from communion in predicting both relationship and health outcomes. Fifth, two somewhat unique findings emerged: (a) communion appeared to be a more consistent predictor of

²The one exception to this statement is that agency was a significant predictor of greater friend support, greater friend conflict, and more anger in cross-sectional analyses. When the other agentic and communal traits were included in the model, these relations disappeared.

positive health outcomes than has emerged in previous research and (b) we detected an increase in unmitigated communion among females during adolescence, which is of concern because unmitigated communion was related to problematic relationships, increased depressive symptoms, and a deterioration in diabetes health over time. Taken collectively, because males are socialized to be agentic and females are socialized to be communal in our culture, these findings underscore the usefulness of a gender-role socialization approach to adolescent health.

Acknowledgments

The authors acknowledge the support of grant R01 DK60586 from the National Institutes of Health to conduct this work and the support of the Pediatric Clinical and Translational Research Center at Children's Hospital (GCRC grant, 5MO1 RR00084). The authors are grateful to Pamela Snyder for her assistance with the analyses, to all of the research assistants who participated in the project, and for the support of the clinic staff of Children's Hospital of Pittsburgh.

Appendix

Appendix A:

Communion

1. I really like to do things for other people.
2. I am very gentle (*tender, soft, mild*).
3. I am very helpful to other people.
4. I pay a lot of attention to how other people are feeling.
5. I am very kind to other people.
6. I try to understand how other people are feeling.
7. I am a very warm, friendly person.

Unmitigated communion

1. I often worry about others' problems.
2. I often get too involved in others' problems.
3. I am only happy when the people around me are happy.
4. I have great difficulty getting to sleep at night when other people are upset.
5. Even when I don't feel well, I always help other people.
6. I have difficulty saying no when someone asks me for help.
7. I always help others with their problems before I take care of my own.
8. I worry that other people need me when I am not there.
9. It is impossible to do what I want when others want me to do something else.

Agency

1. I would rather do things for myself than ask others for help.
2. I am very busy and active.

3. I enjoy trying to win games and contests.
4. I feel sure I can do most of the things I try.
5. I am better at doing things than other people.
6. When things get tough, I almost always keep going.
7. I am often the leader among my friends.

Unmitigated agency

1. I brag about myself a lot.
2. I look out for myself before I look out for others
3. I am greedy.
4. I like to show off (*boast, brag*).
5. Most of the time I feel that I am much better than other people.
6. I am often rude to people.
7. I am sarcastic—this means like a “smart-aleck”.

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Table 1

Correlations Among Gender-Related Traits at Each Wave of Assessment

	Time 1	Time 2	Time 3	Time 4	Time 5
<i>n</i>	263	256	255	257	255
UC/C	.51 ***	.40 ***	.47 ***	.57 ***	.61 ***
UC/A	.10 ⁺	-.04	-.07	.00	-.04
UA/A	.40 ***	.38 ***	.32 ***	.42 ***	.32 ***
UA/C	-.37 ***	-.35 ***	-.34 ***	-.31 ***	-.38 ***
C/A	.04	-.03	.08	-.01	.10
UC/UA	.01	-.01	-.07	.02	-.10

Note: UC=unmitigated communion; C=communion; A=agency; UA=unmitigated agency;

⁺
 $p < .10$;*
 $p < .05$;**
 $p < .01$;***
 $p < .001$

Table 2

Means (Standard Deviations) for Gender-Related Traits by Sex and Wave of Assessment

		Time 1	Time 2	Time 3	Time 4	Time 5
Unmitigated Communion	Male	2.69 (.63)	2.61 (.60)	2.50 (.47)	2.49 (.58)	2.62 (.66)
	Female	2.91 (.67)	2.89 (.56)	2.88 (.62)	2.92 (.60)	3.00 (.57)
Communion	Male	3.38 (.80)	3.54 (.57)	3.46 (.48)	3.41 (.53)	3.46 (.48)
	Female	3.86 (.57)	3.87 (.46)	3.88 (.52)	3.82 (.49)	3.85 (.45)
Agency	Male	3.66 (.60)	3.71 (.49)	3.70 (.39)	3.58 (.46)	3.62 (.48)
	Female	3.46 (.61)	3.57 (.42)	3.59 (.49)	3.51 (.52)	3.62 (.42)
Unmitigated Agency	Male	2.53 (.78)	2.45 (.58)	2.55 (.59)	2.55 (.62)	2.61 (.53)
	Female	2.25 (.68)	2.15 (.58)	2.25 (.49)	2.25 (.54)	2.31 (.56)

Table 3

Concurrent Multi-Level Models: Coefficients and Standard Errors

	Parent Relationship	Friend Support	Friend Conflict	Depression	Anger	Self-Care	HbA1c
Intercept	4.04 (.21) ***	2.66 (.21) ***	.87 (.20) ***	1.16 (.08) ***	1.08 (.23) ***	4.30 (.31) ***	8.54 (.87) ***
Age	-.02 (.01)	.07 (.01) ***	.04 (.01) **	.01 (.00)	.08 (.01) ***	-.10 (.01) ***	.19 (.05) ***
Social Status	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)	-.00 (.00)	.00 (.00)	-.03 (.24) **
BMI	-.01 (.00) ⁺	-.00 (.00)	-.01 (.00) *	.00 (.00) *	-.00 (.00)	-.01 (.01)	-.04 (.02) *
Puberty	-.02 (.02)	-.03 (.02)	-.01 (.02)	-.00 (.01)	.03 (.02)	.03 (.02)	.18 (.08) *
Sex	.11 (.06) *	-.50 (.06) ***	.12 (.05) *	-.10 (.02) ***	-.16 (.05) **	-.04 (.07)	.29 (.24)
UC	-.08 (.03) *	.12 (.03) ***	.09 (.03) **	.08 (.01) ***	.15 (.04) ***	.03 (.04)	.08 (.10)
UA	-.10 (.03) **	-.01 (.03)	.27 (.03) ***	.02 (.01)	.21 (.03) ***	-.10 (.04) **	-.04 (.11)
Agency	.08 (.03) *	.05 (.03)	-.00 (.03)	-.03 (.01) *	.07 (.04)	.07 (.05)	.03 (.13)
Communion	.11 (.03) **	.20 (.03) ***	-.07 (.03) *	-.07 (.01) ***	-.12 (.04) **	-.00 (.06)	.17 (.12)

Note: UC = unmitigated communion; UA = unmitigated agency;

⁺
p < .10;*
p < .05;**
p < .01;***
p < .001

Table 4

Longitudinal (lagged) Multi-Level Models: Coefficients and Standard Errors

	Parent Relationship	Friend Support	Friend Conflict	Depression	Anger	Self-care	HbA1c
Intercept	1.42 (.18) ***	1.20 (.16) ***	1.09 (.17) ***	.77 (.08) ***	1.50 (.21) ***	1.52 (.28)	2.40 (.65) ***
Baseline outcome	.62 (.03) ***	.60 (.03) ***	.41 (.03) ***	.34 (.03) ***	.22 (.03) ***	.63 (.04) ***	.71 (.04) ***
Age	-.01 (.01)	.04 (.01) ***	.02 (.01)	.00 (.01)	.05 (.02) **	-.04 (.01) **	-.06 (.04)
Social status	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)	-.00 (.00)	.00 (.00)	-.01 (.01) *
Puberty	-.02 (.02)	.00 (.02)	.02 (.02)	.01 (.01)	-.01 (.02)	-	-
BMI	-	-	-	-	-	-.00 (.00)	.04 (.01) **
Sex	.06 (.03) ⁺	-.24 (.04) ***	.11 (.04) ***	-.07 (.02) ***	-.18 (.05) ***	.01 (.04)	-.01 (.11)
UC	-.06 (.03) *	.02 (.03)	.06 (.03) *	.03 (.01)	.05 (.04)	-.11 (.03) **	.25 (.10) *
UA	-.03 (.03)	-.07 (.03) **	-.01 (.03)	.03 (.01) ⁺	.09 (.04) *	-.02 (.03)	-.03 (.10)
Agency	.02 (.03)	.09 (.03) **	.06 (.03)	-.03 (.01) *	.03 (.04)	-.02 (.04)	.10 (.12)
Communion	.08 (.03) *	.02 (.03)	-.14 (.03) ***	-.02 (.01)	-.09 (.04) *	.09 (.04) *	-.23 (.11) *

Note: UC = unmitigated communion; UA = unmitigated agency;

⁺
p < .10;*
p < .05;**
p < .01;***
p < .001; -- variable not entered in the model