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Parent Autonomy Support, Academic Achievement and Psychosocial Functioning: A Meta-Analysis of Research

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Parent Autonomy Support, Academic Achievement and Psychosocial Functioning: A Meta-Analysis of Research

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Report

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Master of Arts

The University of Texas at Austin

May 2014

Dedication

I dedicate this master report to my parents who have supported me always on my educational journey.

Acknowledgements

First I would like to thank my advisor, Dr. Patall for her knowledge, guidance, and autonomy support as I worked through this meta-analysis. I would also like to thank my coders and searchers, Carlton Fong, Andrew Corrigan and Lisa Pine; this would not have been possible without you. Thank you also to Dr. Borich for his program evaluation expertise. Finally, I would like to thank my friends for reading countless drafts, listening to ideas, and keeping me laughing.

Abstract

Parent Autonomy Support, Academic Achievement and Psychosocial Functioning: A Meta-Analysis of Research

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In a synthesis of research on parent autonomy support, meta-analytic results indicated that parental autonomy support was related to greater academic achievement, autonomous motivation, and psychological health. A meta-analysis of 20 studies correlating parent autonomy support and achievement-related outcomes revealed that parental autonomy support had a positive relationship with achievement outcomes. A meta-analysis of 8 samples from 6 studies correlating parent autonomy support and autonomous motivation revealed autonomy support had a stronger relation with motivation for school in general than motivation for non-school domains. A meta-analysis of 11 studies correlating parent autonomy support and well-being revealed that parental autonomy support had a stronger relation with non-school related self-esteem than in academic self-esteem. Implications for future research and practice are discussed. A suggested intervention program is also analyzed.

Keywords: parental involvement, autonomy support, academic achievement, motivation, well-being, meta-analysis

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Literature Review

Most people would agree that parents play a critical role in shaping a child's social, psychological and academic functioning. The relationship between parent and child may be one of the most important relationships over the course of a person's life span. The early attachment an infant establishes with parents serve as the foundation for happy and healthier relationships later in life (Burrow-Sanchez & March, 2006; Chen, 2009; Cox, 2002) and predicts later development (Linwood, 2006; Steinberg, 2001). From background characteristics to parenting style, the literature consistently supports the notion that parents influence children's school performance (Gordon & Cui, 2012; Ishak, Low & Lau, 2012; Rivers, Mullis, Fortner, & Mullis, 2012). The evidence suggests that parents who form a strong, trusting, and warm relationship with their child, have children who exhibit greater self-reliance in the classroom, greater curiosity and flexibility, and complexity in their play, as well as higher self-esteem and fewer behavioral problems (Cox, 2002; Linwood, 2006).

Parents vary greatly in their parenting styles, as well as the extent to which and ways they become involved in their children's lives (Pomerantz, Moorman, & Litwack, 2007). In particular, a growing body of research has suggested that parents interacting with their children in ways that support their experience of autonomy or feeling that their actions are their own (Deci & Ryan, 1987) may be particularly important in supporting adaptive psychological, social, and academic outcomes, including intrinsic motivation (Chirkov & Ryan, 2001), well-being (Ferguson, Kasser, & Jahng, 2011), and academic achievement (Strage & Brandt, 1999).

Parents may use a number of strategies and practices to support their children's experience of autonomy. Autonomy supportive environments are characterized primarily by parents' acknowledgement of children's perspectives, encouragement of children to experiment, provision of opportunity to make choices, and minimal use of controlling language and contingencies with children (Deci & Ryan, 2012). Parents who are autonomy supportive nurture inner motivational resources by relying on flexible language when communicating with their child, and providing explanatory rationales for why it may be personally important or useful for a child to engage in a behavior (Reeve, 2009). For example, a parent and child might be discussing how to do a homework assignment. An autonomy supportive parent would ask for the child's input, try to understand their child's perspective on approaches for solving the homework assignment, and encourage their child to work in their own way. On the other hand, a controlling parent would tell the child exactly how to do the homework and not ask for any input from the child.

While a good deal of research examining the relations between parent autonomy support and child psychological, social, and academic functioning has accumulated, this research has yet to be synthesized in order to assess the overall effects of this style of parent interaction. Likewise, little research has explored the conditions under which parent autonomy support is more or less beneficial. Thus, in this paper, meta-analysis is used to examine the relation between parent autonomy support and a variety of outcomes indicative of children's adaptive functioning, including their motivation, psychological well-being, and academic achievement. First, the overall relation between parent autonomy support and relevant child outcomes is examined. Next, it is explored whether these relations are enhanced or diminished by a number of theoretically relevant moderators, including grade level, autonomy support respondent, the agent of autonomy

support, the domain of the autonomy support, the outcome, and the domain of the outcome.

THE EFFECT OF AUTONOMY SUPPORTIVE PARENTING

According to Self-Determination Theory, there are three universal and basic psychological needs that underline human motivation and achievement: autonomy, competence, and relatedness (Deci, 1980). Social contexts that satisfy these needs will enhance intrinsic motivation, well-being, and achievement (Beiswenger & Grolnick, 2010; Grolnick, Gurland, DeCourcey, & Jacob 2002; Hui, Sun, Chow, & Chu, 2011), while contexts that undermine these needs will diminish adaptive functioning (Bronstein, Ginsburg, & Herrera, 2005; Jiang, Yau, Bonner, & Chiang, 2011). In particular, autonomy reflects "volitional, harmonious, and integrated functioning" (Joussemet, Laundry, & Koestner, 2008) and may be particularly important for motivation and psychological well-being. That is, Self-Determination Theory has traditionally assumed that feelings of competence and relatedness will not enhance motivation and well-being, unless accompanied by a sense of autonomy (Ryan & Deci, 2000).

Given the centrality of these psychological needs for human functioning, it would seem reasonable to assume that when a child's need for autonomy is supported by parents, the child's motivation, psychological well-being, and academic outcomes are likely to be optimally supported (Annear & Yates, 2010; Grolnick, 2009; Joussemet, et al., 2008). In fact, a great deal of research has supported this notion.

Psychosocial functioning. Research has suggested that parental autonomy support may be related to enhanced psychosocial functioning, including intrinsic motivation for school (Bronstein, et al., 2005, Dai, 1998; Hui, et al., 2011), and greater well-being (Beiswenger & Grolnick, 2010; dai, 1998; Downie, et al,, 2007; Ferguson, et

al., 2011; Jiang, et al., 2011; Lekes, Gingras, Phillippe, Koestner, & Fang, 2010; Robbins, 1995; Wang, 2006).

For example, Bronstein and colleagues (2005) found that greater parental autonomy support in 5th grade predicted an enhanced intrinsic motivational orientation toward school in 7th grade. Similarly, Chirkov and Ryan (2001) found children's perceptions that their parents were autonomy supportive predicted greater academic motivation in both Russian and American adolescents.

The relation between parent autonomy support and intrinsic motivation may be particularly important because intrinsic motivation may be the primary mechanism through which other outcomes such as engagement, learning, and achievement are supported. For example, Wormington, Corpus, and Anderson (2012) found that students with high intrinsic motivation reported the strongest academic performance and greater overall extracurricular participation compared to those who reported low intrinsic motivation. In addition, Vansteenkiste and colleagues (2005) found that intrinsic goal framing consistently resulted in better conceptual integration of the learning material.

Psychological well-being, defined as a subjective sense of the quality of a child's life, including life satisfaction, self-esteem and self-worth, is another outcome that has frequently been the object of study in relation to autonomy supportive parenting. Well-being is hypothesized to come from the content of what one is trying to do and a child is expected to feel a positive sense of well-being when they are striving for goals that are personally relevant (Reeve, 2009). In line with this notion, research has supported the positive relationship between parent autonomy support and well-being. For example, Downie and colleagues (2007) found in two studies with Canadian and Chinese-Malaysian sojourners that children who perceived their parents to be autonomy supportive indicated higher well-being. Likewise, Lekes and colleagues (2010) found that

autonomy supportive parenting was associated with greater well-being among both Chinese and North American adolescents.

While most research has supported the positive relation between parent autonomy support and adaptive psychosocial functioning, results have not been ubiquitously supportive. For example, Beiswenger and Grolnick (2010) found in a study examining parents and adolescent children that neither mother nor father autonomy support predicted autonomous motivation in after school activities. In addition, Chirkov and Ryan (2001) found in a study examining parents and adolescent children in both Russia and the United States that parental autonomy granting was significantly positively related to identified regulation, and correlated with intrinsic motivation, though not significantly.

Academic achievement. A great deal of research has also examined the relation between parent autonomy support and academic achievement. Research examining this relationship across a variety of indicators of achievement, including grade point average (GPA), individual course grades (Birman & Espino, 2007; Cooper, Lindsay, & Nye, 2000; Soenens & Vansteenkiste, 2005), and standardized test scores (Bronstein, et al., 2005; Halpern-Felsher, 1994) has suggested that parent autonomy support can have a positive relation with academic achievement.

While many studies have found a relationship between parental autonomy support and school achievement, still other studies have not revealed significant relations and the strength of the relation remains uncertain. For example, Deslandes and colleagues (1997) found that parents' psychological autonomy granting in the form of democratic discipline and encouragement of the adolescent to express individuality within the family was a significant positive predictor of adolescents' school grades. Similarly, Soenens and Vansteenkiste (2005) in two studies found that parental autonomy support, characterized by parents encouraging their children to pursue their own interests and values was

positively correlated with high school students' grades. In contrast, while Grolnick and colleagues (1991) found a positive correlation between maternal and paternal autonomy support in the form of the children's perceptions of parents scale and grades, these correlations were not statistically significant. Fei-Yin Ng (2004) found both a negative and positive correlation between mothers autonomy support, in the form of discussion on homework strategies and maximizing study time, and academic achievement. The negative correlation was at the first time point, taken at the beginning of the study and the positive correlation was at the second time point, taken six months later.

FACTORS INFLUENCING THE RELATION BETWEEN PARENT AUTONOMY SUPPORT AND OUTCOMES

Numerous factors could potentially influence the relationship between parent autonomy support, motivation, well-being, and academic achievement. Here I focus on several theoretical (grade level, agent of support, domain of autonomy support and domain of outcome) and methodological (outcome measure and autonomy support respondent) factors that the literature has suggested may influence the relationship between parent autonomy support and student psychosocial and academic functioning.

Grade level. Grade level can play an important part in understanding the relationship between autonomy supportive parenting and academic achievement and psychosocial functioning. Specifically, autonomy supportive parenting might be more impactful at some developmental stages compared to others. For example, autonomy support might be particularly important during adolescents, when children experience an increase in cognitive development and the development of conceptualizations of the self as an autonomous, efficacious individual (Hill & Tyson, 2009).

Agent of support. Research on autonomy supportive parenting sometimes examines only mothers as agents of support (Grolnick, et al., 2002), while some look at

mothers as agents of support compared to fathers as agents of support (d'Ailly, 2002), and still others do a combination of mothers, fathers, and both parents (Grolnick & Ryan, 1989). However, it is possible that the relationship between autonomy support and child functioning may be different depending on who is the agent of support. By focusing on only mothers, some researchers may believe they hold the most influence on their children. I did not find any studies where only fathers were examined as autonomy supportive. Due to this variability in the focus on agent of support I believe this to be an important moderator.

Domain of autonomy support. Researchers mainly examined two different domains of autonomy support, general or general academics. For example, Chirkov and Ryan (2001) used a scale looking at the domain of autonomy support in general, Perceptions of Parental Autonomy-Support (Robbin, 1995) which had items such as, "My parents allow me to decide things for myself," and "My parents, whenever possible allow me to choose what to do." Studies that focused on the domain of autonomy support in the general academics would ask questions in relation to school and school functioning as Bronstein and colleagues (2005) did in their longitudinal study. Sample items exploring autonomy support, specifically encouragement, included, "They tell me what a good student I am." The domain of autonomy support may matter as parents have a larger impact on home life than school life.

Domain of the outcome. Along the same lines, researchers consistently examined the domain of the outcome as non-school (Dai, 1998; Downie, et al., 2007) or general academics (Dai, 1998) in both the psychological health and autonomous motivation outcomes. Due to this, autonomy support might be particularly important for non-school domains of outcome because, as mentioned previously, parents may have a larger impact on home life than school life. In academic achievement, the domain of the outcome was

either general academics or something more specific, like a particular subject matter. For example, Soenens and Vansteenkiste (2005) focused general academics, while others, such as Grolnick and colleagues (2000) focused on math and English language arts.

Outcome. The outcome itself may make a difference in how autonomy supportive parenting relates to children. Psychological health examines well-being (Ferguson, et al., 2011) and self-esteem (Jiang, et al., 2011), while autonomous motivation examines intrinsic motivation (Bronstein, et al., 2005; Hui, et al., 2011) or identified regulation (Beiswenger & Grolnick, 2010). While these are nuanced versions of psychological health and autonomous motivation are very similar constructs, it is important to examine them separately to see if there may be a difference. In terms of academic achievement the outcomes could be course grades and GPA (Birman & Espino, 2007) or standardized scores (Joussemet, et al., 2005). Once again it is important to examine them separately and see if they are different.

Autonomy support respondent. The strength of the relationship between parental autonomy support and academic achievement and psychosocial functioning may differ depending on who responds to the autonomy support measure. That is, some researchers have the parents rate themselves on how autonomy supportive their parenting style is (Birman & Espino, 2007), while others have the children provide their perception of how autonomy supportive their parents are (Blackwelder, 2006). Parents may feel they are very autonomy supportive in their practices, but their children might have a different perception and see them as less autonomy supportive. It may not matter how autonomy supportive a parent thinks they are. What may matter is how autonomy supportive a child thinks their parents are, because it is the child's perceptions that will drive changes in the child's outcomes.

NEED FOR A SYNTHESIS ON THE EFFECT OF PARENTAL AUTONOMY SUPPORT

A large body of literature on the effect of parental autonomy support has accumulated over the last 25 years, making a synthesis of the findings timely. Given the conflicting findings across the various outcomes, a meta-analysis might begin to clarify how autonomy supportive parenting relates to academic achievement and psychosocial functioning. Further, the literature has suggested that a number of theoretical and methodological factors including the child's grade level, the agent of support, the domain of the autonomy support, the domain of the outcome, type of report, the autonomy support respondent, and the type of outcome measure may influence the relationship between parent autonomy support and students' adaptive functioning. A meta-analysis provides a means to assess the impact of these variations that occur both within and between studies.

The following predictions were made concerning the relations between parental autonomy support, autonomous motivation, psychological health, and academic achievement. Parental autonomy support will have a positive overall relation with both adaptive psychosocial outcomes and academic achievement. Further, the positive relation of parental autonomy support on adaptive psychosocial outcomes and academic achievement will be stronger when the following moderators are present: a) when the grade level is high school, b) when the agent of support is both parents, c) when the domain of the autonomy support is general, d) when the domain of the outcome is non-school, and e) when the autonomy support respondent is the student.

Method

LITERATURE SEARCH PROCEDURES

An assortment of search strategies was utilized to discover both published and unpublished work examining the effects of parental autonomy support. First, computer searches of the following electronic reference databases were conducted: PsycINFO, Educational Resources Information Clearinghouse (ERIC), Proquest Dissertations and Theses, and Google Scholar. For each database, a series of search terms was employed: autonomy* AND (parent* OR mother* OR father* OR patern* OR matern*) applying the appropriate truncation and Boolean techniques to achieve an inclusive yet focused search. In addition, Social Sciences Citation Index was searched for documents that had cited several seminal articles on parent autonomy support: Grolnick and Ryan (1989), Deci and Ryan (1987), Grolnick and Ryan (1987), and Pomerantz (2007). These searches located a total of 6,839 non-duplicate, potentially relevant documents.

To supplement searches of electronic databases and obtain any research that might not be found through computer searches, the reference sections of relevant documents were examined for cited works that also might be applicable to the topic.

In addition, two direct contact strategies were employed to ensure items were requested from sources that might have access to parental autonomy support research not included in the reference and citation databases. First, requests for unpublished research were sent through the following listservs: Motivation in Education Special Interest Group from the American Education Research Association, Society for Personality and Social Psychology, and Society of Research in Adolescence. Second, requests were sent via electronic mail to two prominent researchers in the motivation and autonomy support areas regarding access to any relevant data that were not publicly available.

Each title and abstract was examined by the author. If the abstract provided and indicated that the document contained data relevant to the relationship between autonomy support and an achievement-related or psychosocial functioning outcome the full document was obtained for further examination.

CRITERIA FOR INCLUDING STUDIES

To be included in the meta-analysis, studies were required to meet several criteria. First, we focused our synthesis of research on the three most commonly studied outcomes: autonomous motivation, psychological well-being, or academic achievement. Thus, all studies must have examined the relation between parent autonomy support and one of these outcomes. Academic achievement was the most commonly examined outcome and was measured in the following ways, performance on a specific academic task, non-standardized test score or scores (i.e. end of unit test scores, researcher developed test, or teacher developed test), standardized test scores, course grades, GPA, homework completion, or homework grades. Autonomous motivation outcomes included measures of intrinsic motivation and identified regulation. Finally, psychological health outcomes included measures of well-being and self-esteem. Autonomy support could have been measured in many ways, including through observation or self-report by either the child or parent. While autonomy support was operationalized in a variety of ways across research studies, autonomy support was broadly defined as parents encouraging and providing children with opportunities for choice making and opinion exchange.

The studies included in the meta-analysis were all correlational in which the extent of parent autonomy support and the level of the outcome were measured, generally, as it naturally occurs. The design of the studies must have involved the

calculation of a bivariate correlation coefficient between parental autonomy support and autonomous motivation, psychological health, or achievement.

Finally, two sampling restrictions were placed on the included studies. Studies may include non-U.S. participants, but only if the study is written in English. All non-English studies were excluded.

Example of an included study. Deslandes, Royer, Turcotte, and Bertrand (1997) examined "the influence of parenting style and parental involvement in schooling on academic achievement at the secondary level" specifically by looking at 525 adolescents in Quebec. This study was included because it has measures of parental autonomy support and measures of academic outcomes. Autonomy support was measured by using one of the subscales of the Steinberg Parenting Style Questionnaire. The autonomy support subscale measured the extent to which parents employ democratic discipline and encourage the adolescent to express individuality with the family. Academic outcomes were measured by year-end grade point averages obtained from the official school records. A correlation was provided showing the relationship between autonomy support and year-end grade point average.

Example of an excluded study. Lin and colleagues (2005) investigated data on child connectedness and maternal encouragement of autonomy and connectedness. While there was a measure of parental autonomy support, the outcome of connectedness was not related to achievement, psychological health, or autonomous motivation, therefore it was not included in the meta-analysis.

INFORMATION RETRIEVED FROM STUDIES

Numerous characteristics of each study were included in the database, when available. These characteristics encompassed six broad distinctions among studies: (a) the

research report, (b) the study characteristics, (c) the characteristics of the participants, (d) the measure of autonomy support, (e) the measure of achievement or psychosocial functioning, and (f) the estimate of the relationship between parental autonomy support and the outcome. We used simple bivariate correlation coefficients, *r*, as measures of the direction and magnitude of the relationship. Table 1 presents the characteristics coded. Although many characteristics were coded from reports, not all could be used for moderator tests due to a lack of reporting or lack of variability.

CODER RELIABILITY

Two of four graduate and undergraduate students extracted information from each report selected for inclusion. Discrepancies were noted and discussed by the coders, and if agreement was not reached, the faculty advisor to the project was consulted. Because all studies were independently coded twice and all disagreements resolved by a third independent coder, we did not calculate a reliability for this process. However, the agreement between coders averaged 92% for all the articles coded before discrepancies were resolved. Evidence suggests that the process used results in high reliability (Rosenthal, 1987).

METHODS OF DATA INTEGRATION

Before conducting any statistical integration of the effect sizes, the number of positive and negative effects was counted. Next, the range of estimated relationships was calculated. We examined the distribution of sample sizes and effect sizes to determine whether any studies contained statistical outliers. Grubbs'(1950) test was applied and if outliers were identified, these values were set at the value of their next nearest neighbor.

Both published and unpublished studies were included in the synthesis. There is still the possibility that not all studies investigating the relationship between parental

autonomy support and achievement or psychosocial functioning were obtained. Therefore, Duval and Tweedie's (2000) trim-and-fill procedure was employed. The trim-and-fill procedure tests whether the distribution of effect sizes used in the analyses was consistent with that expected if the estimates were normally distributed.

CALCULATING AVERAGE EFFECT SIZES

A weighting procedure was used to calculate average effect sizes across all comparisons. In this procedure, each independent effect size was first multiplied by the inverse of its variance. The sum of the effect sizes was then divided by the sum of the inverses. Also, 95% confidence intervals were calculated. If the confidence interval did not contain zero, then the null hypothesis that parental autonomy support had no relation to the achievement-related or psychosocial functioning-related outcome was rejected.

STATISTICAL INTEGRATION

All analyses were conducted twice, once using fixed effect assumptions and once employing random effects assumptions. Possible moderators of the parental autonomy support and achievement-related or psychosocial functioning-related relationship were tested via homogeneity analyses (Cooper & Hedges, 1994; Hedges & Olkin, 1985). All statistical analyses were conducted with the Comprehensive Meta-Analysis (CMA) statistical software package (Bronstein, Hedges, Higgins, & Rothstein, 2005).

Results

STUDIES CORRELATING PARENTAL AUTONOMY SUPPORT AND AUTONOMOUS MOTIVATION

The literature search uncovered 6 studies that estimated the correlation between parental autonomy support and autonomous motivation. Intrinsic motivation is the prototype of autonomous motivation, when people engage in an activity with a sense of self-initiation, volition, and freedom (Gagne & Deci, 2007). The 6 studies reported 34 separate correlations based on 8 independent samples of students. Of those correlations, 22 measured intrinsic motivation and 12 measured identified regulation. Intrinsic motivation was measured by self-report items, such as "I participate because I enjoy this activity," while identified regulation was measured by self-report items, such as "I participate because doing this activity is important to me." The characteristics of these studies are listed in Table 2.

The 6 studies were published between the years 1986 and 2011. The sample sizes ranged from 48 to 461, with a median size of 77. The mean sample size was 107.53, with a standard deviation of 84.07, suggesting a nonnormal distribution. The Grubbs test revealed a significant outlier, $p < .05$. This sample was the largest in the data set, reported by Hui (2011). As a result, this sample size was replaced with the next largest sample size in the data set, 266. The mean sample size for the adjusted data set was 101.79, with a standard deviation of 63.32. There were no additional significant outliers among the correlations, so all were retained for analysis as reported. The effects sizes of the correlations ranged from -.06 to .47. There were 2 negative effects and 32 positive effects.

Analysis of all correlations. The The weighted average correlation was $r = .24$ (95% CI = .18/.29) with a fixed-error model and $r = .23$ (95% CI = .17/.29) with a

random-error model. As revealed by the CIs, the hypothesis that the relationship between parental autonomy support and intrinsic motivation is $r = 0$ can be rejected under the fixed-error model and the random-error model. In addition, the tests of the distribution of correlations revealed that we could not reject the hypothesis that the correlations were estimating the same underlying population value, Q (7) = 8.68, p = .28.

Trim-and-fill analyses were conducted by testing studies missing from the left side of the mean. With a fixed-effects model there was no evidence that any studies were missing. Under the random-effects model there was also no evidence to suggest that any studies were missing.

Next, a moderator analysis examining the association between the magnitude of correlations and the publication status of the study report was conducted. Five of the samples had been published, and their results were compared to the 3 samples that appeared in dissertations. Under the fixed-error model, correlations from published reports, r = .22 (95% CI = .16/.28), were not significantly different from those from unpublished sources, r = .26 (95% CI = .18/.35), Q (1) = .60, p = .44. Under the random-error model, there was no difference between published and unpublished reports, Q (1) = .29, p = .59.

Moderator analyses. Next, additional moderator analyses of the relationship between parental autonomy support and intrinsic motivation were conducted using four moderators: grade level, agent of support, outcome and type of autonomy support. Autonomy support respondent, domain of autonomy support, and domain of outcome were not examined for this outcome, as they were for academic achievement, because of limited variability for these moderators with this outcome. Moderator tests were conducted even though a non-significant test of heterogeneity was found as part of a theoretical exploratory analysis.

Two moderator analyses were significant under both fixed-effects assumptions and random-effects assumptions, grade level and agent of support. Table 3 presents the results of analyses examining all four different moderators.

Grade level. Correlations were grouped by those in elementary and middle school and those in high school. Elementary and middle school were combined because elementary school only had one study and middle school had two, so due to low sample size they were combined. The overall moderator test revealed that the relationship between parental autonomy support and intrinsic motivation varied by grade level under both fixed-effect Q (1) = 5.26, $p < .05$, and random-effect assumptions, Q (1) = 5.26, $p < .05$.

Under fixed-effect assumptions, the significant average weighted correlation for elementary and middle school, $r = .12$ (95% CI = .002/.24) was significantly different from high school, $r = .28$ (95% CI = .21/.35), Q (1) = 5.26, $p < .05$. As indicated by the CIs both the combined elementary and middle school and high school were significantly different from zero under fixed-error assumptions. Under random-effect assumptions, the significant average weighted correlation for elementary and middle school, $r = .12$ (95% CI = .002/.24) was significantly different from high school, $r = .28$ (95% CI = .21/.35), Q (1) = 5.26, $p < .05$. As indicated by the CIs both the combined elementary and middle school and high school were significantly different from zero under random-error assumptions.

Agent of support. Correlations were grouped by those that categorized agent of support as mother, father, or both parents. The overall moderator test revealed that the relationship of parental autonomy support on intrinsic motivation varied by agent of support under both fixed-effect, Q (2) = 7.06, $p < .05$, and random-effect assumptions, Q (2) = 6.18, $p < .05$.

Pairwise comparisons were then conducted. Mother as agent of support was compared to father as agent of support. Using fixed-effect assumptions, the significant average weighted correlation for mother as agent of support, r = .12 (95% CI = 0/.24), was not different from the average weighted correlation for father as agent of support, r = .09 (95% CI = -.05/.23), Q (1) = .10, p = .75. As indicated by the CIs, mother as agent of support was significantly different from zero under fixed-error assumptions, but father as agent of support was not. Under random-effect assumptions the significant average weighted correlation for mother as agent of support, r = .13 (95% CI = -.01/.27), was not different from the average weighted correlation for father as agent of support, r = .09 (95% CI = -.05/.23), Q (1) = .13, p = .72. As indicated by the CIs, mother and father as agent of support were not significantly different from zero under random-error assumptions.

Next, mother as agent of support was compared to both parents as agents of support. Under fixed-error assumptions, the significant average weighted correlation for mother as agent of support, r = .13 (95% CI .004/.24) was significantly different from the significant average weighted correlation for both parents as agents of support, r = .25 (95% CI = .20/.31), Q (1) = 3.83, p = .05. As indicated by the confidence intervals, both mother as agent of support and both parent as agent of support were significantly different from zero under fixed-error assumptions. Under random-error assumptions, the average weighted correlation for mother as agent of support, r = .13 (95% CI = - .01/.27) was not significantly different from the significant average weighted correlation for both parents as agents of support, r = .25 (95% CI = .20/.31), Q (1) = 2.66, p = .10. As indicated by the confidence intervals, both parents as agents of support was significantly different from zero under random-error assumptions, but mother as agent of support was not.

Finally, father as agent of support was compared to both parents as agents of support. Under fixed-error assumptions, the average weighted correlation for father as agent of support, r = .09 (95% CI = -.05/.23) was significantly different from both parents as agents of support, r = .25 (95% CI = .20/.31), Q (1) = 4.31, p < .05. As indicated by the confidence intervals, both parents as agents of support was significantly different from zero under fixed-error assumptions, but father was not. Under random-error assumptions, the average weighted correlation for father as agent of support, r = .09 (95% CI = -.05/.23) was significantly different from both parents as agents of support, r = .25 (95% CI = .20/.31), Q (1) = 4.31, p < .05. As indicated by the confidence intervals, both parents as agents of support was significantly different from zero under fixed-error assumptions, but father was not.

STUDIES CORRELATING PARENTAL AUTONOMY SUPPORT AND PSYCHOLOGICAL HEALTH

The literature search uncovered 11 studies that estimated the correlation between parental autonomy support and a measure of psychological well-being and self-esteem. The 11 studies reported 34 separate correlations based on 21 separate samples. Of those correlations, 18 measured well-being and 16 measured self-esteem. Well-being was measured by scales such as the 18 item Psychological Well-Being Scale by Ryff and Keyes (1995), while self-esteem was measured by scales such as the Multidimensional Self-Esteem Inventory by Epstein and Obrien (1980). The characteristics of these studies are listed in Table 4.

The 11 studies appeared between the years 1994 and 2011. The sample sizes ranged from 60 to 567, with a median size of 142. The mean sample size was 205.56, with a standard deviation of 148.03, suggesting a normal distribution. The Grubbs test did not reveal any significant outliers. There were no significant outliers among the

correlations, so all were retained for analysis as reported. The effects sizes of the correlations ranged from -.05 to .59. There were 1 negative effect and 33 positive effects.

Analysis of all correlations. The weighted average correlation was r = .38 (95% CI = .36/.41) with a fixed-error model and r = .36 (95% CI = .30/.42) with a random-error model. As revealed by the CIs, the hypothesis that the relationship between parental autonomy support and well-being is r = 0 can be rejected under both the fixed-error model and the random-error model. In addition, the tests of the distribution of the correlations revealed that we could reject the hypothesis that the correlations were estimating the same underlying population value, Q (20) = 98.70, p < .0001.

Trim-and-fill analyses were conducted with missing studies to the left of the mean. Under both fixed and random-effects model, no additional correlations were imputed.

Next, a moderator analyses was conducted examining the association between the magnitude of correlations and the publication status of the study report. Fourteen of the samples had been published, and their results were compared to the 7 samples that had appeared in dissertations. Under the fixed-error model, correlations from published reports, r = .39 (95% CI = .36/.43) were not significantly different from those from unpublished sources, r = .36 (95% CI = .32/.41), Q (1) = 1.28, p = .26. Under the random-error model, there was no difference between published and unpublished reports, Q (1) = 1.02, p = .31).

Moderator analyses. Next, moderator analyses on the relationship between parental autonomy support and psychological health were conducted using six moderators: grade level, agent of support, autonomy support respondent, domain of autonomy support, outcome, and domain of outcome.

Six moderator analyses were significant under fixed-effects assumptions, and four moderators remained significant when a random-effects model was implemented. The four most robust moderators are presented here: agent of support, domain of autonomy support, outcome, and domain of outcome. Table 5 presents the results of analyses examining all the different moderators.

Agent of support. Correlations were grouped into those with the agent of support as mother, father, or both parents. The overall moderator test revealed that the relationship between parental autonomy support and well-being and/or self-esteem varied by agent of support under both fixed-effect Q (2) = 23.20, $p < .0001$, and random-effects assumptions Q (2) = 9.93, $p < .01$.

Pairwise comparisons were then conducted. First, mothers as agent of support were compared to fathers as agents of support. Using fixed-error assumptions, the significant average weighted correlation for mothers, $r = .25$ (95% CI = .17/.32), was not different from the significant average weighted correlation for fathers, $r = .26$ (95% CI = .18/.33), Q (1) = .02, $p = .88$. As is evidenced by the CIs both mothers and fathers as agents of support were significantly different from zero under fixed-error assumptions. Using random-error assumptions, the significant average weighted correlation for mothers, $r = .25$ (95% CI = .16/.33), was not different from the significant average weighted correlation for fathers, $r = .26$ (95% CI .18/.33), Q (1) = .03, $p = .87$. As is evidenced by the CIs both mothers and fathers as agents of support were significantly different from zero under random-error assumptions.

Next, mother as agents of support was compared to both parents as agents of support. Under fixed-error assumptions, the significant average weighted correlation for mothers, $r = .25$ (95% CI = .17/.32), was significantly different from the significant average weighted correlation for both parents, $r = .40$ (95% CI = .37/.42), Q (1) = 14.31,

$p < .0001$. As is evidenced by the CIs both mother as agents of support and both parents as agents of support are significantly different from zero under fixed-error assumptions. Under random-error assumptions, the significant average weighted correlation for mothers, $r = .25$ (95% CI = .16/.33), was significantly different from the significant average weighted correlation for both parents, $r = .40$ (95% CI = .33/.45), Q (1) = 7.25, $p < .01$. As is evidenced by the CIs both mother as agents of support and both parents as agents of support are significantly different from zero under random-error assumptions.

Finally, father as agent of support was compared to both parents as agents of support. Under fixed-error assumptions, the significant average weighted correlation for fathers, $r = .26$ (95% CI = .18/.33), was significantly different from the significant average weighted correlation for both parents, $r = .40$ (95% CI = .37/.42), Q (1) = 97.16, $p < .01$. As is evidenced by the CIs both father as agent of support and both parents as agents of support are significantly different from zero under fixed-error assumptions. Under random-error assumptions, the significant average weighted correlation for fathers, $r = .26$ (95% CI = .18/.33), was significantly different from the significant average weighted correlation for both parents, $r = .40$ (95% CI = .37/.45), Q (1) = 6.82, $p < .01$. As is evidenced by the CIs both father as agent of support and both parents as agents of support are significantly different from zero under random-error assumptions.

Domain of autonomy support. Correlations were grouped by the domain of autonomy support as either global or academics focused. Global refers to the autonomy support measure looking at autonomy support in a general context, while academics focused refers to the autonomy support measure looking at parental autonomy support specifically in relation to school work and other academics. The overall moderator test revealed that the effect of parental autonomy support on well-being and/or self-esteem varied by domain of autonomy support under both fixed effect, Q (1) = 22.73, $p < .0001$,

and random-effect assumptions, Q (1) = 10.07, p < .001. The significant weighted average correlation for global was r = .41 (95% CI = .38/.44) with a fixed-error model and r = .40 (95% CI = .34/.46) with a random-error model. The significant weighted average correlation for academics was r = .23 (95% CI = .16/.34) with a fixed-error model and r = .23 (95% CI = .14/.31) with a random-error model.

Outcome. Correlations were grouped by outcome as either well-being or self-esteem. The overall moderator test revealed that the effect of parental autonomy support on the outcome varied under both fixed effect, Q (1) = 39.09, p < .0001, and random-effect assumptions, Q (1) = 9.37, p < .05. The significant weighted average correlation for well-being was r = .44 (95% CI = .41/.27) with a fixed-error model and r = .43 (95% CI = .37/.49) with a random-error model. The significant weighted average correlation for self-esteem was r = .27 (95% CI = .22/.31) for a fixed-error model and r = .28 (95% CI = .19/.36) for a random-error model.

Domain of outcome. Correlations were grouped by domain of the well-being or self-esteem outcome as academics focused, non-school, and another domain. The overall moderator test revealed that the effect of parental autonomy support on well-being and self-esteem varied by domain of outcome under both fixed effect, Q (2) = 25.19, p < .0001, and random-effect assumptions, Q (2) = 9.65, p < .05.

Pairwise comparisons were then conducted. Using fixed-error assumptions, the significant average weighted correlation for academic well-being and self-esteem, r = .20 (95% CI = .10/.29), was different from the significant average weighted correlation for non-school well-being and self-esteem, r = .41 (95% CI = .38/.43), Q (1) = 20.16, p < .0001. Under random-error assumptions, the significant average weighted correlation for academic well-being and self-esteem, r = .21 (95% CI = .08/.33), was different from the

significant average weighted correlation for non-school well-being and self-esteem, r = .39 (95% CI = .33/.45), Q (1) = 7.41, $p < .05$.

STUDIES CORRELATING PARENTAL AUTONOMY SUPPORT AND ACADEMIC ACHIEVEMENT

The literature search uncovered 20 studies that estimated the correlation between parental autonomy support and a measure of academic achievement. The 20 studies reported 88 separate correlations based on 29 independent samples of students. Of those correlations, 25 measured GPA, 34 measured course grades, 28 measured standardized tests, and 1 measured task performance. The characteristics of these studies are listed in Table 6.

The 20 studies were published between the years 1986 and 2011. The sample sizes ranged from 48 to 805, with a median size of 77. The mean sample size was 174.68, with a standard deviation of 190.01, suggesting a normal distribution. The Grubbs test did not reveal any significant outliers. There were also no significant outliers among the correlations, so all were retained for analysis as reported. The effect sizes of the correlations ranged from -.33 to .50. There were 72 positive effects, 15 negative effects and one effect for which the correlation was zero.

Analysis of all correlations. The weighted average correlation was r = .11 (95% CI = .08/.13) with a fixed-error model and r = .12 (95% CI = .07/.16) with a random-error model. As revealed by the CIs, the hypothesis that the relationship between parental autonomy support and achievement is $r = 0$ can be rejected under both the fixed-error model and the random-error model. In addition, the tests of the distribution of correlations revealed that we could reject the hypothesis that the correlations were estimating the same underlying population value, Q (28) = 94, $p < .0001$.

Trim-and-fill analyses were conducted. With a fixed-effects model, there was evidence that six effect sizes might have been missing on the left side of the distribution. Imputing these values would change the mean correlation to r = .08 (95% CI = .06/.11). With the random-effects model, there was evidence that seven effect sizes might have been missing. Imputing these values would change the mean correlation to r = .08 (95% CI = .06/.10). Thus, even when testing for possible data censoring, the relationship between parent autonomy support and achievement was positive and significantly different from zero, although the magnitude was reduced slightly.

Next, a moderator analysis was conducted to examine the association between the magnitude of correlations and the publication status of the study report. Nineteen of the samples had been published, and their results were compared to the 11 samples that had appeared in dissertations, conference papers, and master theses. Under the fixed-error model, correlations from the published reports, r = .12 (95% CI = .08/.15), were not significantly different from those from unpublished sources, r = .09 (95% CI = .06/.13), Q (1) = .84, p = .36. There was also no difference between published and unpublished reports under the random error model, Q (1) = .15, p = .7.

Moderator analyses. Next, additional moderator analyses were performed on the relationship between parental autonomy support and academic achievement using six moderators: grade level, agent of support, autonomy support respondent, domain of autonomy support, outcome, and domain of outcome.

Four moderator analyses were significant under fixed-effect assumptions, and none of the moderators remained significant when a random-effects model was implemented. Table 7 presents the results of analyses examining all the different moderators.

Discussion

In line with Self-Determination Theory, the results of this meta-analysis suggest that parental autonomy support has a positive relationship with academic achievement, autonomous motivation, and psychological health.

The strength of the overall correlation between parental autonomy support and academic achievement was small and significant under both fixed and random effects. The strength of the overall correlation between parental autonomy support and autonomous motivation was higher than academic achievement, but still small. The strength of the relationship between parental autonomy support and psychological health was medium, and the strongest of the three.

The relationship between parent autonomy support and academic achievement may be small because achievement is a distal outcome that is influenced by numerous factors other than autonomy support. Even though the relation between academic achievement and parent autonomy support is small, I would argue that it is still important because it represents a strategy parents may use to improve their child's achievement that requires few material resources. Further, it would make sense for autonomous motivation and well-being to have a stronger relationship with parental autonomy support compared to academic achievement because they are more proximal measures.

The moderator analysis in the meta-analysis exploring autonomous motivation indicted that the agent of support and grade level were the two most robust moderators, significant under both fixed and random effects. When both parents were simultaneously assessed as agents of support, the relationship between autonomy support and achievement was stronger compared to when the autonomy supportiveness of either parent was assessed independently. Results suggest that children may experience greater

motivational benefits when both parents are autonomy supportive. Also in line with predictions, moderator analyses for autonomous motivation revealed that autonomy support has a stronger effect for high school compared to elementary and middle school students. Given adolescents emerging desire to be autonomous individuals, autonomy support would appear to be especially important for supporting motivation during this developmental period.

The moderator analyses for psychological health indicated that the agent of support, the domain of the autonomy support, the outcome, and the domain of the outcome were the four most robust moderators. The relationship for agent of support was strongest for both parents. Once again, autonomy support had a stronger relationship with psychological health when both parents were reported as being autonomy-supportive, compared to when the autonomy-supportiveness of just one parent alone was examined. The relationships between parental autonomy support and psychological health was also moderated by the domain of the autonomy support, showing that the relationship was stronger when autonomy support was provided across domains globally, rather than specifically for academics. This could be due to the reality that there are many other influences on children's well-being in school, such as teachers, peers, and the school climate. Similarly, results suggested that the relationship between parent autonomy support and psychological health was stronger for non-school psychological health compared to school-focused well-being and self-esteem. This could be due to academic contexts being very complex, with elements that make students feel controlled already built into them at the teacher and school level, for example a child may have an autonomy supportive parent but a controlling teacher. The child may focus on the controlling teacher when thinking about school-focused well-being. Further, there are a lot of other factors in the school, such as rigid structures and little opportunity for choice,

which could be contradictory to parent autonomy support, allowing parental autonomy support to have a stronger relation with non-school domains, such as home and family life. Finally, moderator analyses also showed that the relationship was stronger for well-being than for self-esteem. This suggests that parents can positively increase their child's well-being through autonomy supportive parenting practices.

One of the most salient results was seen in the moderator agent of support, both parents was the strongest in both psychological health and autonomous motivation. This is especially important for practice, as research has focused on mothers over fathers in many cases, while this indicates that both parents are important.

FUTURE DIRECTIONS AND LIMITATIONS

Future research on autonomy supportive parenting should look at a more diverse set of academic domains. There was very little research done on specific academic domains, such as science. Research tended to focus on academics in general, math or English language arts. I believe it would be helpful to explore how autonomy support impacts different domains. In addition, it would be helpful to conduct research looking at autonomy supportive parenting and its relationship with different development levels, such as more research examining the middle school and high school grades versus the elementary grades. This would allow for a more nuanced understanding of how autonomy supportive parenting impacts different developmental levels. While there was support for autonomy supportive parenting having the strongest relationship with high school children, this was only significant for the autonomous motivation outcome. More research is needed to explore whether this holds for academic achievement and other outcomes.

It is important to note that some of these findings were based on small numbers of effect sizes, so it is difficult to place a great deal of confidence in the specific magnitude of the estimated effects. This is especially true in autonomous motivation. In addition, in autonomous motivation some moderators could not be tested due to low sample size, such as autonomy support respondent, domain of autonomy support, and domain of outcome.

Addendum

PART I – DESCRIPTION OF THE PROGRAM

The outcome of the program is to train parents of 7th and 8th graders to be more autonomy supportive and less controlling. There is one goal of the program; to teach parents how to be autonomy supportive in both academic and non-academic contexts. Increased parental autonomy support and less controlling parenting are first order outcomes. Increased children's academic intrinsic motivation, increased psychological well-being, and increased academic achievement are second order outcomes.

Over a 7 week period parents will participate in 7 parent training sessions at their home. Each session will focus on teaching parents different autonomy supportive practices. At the beginning of the program parents will be provided an informational booked with exercise, detailed examples, and explanations of how to be autonomy supportive. Parents will be coached during each session by a trained instructor. Each session will follow the following format: clear explanation of the concept to be taught, modeling of the concept by the instructor, role-playing of the concept by the parents, continued practice by the parents, and feedback from the instructor. In addition during the seven weeks, parents will keep a daily log noting times they exhibited autonomy supportive behavior towards their children.

The booklet and training sessions will be designed from a Self-Determination Theory perspective. In Self-Determination Theory autonomy support is characterized by acknowledgement of children's perspectives, encouragement of children to experiment, provision of opportunity to make choices, and minimal use of controlling language. Self-Determination Theory will be the guiding theory behind the sessions design.

The program will be serving parents of 7th and 8th grade students. Families will be able to volunteer for participation in the program. It is strongly encouraged that both parents attend the in-home training sessions.

First and second order outcomes. The first order outcomes, which will be measured at the end of the program, will include observational measures of parental autonomy support, parent self-reports on parental autonomy support, and a child's measure on parental autonomy support. The second order outcomes, which will be measured two weeks after the end of the program, will include measures of children's academic intrinsic motivation and psychological well-being. In addition, children's academic grades will be collected at the end of the school year.

Evaluative criteria. The program will be coming from a value-oriented orientation.

PART II – NARRATIVE OVERVIEW OF THE PROGRAM

The main purpose of the program is to help parents become more autonomy supportive. The program will focus on the outcomes of increased parental autonomy support, decreased parental control, increased children's academic intrinsic motivation and psychological well-being. The inputs include the children, parents, training materials, and program facilitators. There are many constraints that could play a role in this program: the parent's motivation and parenting style, the child's motivation, the skill level of the program facilitators, and support from the spouse.

There are three main transactions of the program: to teach and model autonomy supportive concepts, role playing and practice of autonomy supportive concept, and receive and process feedback on autonomy supportive role playing and practice. In

addition, autonomy support during the week will be logged in a journal. See Figures 1 – 3 for additional information about the transactions.

PART III – NATURAL QUESTIONS AND DATA ANALYSIS PROCEDURES

1. Parent question: How will this program help my child become more intrinsically motivated in their academics?
    a. Variables to be measured – children's intrinsic motivation
    b. Instruments used to measure the variables
        i. Relative Autonomy Index (RAI) – Ryan and Connell's (1989) RAI measures children's growth in autonomous motivation, it rewards more points to more autonomous forms of self-regulation
        ii. Children's Academic Intrinsic Motivation Inventory (CAIMI) – Gottfried's (1986) 18 item scale measures children's curiosity, persistence, and enjoyment of tasks
    c. Data Analysis
        i. Children's intrinsic motivation – pre-intervention and post-interevention scores will be analyzed using ANOVA

Appendix

Table 1: Complete list of the information retrieved from the studies

Report characteristics

1. Author name
2. Year
3. Type of report (journal article, book, book chapter, dissertation, MA thesis, private report, government paper, conference paper, other)
4. Was this peer-reviewed?

Study information

1. Participants location (in the United States, in a country outside the United States)
    a. Specify
2. Community type (urban, suburban, rural, can't tell)
3. Setting (home, school, lab, sport, other)

Participant and sample characteristics

1. Student labels (gifted, above average ability/achievement, average ability/achievement, at risk, low ability/below grade level, possessing a learning deficit, other)
2. Socioeconomic status (low, low-middle, middle, middle-upper, upper, mixed, no socioeconomic status information)
3. Grade level
4. Sex
5. Ethnicities (White, African American, Asian American, Hispanic, Native American, Other)
6. Percentages of ethnicities

Parental autonomy support measure characteristics

1. Domain (general, general academics, mathematics, science, English language arts, sports, social studies, music/arts, other)
2. Agent of support (both parents, mother, father)
3. How was autonomy support measured? (observation, child scale, parent scale)
4. Self-report (existing, created)
5. Name of measure
6. Type of autonomy support (general multidimensional, offering choice, attending to student perspective, creating relevance, providing encouragement, providing rationale, asking what child wants, providing information feedback, offering hints, other)

Outcome Measure

1. Outcome
    a. Academic achievement (task performance, non-standardized test score, standardized test score, course grades, GPA, homework completion, homework grades, other)
    b. Psychosocial functioning (intrinsic motivation, identified regulation,

integrated regulation, interjected regulation, extrinsic motivation, enjoyment, interest, situational interest, individual interest, positive emotions, negative emotions, perceived competence, expectancies for success, perceived autonomy, cognitive engagement, behavioral engagement, effort, persistence, re-engagement with domain, positive school attitudes, negative school attitudes, task value, intrinsic value, attainment value, utility value, self-esteem/self-worth, self-acceptance, self-concept, creativity, executive functioning)

2. Outcome measured (behavior, self-report)
    a. Behavioral measure (report from student, observed by teacher, observed by parent, observed by researcher)
    b. Self-report (existing, created)
3. Name of measure
4. Domain of outcome (general non-school, school in general, math, science, English language arts, social studies, sports, music/arts, other)
5. Delay?

Effect size information

1. Total sample size
2. Direction of the effect
3. Effect size

Table 2: Characteristics of studies correlating parental autonomy support and autonomous motivation

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Beiswenger (2010)	Journal Article	142	Middle School	No	Child Scale	Mother	General	Intrinsic Motivation	General, non-school	+.06
Beiswenger (2010)	Journal Article	142	Middle School	No	Child Scale	Mother	General	Identified Regulation	General, non-school	+.03
Beiswenger (2010)	Journal Article	142	Middle School	No	Child Scale	Father	General	Intrinsic Motivation	General, non-school	+.12
Beiswenger (2010)	Journal Article	142	Middle School	No	Child Scale	Father	General	Identified Regulation	General, non-school	+.02
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale	Mother	Academics	Intrinsic Motivation	Academics	+.18
Bronstein (2005)	Journal Article	77	Middle School	Yes	Child Scale	Mother	Academics	Intrinsic Motivation	Academics	+.30
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale	Mother	Academics	Intrinsic Motivation	Academics	+.29
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale, Parent Scale	Both Parents	Academics	Intrinsic Motivation	Academics	+.19
Bronstein (2005)	Journal Article	77	Middle School	Yes	Child Scale, Parent Scale	Both Parents	Academics	Intrinsic Motivation	Academics	+.12
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale, Parent Scale	Both Parents	Academics	Intrinsic Motivation	Academics	+.22
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale, Parent Scale	Both Parents	Academics	Intrinsic Motivation	Academics	+.19
Bronstein (2005)	Journal Article	77	Middle School	Yes	Child Scale, Parent Scale	Both Parents	Academics	Intrinsic Motivation	Academics	+.19
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale, Parent Scale	Both Parents	Academics	Intrinsic Motivation	Academics	+.32
Chirkov (2001)	Journal Article	116	High School	No	Child Scale	Both Parents	General	Identified Regulation	Academics	+.38
Chirkov (2001)	Journal Article	116	High School	No	Child Scale	Both Parents	General	Intrinsic Motivation	Academics	+.14
Chirkov	Journal	120	High School	No	Child Scale	Both	General	Identified	Academics	+.47

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
(2001)	Article					Parents		Regulation		
Chirkov (2001)	Journal Article	120	High School	No	Child Scale	Both Parents	General	Intrinsic Motivation	Academics	+.16
Dai (1998)	Dissertation	153	High School	No	Child Scale	Both Parents	General	Identified Regulation	Academics	+.21
Dai (1998)	Dissertation	153	High School	No	Child Scale	Both Parents	General	Intrinsic Motivation	Academics	+.20
Dai (1998)	Dissertation	266	High School	No	Child Scale	Both Parents	General	Identified Regulation	Academics	+.41
Dai (1998)	Dissertation	266	High School	No	Child Scale	Both Parents	General	Intrinsic Motivation	Academics	+.22
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Mother	General	Identified Regulation	Academics	+.13
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Mother	General	Intrinsic Motivation	Academics	+.10
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Father	General	Identified Regulation	Academics	-.04
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Father	General	Intrinsic Motivation	Academics	+.15
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Both Parents	General	Identified Regulation	Academics	-.06
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Both Parents	General	Intrinsic Motivation	Academics	+.14
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Mother	General	Identified Regulation	Academics	+.11
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Mother	General	Intrinsic Motivation	Academics	+.14
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Father	General	Identified Regulation	Academics	+.25
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Father	General	Intrinsic Motivation	Academics	+.30
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Both Parents	General	Identified Regulation	Academics	+.12

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Both Parents	General	Intrinsic Motivation	Academics	+.14
Hui (2011)	Journal Article	461	High School	No	Child Scale	Both Parents	General	Intrinsic Motivation	Academics	+.23

Table 3: Results of analyses examining the correlation between parental autonomy support and autonomous motivation

Moderators	*k*	*r*	95% Confidence Interval		*Q*
			Low estimate	High estimate	
Overall	8	.24** (.23**)	.18 (.17)	.29 (.29)	8.68
					Q_b
Publication type					.60 (.29)
Published	5	.22** (.22**)	.16 (.14)	.28 (.30)	
Unpublished	3	.26** (.26**)	.18 (.15)	.35 (.35)	
Grade level					5.26* (5.26)*
Elementary and Middle School (K-8)	3	.12* (.12*)	.002 (.002)	.24 (.24)	
High School (9-12)	4	.28** (.28**)	.21 (.21)	.35 (.35)	
Agent of support					7.06* (6.17*)
Both Parents	7	.25** (.25**)	.20 (.20)	.30 (.30)	
Mother	3	.12* (.13)	0 (-.01)	.24 (.27)	
Father	2	.09 (.09)	-.05 (-.05)	.23 (.23)	
Outcome					3.46 (.28)
Intrinsic Motivation	11	.18** (.18**)	.13 (.13)	.23 (.23)	
Identified Regulation	9	.25** (.22**)	.19 (.08)	.31 (.35)	

Note. Random-effects *Q* values and point estimates are presented in parentheses. Q_b is an index of the heterogeneity between the group mean effect sizes. If Q_b is significant, it indicates that the mean effect sizes across categories differ by more than sampling error; that is there is a statistical difference between groups.
*$p < .05$. ** $p < .0001$.

Table 4: Characteristics of studies correlating parental autonomy support and psychological well-being

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Beiswenger (2010)	Journal Article	142	Middle School	No	Child Scale	Mother	General	Well-being	Non-school	+.27
Beiswenger (2010)	Journal Article	142	Middle School	No	Child Scale	Father	General	Well-being	Non-school	+.30
Chirkov (2001)	Journal Article	116	High School	No	Child Scale	Both Parents	General	Self-esteem	Academics	+.40
Chirkov (2001)	Journal Article	120	High School	No	Child Scale	Both Parents	General	Self-esteem	Academics	+.54
Dai (1998)	Dissertation	153	High School	No	Child Scale	Both Parents	General	Self-esteem	Academics	+.28
Dai (1998)	Dissertation	266	High School	No	Child Scale	Both Parents	General	Self-esteem	Academics	+.15
Downie (2007)	Journal Article	105	College	No	Child Scale	Both Parents	General	Well-being	Non-school	+.33
Downie (2007	Journal Article	105	College	No	Child Scale	Mother	General	Well-being	Non-school	+.31
Downie (2007	Journal Article	105	College	No	Child Scale	Father	General	Well-being	Non-school	+.30
Downie (2007	Journal Article	125	College	No	Child Scale	Both Parents	General	Well-being	Non-school	+.27
Ferguson (2011)	Journal Article	322	High School	No	Child Scale	Both Parents	General	Well-being	Non-school	+.59
Ferguson (2011)	Journal Article	99	High School	No	Child Scale	Both Parents	General	Well-being	Non-school	+.48
Ferguson (2011)	Journal Article	125	High School	No	Child Scale	Both Parents	General	Well-being	Non-school	+.46
Ferguson	Journal	98	High	No	Child Scale	Both	General	Well-	Non-school	+.48

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
(2011)	Article		School			Parents		being		
Grolnick (2000)	Journal Article	60	Middle School	No	Child Scale	Mother	Academics	Self-esteem	Non-school	+.14
Grolnick (2000)	Journal Article	60	Middle School	Yes	Child Scale	Mother	Academics	Self-esteem	Non-school	-.05
Grolnick (2000)	Journal Article	60	Middle School	No	Child Scale	Mother	Academics	Self-esteem	Non-school	+.22
Halpern-Felsher (1994)	Dissertation	66	High School	No	Observation	Father	Academics	Self-esteem	Other	+.20
Halpern-Felsher (1994)	Dissertation	66	High School	No	Observation	Mother	Academics	Self-esteem	Other	+.40
Halpern-Felsher (1994)	Dissertation	67	High School	No	Observation	Father	Academics	Self-esteem	Other	+.17
Halpern-Felsher (1994)	Dissertation	67	High School	No	Observation	Mother	Academics	Self-esteem	Other	+.04
Jiang (2011)	Journal Article	218	High School	No	Child Scale	Both Parents	Academics	Self-esteem	Non-school	+.33
Jiang (2011)	Journal Article	271	High School	No	Child Scale	Both Parents	Academics	Self-esteem	Non-school	+.18
Lekes (2010)	Journal Article	567	High School	No	Child Scale	Both Parents	General	Well-being	Non-school	+.43
Lekes (2010)	Journal Article	515	High School	No	Child Scale	Both Parents	General	Well-being	Non-school	+.36
Robbins (1995)	Dissertation	177	College	No	Child Scale	Both Parents	General	Self-esteem	Non-school	+.29
Robbins (1995)	Dissertation	177	College	No	Child Scale	Mother	General	Self-esteem	Non-school	+.25
Robbins (1995)	Dissertation	177	College	No	Child Scale	Father	General	Self-esteem	Non-school	+.25

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Wang (2006)	Dissertation	433	Middle School	No	Child Scale	Both Parents	General	Well-being	Non-school	+.47
Wang (2006)	Dissertation	433	Middle School	Yes	Child Scale	Both Parents	General	Well-being	Non-school	+.45
Wang (2006)	Dissertation	433	Middle School	No	Child Scale	Both Parents	General	Well-being	Non-school	+.44
Wang (2006)	Dissertation	373	Middle School	No	Child Scale	Both Parents	General	Well-being	Non-school	+.47
Wang (2006)	Dissertation	373	Middle School	Yes	Child Scale	Both Parents	General	Well-being	Non-school	+.50
Wang (2006)	Dissertation	373	Middle School	No	Child Scale	Both Parents	General	Well-being	Non-school	+.55

Table 5: Results of analyses examining the correlation between parental autonomy support and well-being and self-esteem

Moderators	*k*	*r*	95% Confidence Interval		*Q*
			Low estimate	High estimate	
Overall	21	.38***(.36***)	.36 (.30)	.41 (.42)	98.70***
					Q_b
Publication type					1.28 (1.02)
Published	14	.39*** (.39***)	.36 (.32)	.43 (.45)	
Unpublished	7	.36*** (.31***)	.32 (.18)	.41 (.43)	
Grade level					10.13* (2.9)
Middle school (5-8)	4	.44*** (.38***)	.39 (.25)	.49 (.51)	
High school (9-12)	14	.38*** (.37***)	.35 (.29)	.41 (.45)	
College	3	.28*** (.28***)	.19 (.19)	.37 (.37)	
Autonomy support respondent					5.03* (2.84)
Child scale	19	.39*** (.37***)	.36 (.31)	.41 (.43)	
Observation	2	.21* (.21*)	.03 (.01)	.36 (.39)	
Agent of support					23.20*** (9.93*)
Both parents	17	.40*** (.39***)	.37 (.33)	.42 (.45)	
Mother	6	.25*** (.25***)	.17 (.16)	.32 (.33)	
Father	5	.26*** (.26***)	.18 (.18)	.33 (.33)	
Domain of autonomy support					22.73*** (10.07**)
General	16	.41*** (.40***)	.38 (.34)	.44 (.46)	
Academics	5	.23*** (.23***)	.16 (.14)	.30 (.31)	
Outcome					39.09*** (9.37*)
Well-being	11	.44*** (.43***)	.41 (.37)	.47 (.49)	
Self-esteem	10	.27*** (.28***)	.22 (.19)	.31 (.36)	

Domain of outcome					25.19*** (9.65*)
Non-school	17	.41*** (.39***)	.38 (.33)	.43 (.45)	
Academics	2	.20*** (.21***)	.10 (.08)	.29 (.33)	
Other	2	.21* (.21*)	.03 (.01)	.36 (.39)	

Note. Random-effects Q values and point estimates are presented in parentheses. Q_b is an index of the heterogeneity between the group mean effect sizes. If Q_b is significant, it indicates that the mean effect sizes across categories differ by more than sampling error; that is there is a statistical difference between groups.
*$p < .05$. ** $p < .01$. *** $p < .0001$.

Table 6: Characteristics of studies correlating parental autonomy support and academic achievement

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Birman (2007)	Journal Article	120	High School	No	Parent Scale	Both Parents	General	GPA	General academics	-.33
Blackwelder (2006)	MA Thesis	217	College	No	Child Scale	Both Parents	General	Course Grades	General academics	+.15
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale	Mother	Academics	GPA	General academics	-.03
Bronstein (2005)	Journal Article	77	Middle School	Yes	Child Scale	Mother	Academics	GPA	General academics	-.07
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale	Mother	Academics	Standardized Test Scores	General academics	-.25
Bronstein (2005)	Journal Article	77	Middle School	Yes	Child Scale	Mother	Academics	Standardized Test Scores	General academics	-.02
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale	Mother	Academics	GPA	General academics	+.24
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale	Mother	Academics	Standardized Test Scores	General academics	+.18
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale, Parent Scale	Both Parents	Academics	GPA	General academics	+.19
Bronstein (2005)	Journal Article	77	Middle School	Yes	Child Scale, Parent Scale	Both Parents	Academics	GPA	General academics	+.15
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale, Parent Scale	Both Parents	Academics	Standardized Test Scores	General academics	+.25
Bronstein (2005)	Journal Article	77	Middle School	Yes	Child Scale, Parent Scale	Both Parents	Academics	Standardized Test Scores	General academics	+.11
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale, Parent Scale	Both Parents	Academics	GPA	General academics	+.17
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale, Parent Scale	Both Parents	Academics	Standardized Test Scores	General academics	+.25
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale, Parent Scale	Both Parents	Academics	GPA	General academics	+.15
Bronstein	Journal	77	Middle	Yes	Child Scale,	Both	Academics	GPA	General	+.17

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
(2005)	Article		School		Parent Scale	Parents			academics	
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale, Parent Scale	Both Parents	Academics	Standardized Test Scores	General academics	+.19
Bronstein (2005)	Journal Article	77	Middle School	Yes	Child Scale, Parent Scale	Both Parents	Academics	Standardized Test Scores	General academics	+.21
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale, Parent Scale	Both Parents	Academics	GPA	General academics	+.32
Bronstein (2005)	Journal Article	77	Middle School	No	Child Scale, Parent Scale	Both Parents	Academics	Standardized Test Scores	General academics	+.42
Cooper (2000)	Journal Article	709	Mixed	No	Parent Scale	Both Parents	Academics	Standardized Test Scores	General academics	+.15
Cooper (2000)	Journal Article	709	Mixed	No	Parent Scale	Both Parents	Academics	Course Grades	General academics	+.13
Dai (1998)	Dissertation	153	High School	No	Child Scale	Both Parents	General	Course Grades	General academics	+.12
Dai (1998)	Dissertation	266	High School	No	Child Scale	Both Parents	General	Course Grades	General academics	+.07
d'Ailly (2002)	Conference Paper	805	Mixed	No	Child Scale	Mother	General	Course Grades	General academics	+.05
d'Ailly (2002)	Conference Paper	805	Mixed	No	Child Scale	Father	General	Course Grades	General academics	-.01
d'Ailly (2002)	Conference Paper	740	Mixed	No	Child Scale	Mother	General	Course Grades	General academics	+.01
d'Ailly (2002)	Conference Paper	740	Mixed	No	Child Scale	Father	General	Course Grades	General academics	-.01
Deslandes (1997)	Journal Article	525	High School	No	Child Scale	Both Parents	Academics	GPA	General academics	+.13
Fei-Yin Ng (2004)	Journal Article	121	Elementary School	No	Parent Scale	Mother	Academics	Course Grades	General academics	-.03
Fei-Yin Ng (2004)	Journal Article	121	Elementary School	No	Parent Scale	Mother	Academics	Course Grades	General academics	+.12
Fei-Yin Ng (2004)	Journal Article	110	Elementary School	No	Parent Scale	Mother	Academics	Task Performance	Digit search task	+.39

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Fulton (2008)	Journal Article	85	College	No	Child Scale	Both Parents	General	GPA	General academics	-.03
Fulton (2008)	Journal Article	160	College	No	Child Scale	Both Parents	General	GPA	General academics	+.23
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Mother	General	Standardized Test Scores	General academics	+.10
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Mother	General	Course Grades	General academics	+.36
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Father	General	Standardized Test Scores	General academics	+.13
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Father	General	Course Grades	General academics	+.06
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Both Parents	General	Standardized Test Scores	General academics	+.30
Grolnick (1986)	Dissertation	48	Elementary School	No	Observation	Both Parents	General	Course Grades	General academics	+.46
Grolnick (1989)	Journal Article	66	Mixed	No	Observation	Mother	General	Standardized Test Scores	General academics	+.19
Grolnick (1989)	Journal Article	66	Mixed	No	Observation	Father	General	Standardized Test Scores	General academics	+.34
Grolnick (1989)	Journal Article	66	Mixed	No	Observation	Both Parents	General	Standardized Test Scores	General academics	+.30
Grolnick (1989)	Journal Article	66	Mixed	No	Observation	Mother	General	Course Grades	General academics	+.46
Grolnick (1989)	Journal Article	66	Mixed	No	Observation	Father	General	Course Grades	General academics	+.33
Grolnick (1989)	Journal Article	66	Mixed	No	Observation	Both Parents	General	Course Grades	General academics	+.46
Grolnick (1991)	Journal Article	456	Elementary School	No	Child Scale	Mother	General	Course Grades	General academics	+.06
Grolnick (1991)	Journal Article	456	Elementary School	No	Child Scale	Mother	General	Standardized Test Scores	General academics	+.10
Grolnick	Journal	456	Elementary	No	Child Scale	Father	General	Course	General	+.03

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
(1991)	Article		School					Grades	academics	
Grolnick (1991)	Journal Article	456	Elementary School	No	Child Scale	Father	General	Standardized Test Scores	General academics	+.02
Grolnick (2000)	Journal Article	60	Middle School	No	Child Scale	Mother	Academics	Course Grades	English Language Arts	+.05
Grolnick (2000)	Journal Article	60	Middle School	No	Child Scale	Mother	Academics	Course Grades	Math	-.18
Grolnick (2000)	Journal Article	60	Middle School	Yes	Child Scale	Mother	Academics	Course Grades	English Language Arts	-.04
Grolnick (2000)	Journal Article	60	Middle School	Yes	Child Scale	Mother	Academics	Course Grades	Math	0
Grolnick (2000)	Journal Article	60	Middle School	No	Child Scale	Mother	Academics	Course Grades	English Language Arts	+.47
Grolnick (2000)	Journal Article	60	Middle School	No	Child Scale	Mother	Academics	Course Grades	Math	+.13
Grolnick (2002)	Journal Article	60	Elementary School	No	Observation	Mother	Other (verbal)	Course Grades	General academics	-.33
Grolnick (2002)	Journal Article	60	Elementary School	No	Observation	Mother	Other (verbal)	Course Grades	General academics	+.37
Grolnick (2002)	Journal Article	60	Elementary School	No	Observation	Mother	Other (nonverbal)	Course Grades	General academics	-.33
Grolnick (2002)	Journal Article	60	Elementary School	No	Observation	Mother	Other (nonverbal)	Course Grades	General academics	+.34
Halpern-Felsher (1994)	Dissertation	66	High School	No	Observation	Father	Academics	GPA	General academics	+.34
Halpern-Felsher (1994)	Dissertation	66	High School	No	Observation	Mother	Academics	GPA	General academics	+.50
Halpern-	Dissertation	66	High	No	Observation	Father	Academics	Standardized	Math	+.24

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Felsher (1994)			School					Test Scores		
Halpern-Felsher (1994)	Dissertation	66	High School	No	Observation	Mother	Academics	Standardized Test Scores	Math	+.30
Halpern-Felsher (1994)	Dissertation	66	High School	No	Observation	Father	Academics	Standardized Test Scores	English Language Arts	+.19
Halpern-Felsher (1994)	Dissertation	66	High School	No	Observation	Mother	Academics	Standardized Test Scores	English Language Arts	-.07
Halpern-Felsher (1994)	Dissertation	67	High School	No	Observation	Father	Academics	GPA	General academics	+.13
Halpern-Felsher (1994)	Dissertation	67	High School	No	Observation	Mother	Academics	GPA	General academics	+.06
Halpern-Felsher (1994)	Dissertation	67	High School	No	Observation	Father	Academics	Standardized Test Scores	Math	+.27
Halpern-Felsher (1994)	Dissertation	67	High School	No	Observation	Mother	Academics	Standardized Test Scores	Math	+.21
Halpern-Felsher (1994)	Dissertation	67	High School	No	Observation	Father	Academics	Standardized Test Scores	English Language Arts	+.32
Halpern-Felsher (1994)	Dissertation	67	High School	No	Observation	Mother	Academics	Standardized Test Scores	English Language Arts	+.19
Jiang (2011)	Journal Article	218	High School	No	Child Scale	Both Parents	Academics	GPA	General academics	+.10
Jiang (2011)	Journal Article	271	High School	No	Child Scale	Both Parents	Academics	GPA	General academics	+.22

Author (year)	Type of document	Sample size	Grade level	Delay in outcome measure	Autonomy support respondent	Agent of support	Domain of autonomy support	Outcome	Domain of outcome	Correlation
Joussemet (2005)	Journal Article	132	Elementary School	No	Observation	Mother	General	Standardized Test Scores	Math	-.06
Joussemet (2005)	Journal Article	132	Elementary School	No	Observation	Mother	General	Standardized Test Scores	English Language Arts	+.16
Soenens (2005)	Journal Article	328	High School	No	Child Scale	Mother	General	GPA	General academics	+.14
Soenens (2005)	Journal Article	328	High School	No	Child Scale	Father	General	GPA	General academics	+.09
Soenens (2005)	Journal Article	285	High School	No	Child Scale	Mother	General	GPA	General academics	+.13
Soenens (2005)	Journal Article	285	High School	No	Child Scale	Father	General	GPA	General academics	+.13
Strage (1999)	Journal Article	236	College	No	Child Scale	Both Parents	General	GPA	General academics	+.15
Strage (1999)	Journal Article	236	College	No	Child Scale	Both Parents	General	GPA	General academics	+.03
Wang (2006)	Dissertation	433	Middle School	No	Child Scale	Both Parents	General	Course Grades	General academics	+.14
Wang (2006)	Dissertation	433	Middle School	Yes	Child Scale	Both Parents	General	Course Grades	General academics	+.17
Wang (2006)	Dissertation	433	Middle School	No	Child Scale	Both Parents	General	Course Grades	General academics	+.17
Wang (2006)	Dissertation	373	Middle School	No	Child Scale	Both Parents	General	Course Grades	General academics	+.28
Wang (2006)	Dissertation	373	Middle School	Yes	Child Scale	Both Parents	General	Course Grades	General academics	+.28
Wang (2006)	Dissertation	373	Middle School	No	Child Scale	Both Parents	General	Course Grades	General academics	+.24

Table 7: Results of analyses examining the correlation between parental autonomy support and academic achievement

Moderators	*k*	*r*	95% Confidence Interval		*Q*
			Low estimate	High estimate	
Overall	29	.11*** (.12***)	.08 (.07)	.13 (.16)	94.00***
					Q_b
Publication type					94.00***(.15)
Published	19	.12*** (.11***)	.08 (.05)	.15 (.17)	
Unpublished	10	.09*** (.13***)	.06 (.06)	.13 (.19)	
Grade level					6.60(4.30)
Elementary (K-4)	7	.10*** (.12)	.03 (-.04)	.16 (.26)	
Middle School (5-8)	4	.20*** (.20***)	.14 (.14)	.26 (.26)	
High School (9-12)	10	.11*** (.10**)	.07 (.02)	.15 (.18)	
College	4	.13*** (.13**)	.05 (.03)	.20 (.21)	
Autonomy support respondent					6.37* (2.18)
Child Scale	18	.10*** (.11***)	.07 (.07)	.13 (.15)	
Parent Scale	3	.07* (-.04)	0 (-.32)	.13 (.23)	
Observation	8	.20*** (.19*)	.12 (.03)	.27 (.35)	
Agent of support					17.95*** (1.73)
Both parents	16	.14*** (.14***)	.11 (.08)	.17 (.20)	
Mother	16	.08*** (.12***)	.05 (.05)	.12 (.18)	
Father	9	.04* (.08*)	.01 (.02)	.08 (.15)	
Domain of autonomy support					7.79** (3.47)
General	16	.08*** (.09***)	.05 (.03)	.11 (.14)	
Academics	10	.15*** (.15***)	.11 (.11)	.19 (.19)	
Outcome					2.08 (.11)

Course grades/GPA	35	.09*** (.12***)	.07 (.07)	.11 (.17)	
Standardized test scores	13	.12*** (.13***)	.08 (.08)	.16 (.18)	
Domain of Outcome					1.89 (1.23)
English language arts	4	.18** (.18**)	.07 (.07)	.28 (.28)	
Math	4	.08 (.11)	-.03 (-.07)	.19 (.27)	
General academics	26	.10*** (.11***)	.08 (.06)	.13 (.16)	

Note. Random-effects Q values and point estimates are presented in parentheses. Q_b is an index of the heterogeneity between the group mean effect sizes. If Q_b is significant, it indicates that the mean effect sizes across categories differ by more than sampling error; that is there is a statistical difference between groups.
*$p < .05$. ** $p < .01$. *** $p < .0001$.

Figure 1: Overview of the Program

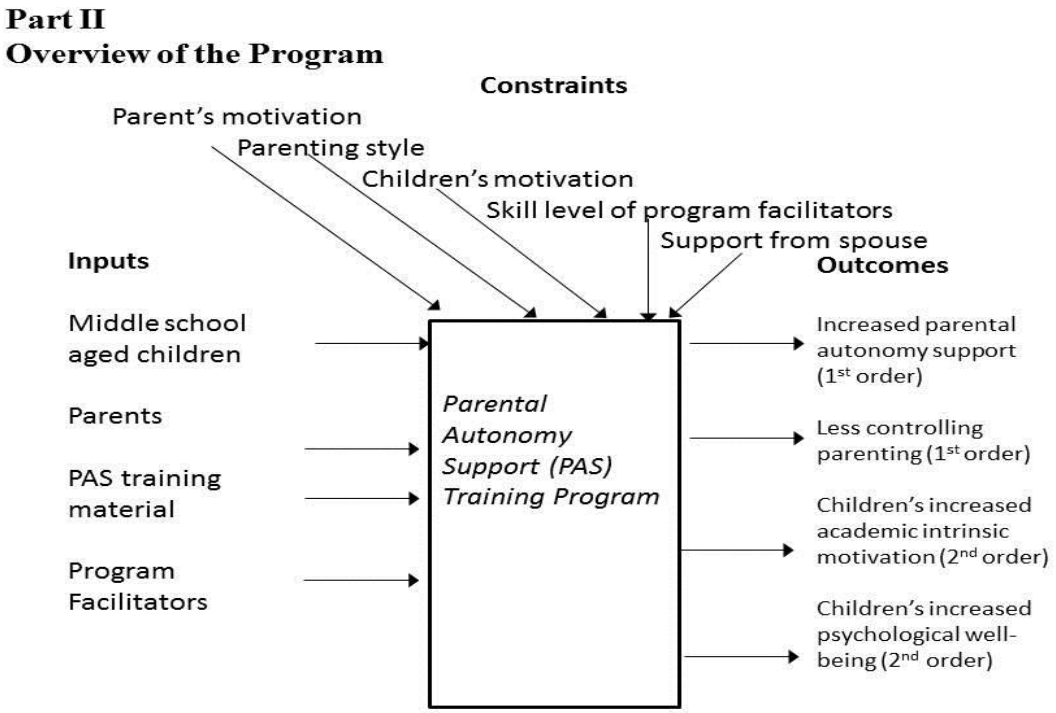


Figure 2: Program's Primary Transactions

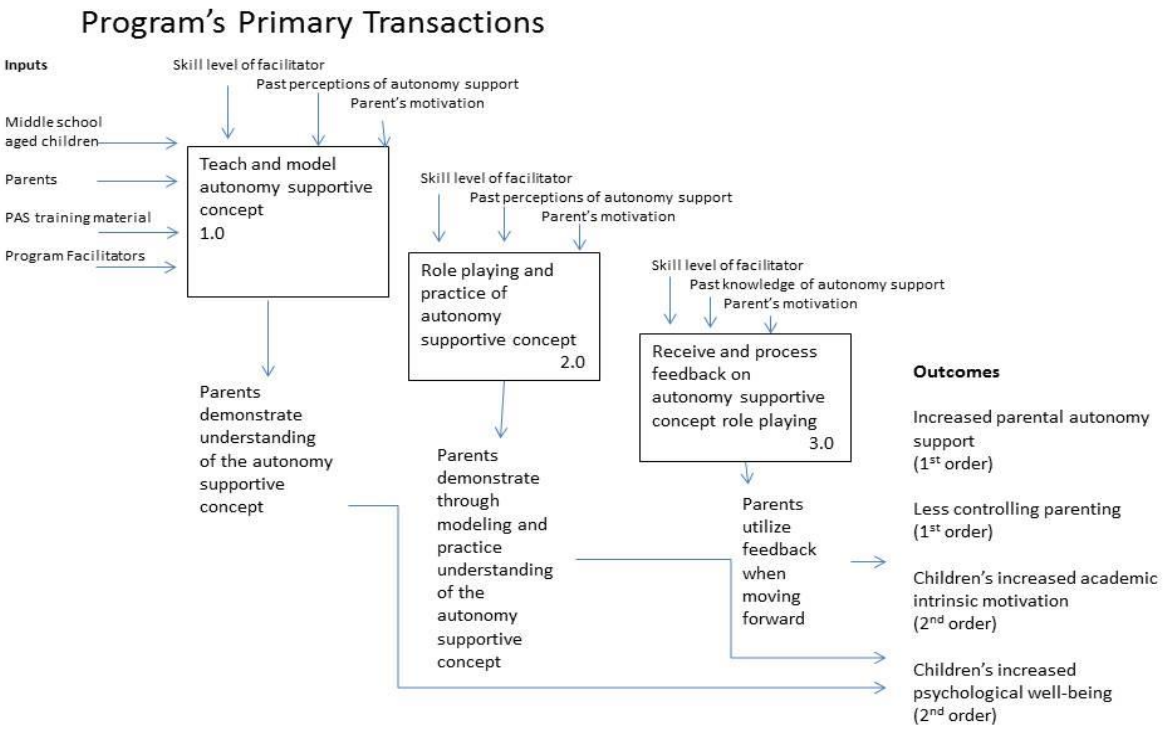
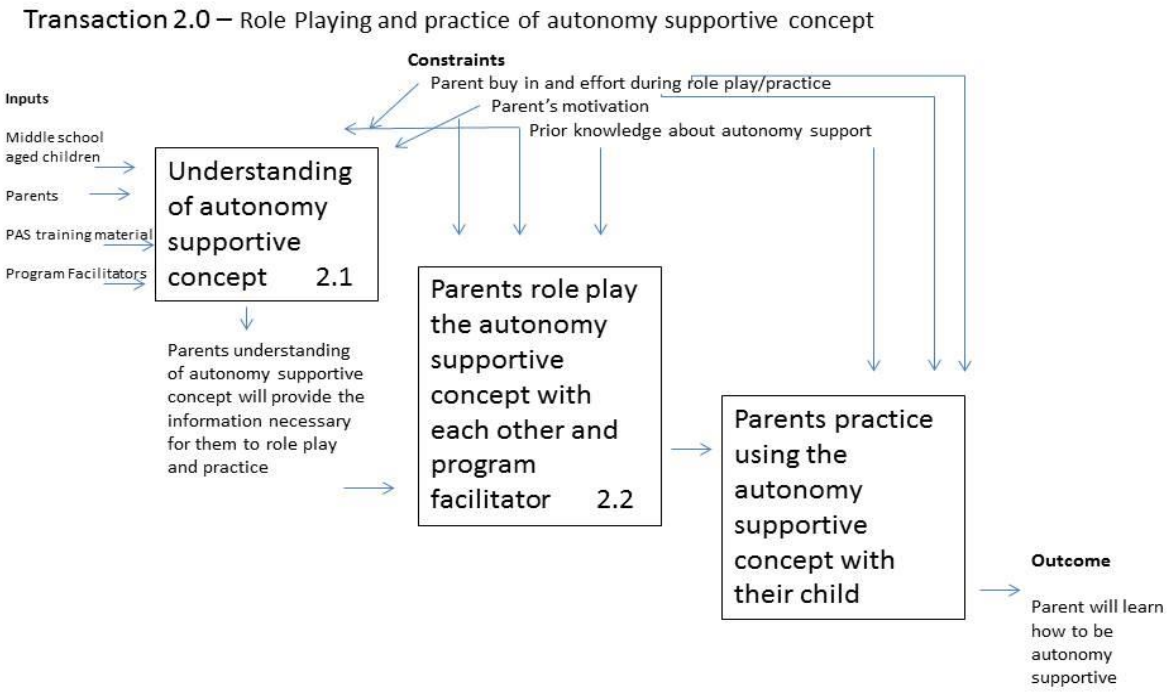


Figure 3: Transaction 2.0



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