

## Toward Disentangling Fathering and Mothering: An Assessment of Relative Importance

*This study employed dominance analysis to assess the relative importance of maternal and paternal support, behavioral control, and psychological control in explaining depression, antisocial behavior, and social initiative within 644 adolescents. We noted the lack of replicated findings concerning differential effects of mothers and fathers and employed an approach that considered mothers' and fathers' overlapping predictive abilities in determining their relative importance. Results lend support to the overall parental framework and additionally suggest (a) mothers' behavioral control is relatively more important than fathers' in explaining sons' subsequent antisocial behavior, (b) fathers' support is relatively more important than mothers' support in explaining subsequent youth social initiative, and (c) mothering and fathering tend to have a cross-gendered effect on early adolescents' depression.*

Over the past two decades, scholars have increasingly turned their attention toward the role of fathers in families and the effects of father involvement on children's outcomes. Given that the majority of the early parenting

studies were based solely on measures of mothers' behaviors, some fathering researchers argue that it is inappropriate to apply this mother template to fathering (Day & Mackey, 1989). Drawing on Freud, Darwin, and Bowlby, some researchers suggest that men and women are biologically designed for different parenting roles, that fathering is fundamentally different from mothering, and that the effects of fathering and mothering behaviors cannot be explained by the same model (Blankenhorn, 1995; Mackey, 1985; Popenoe, 1996). For example, Day and Mackey suggest that the roles of fathers and mothers are "different and complementary" (p. 402) and should not be evaluated by the same standard. Consequently, a variety of fathering theories have been developed.

Fathering theories that have been developed to aid the field in moving beyond mother-only research frequently remain untested or are tested only on fathers. Thus, we once studied primarily mothers and called their behaviors "parenting" without considering whether we had accurately portrayed fathers, but we now often study only fathers and call their behaviors "fathering" without considering whether the effects of those behaviors are similar when enacted by mothers.

This article is guided by the premise that both fathering theories (i.e., theories that specify paternal characteristics, behaviors, roles, or attributes that benefit their offspring) and parenting frameworks, whether stemming from fundamental evolutionary, biological, or developmental theories, must be tested on mothers and fathers together, in a manner that evaluates

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*Key Words:* adolescent functioning, family methodology, fathering, mothering, parent-child relations.

the extent to which the theories are supported for mothers as well as the extent to which they are supported for fathers, taking into account rather than controlling away the contribution of the other parent.

Previous studies that have included both mothering and fathering measures have produced contradictory findings that, taken collectively, have not demonstrated replicated patterns of mother and father differential effects (see Amato, 1998). To address this issue, we consider mothering and fathering jointly, and introduce a relatively new methodology that considers both the shared and the unique predictive abilities of maternal and paternal measures to evaluate the relative importance of mothering and fathering dimensions in predicting important youth outcomes. This approach allows us to identify potential areas in which each is particularly important. Before discussing various approaches to disentangling mothering and fathering, and the studies that have utilized them, we justify the selection of the three parenting dimensions that are the focus of the selected approach.

#### PARENTING DIMENSIONS

Three key parental dimensions have received widespread attention in socialization research: support, behavioral control, and psychological control (Barber, 1996, 1997; Gray & Steinberg, 1999; Steinberg, 1990). For each dimension, research is reviewed that suggests linkages between the parental construct and domains of youth functioning. (See Barber, Stolz, Olsen, & Maughan, 2005, for an elaboration of the potentially specialized nature of these effects.)

##### *Support*

Much research supports the notion that consistent, stable emotional connection between parents and children affords children a solid foundation for the development of important social skills (see Barber, 1997). This connection is often measured by perceptions of how supported children or adolescents feel they are by their parents. This overarching construct of parental support covers a number of more specific constructs such as attachment (Bowlby, 1969), warmth, and nurturance (Maccoby & Martin, 1983). Overall, it appears that support from a parent provides youth with the inner re-

sources needed to confidently initiate and maintain social interaction with adults and peers outside the home and buffers youth from depression (see Barber et al., 2005).

##### *Behavioral Control*

Various aspects of behavioral control, such as supervision, monitoring, and rule setting, have reliably predicted important adolescent outcomes (Barber, Olsen, & Shagle, 1994; Dishion & Loeber, 1985). These and other studies suggest that when parents provide structure around their offspring's behaviors, youth learn to self-regulate and are therefore less likely to engage in antisocial behaviors. Monitoring, which is commonly used as a measure of behavioral control (Barber, 1996; Brown, Mounts, Lamborn, & Steinberg, 1993), has recently undergone conceptual revision by a number of scholars (see Crouter & Head, 2002; Kerr & Stattin, 2000). A new construct has emerged, *parental knowledge*, which is conceptualized as the extent to which the parent knows how and with whom adolescents spend their time. This article focuses on parental knowledge as a measure of the broader construct of behavioral control.

##### *Psychological Control*

Becker (1964) and Schaefer (1965) long ago focused attention on parental behaviors involving shame, guilt, and love-withdrawal, indicating that these were manipulative, negative forms of discipline. In an attempt to clarify the central dimensions of positive parenting, Steinberg (1990) returned scholarly attention to a three-dimensional model including warmth, psychological autonomy, and demandingness. In effect, this reestablished a model wherein the construct of control was separated into two different dimensions. The past decade has witnessed increased attention to this notion of psychological autonomy/control (Barber, 1992, 1996; Steinberg, Lamborn, Dornbusch, & Darling, 1992). This work has demonstrated the existence and negative effects of psychological control, which is defined as "control attempts that intrude into the psychological and emotional development of the child (e.g., thinking processes, self-expression, emotions, and attachment to parents)" (Barber, 1996, p. 3296). Psychological control has previously been linked to both internalized disorders and externalized

problem behaviors in children and adolescents in a variety of cultures (Barber et al., 2005; Hart, Olsen, Robinson, & Mandleco, 1997; Olsen et al., 2002).

Overall, there is widespread agreement that parental support, behavioral control, and psychological control predict important aspects of adolescent functioning, and evidence that each of these three socialization dimensions is predominantly related to one or two discrete youth outcomes. Specifically, the three predominant specialized relationships of parenting dimensions with youth outcomes include the relationship of parental support with youth social initiative, parental psychological control with youth depression, and parental behavioral control with decreased youth antisocial behavior (Barber, 1992; Barber et al., 2005).

#### MOTHERING AND FATHERING

When moving from parenting to mothering and fathering, one finds consensus that mothers strongly affect their children's development. Empirical evidence similarly points to the importance of paternal support, involvement, and control (Amato, 1987; Snarey, 1993). Many of these studies, however, fail to take into account similar measures of mothers. Thus, although Amato (1998) reported that of 59 reviewed studies, 85% found relationships between paternal support or control and child well-being, many of these studies did not actually provide evidence that fathers contribute independently to youth outcomes. Rather, as Amato (1994, p. 1033) indicated, "It is likely . . . that families in which fathers are highly involved are also those in which mothers are especially competent, caring, and encouraging of their husband's participation in child care."

##### *Approaches to Disentangling Mothering and Fathering*

Three approaches have been used to move past these limited findings to disentangle the effects of mothers and fathers on children and adolescents. Each approach is discussed below, examples are offered of studies that have utilized the approach, and an assessment of the effectiveness of each approach is offered.

*Approach 1: same model, unique contributions.* One common approach to disentangling mothers and fathers involves identifying their unique

contributions (in the context of the other parent) to a particular youth outcome (see Amato, 1998; Stolz, 2000, for reviews). This approach assesses whether mothering or fathering explains a significantly different portion of the variance in the child outcome measure than the portion explained by its counterpart. For example, Amato (1998) reported that of 18 identified studies that included measures of both mothers' and fathers' behaviors, 11 found evidence of unique contributions of fathers and mothers, whereas 7 found unique contributions of mothers only. With regard to parental support and control, unique contributions have been reported for mothers only (Umberson, 1992), fathers only (Barnett, Marshall, & Pleck, 1992; Coombs & Landsverk, 1988), and both mothers and fathers (Amato, 1989, 1994; Amato & Rivera, 1999).

This approach is problematic, however, in that measures of mothering and fathering are often moderately to highly correlated. Thus, the unique portion of explanatory power is generally much smaller than the predictive ability shared with the other parent, which is explicitly ignored. The problem worsens when several parenting measures are simultaneously considered. In this situation, the predictor that emerges as contributing uniquely to the outcome is often the one that has the lowest correlation with the other predictors in the model. Thus, although this approach does identify which measures explain unique portions of the variance in the criterion measures (and are necessary for optimal prediction of the outcome), the approach does not address the overall importance, that is, the combined value of any unique variance plus variance explained that is also shared by other predictors. Additionally, unique contributions approaches have yielded contradictory results because the "sliver of uniqueness" is often unstable and sample specific.

*Approach 2: separate models, unique contributions.* Both remaining approaches to the mothering-and-fathering issue attempt to address the problem of shared predictive ability. The second approach, which involves comparing the unique contributions of mothers without considering fathering to the unique contributions of fathers without considering mothering, can be applied to two different research designs. First, researchers have compared contributions of single fathers with those of single mothers, a design based on the notion that differential effects of

fathers and mothers are evidenced in different outcomes of children in single-father and single-mother families as well as in different unique contributions to those outcomes. Although it has been suggested that fathers are better suited to discipline than mothers (Popenoe, 1996), that fathers command more authority than mothers (Maccoby & Mnookin, 1992), and that mothers are more effective at meeting relational needs (Chodorow, 1978), studies comparing father-only and mother-only families find no support for differences in adolescent birth rate (McLanahan & Bumpass, 1988; McLanahan & Sandefur, 1994), school dropout rates (McLanahan & Sandefur), or quality of relationships (Downey, Ainsworth-Darnell, & Dufur, 1998). And, contrary to Popenoe's notion of fathers being better suited to discipline than mothers, youth raised in father-only homes are actually less well behaved than those raised in mother-only homes (Downey et al., 1998). Overall, Downey et al. reported that "the assumption that men and women necessarily promote children's well-being in different ways receives little support here" (p. 889).

Second, the separate model comparison of unique contributions can also be applied to a two-parent design. In this case, the extent to which mothering and fathering function similarly is assessed by the similarity of parent-child linkages in the mothering and fathering models. For example, Barnes and Farrell (1986) reported that fathers' support and mothers' support are both negatively associated with problem alcohol use among teens. Similarly, Papini, Roggman, and Anderson (1991) reported that seventh graders' attachment to fathers and to mothers is associated with lower levels of social anxiety and depression. In a finding suggesting differential parental influence, Clark-Lempers, Lempers, and Netusil (1990) found that children's reports of mothers' support predicted grade point average, but reports of fathers' support did not. In these examples, separate mother-only and father-only models were estimated and then subsequently compared, either statistically or through informal observations (see Amato, 1998; Stolz, 2000, for reviews).

Although the problem of correlated mothering and fathering measures is avoided in this approach, another substantial limitation emerges. The mothering measures are omitted from the father-only model, and the fathering measures are omitted from the mother-only

model, making it possible that the mother-only and father-only results are spurious. In other words, the mothering measure most highly correlated with the omitted fathering measures will tend to show the strongest effect in the mother-only model, and the fathering variable most highly correlated with the omitted mothering variables will tend to show the strongest effect in the father-only analysis.

*Approach 3: same model, relative importance.* Researchers are beginning to use strategies that include mothers and fathers in the same model, but explicitly consider their overlapping, shared predictive ability (see Stolz, 2000; Stolz et al., 2004). Several techniques including commonality analysis (Bring, 1995), dominance analysis (Azen & Budescu, 2003; Budescu, 1993), and relative weight analysis (Johnson, 2000) now allow researchers to address this issue of the *relative importance* of one predictor in the context of other predictors. Although few studies have employed this technique, Amato (1994) evaluated the unique maternal, unique paternal, and joint parental (i.e., common, overlapping) contributions to young-adult happiness, life satisfaction, distress, and self-esteem and reported that the largest contribution to all outcomes except self-esteem, which was primarily predicted by mothering, was the joint component. The present study focuses on this promising approach, because it combats the problem of correlated predictors without introducing the problems that are inherent in separate mother/father analyses.

#### GOAL AND RESEARCH QUESTIONS

Given the parental framework outlined above, and the stated benefits of an approach focusing on the relative importance of mothering and fathering, the present study applies a combined mother/father dominance analysis framework, testing for the relative importance of each of six (three maternal and three paternal) parenting dimensions for three youth outcomes, separately for male and female youth, younger and older youth, and across three different 1-year lags. Our primary purpose is not to formally test a causal model but rather to demonstrate the applicability of this relatively new empirical method for describing the predominance of effects among competing potential influences.

Thus, we pit mothering and fathering measures against each other and address the question, "Which of the six theorized parenting dimensions is the most useful/important predictor (considering both its unique and shared predictive capacity) of each of the three youth outcomes?" This broad question additionally allows us to assess the level of support for the three hypothesized specialized relationships of parenting dimensions with youth outcomes and to identify the strongest contributions of fathers and mothers to youth.

## METHOD

### *Sample and Instrument*

Data came from the National Institute of Mental Health-funded Ogden Youth and Family Project, a longitudinal study of families with adolescents in Ogden, Utah. The baseline sample consisted of students in randomly sampled classrooms in the Ogden City School District in 1994. This sample was stratified so as to represent the percentage (15%) of Hispanic children in the school system. The overall sample consisted of 933 students. It was split equally between male and female students and grade (fifth and eighth grades), and was 71% White (16% Hispanic), 84% middle income, and 46% Mormon. In the first year, an extensive self-report survey of family interaction, personality, youth behavior, and peer, school, and neighborhood experiences was administered to the students in classrooms. Subsequent waves of the survey were done by multiple mailings to the students' homes. Both fifth- and eighth-grade cohorts were followed for four subsequent years until 1997. The participation rate in the first year was over 90%. No follow-up was done of absentees. Multiple mailings following standard mail survey methodology (Dillman, 1978) were employed to maximize response rates in the subsequent years of data collection. Response rates for years 2–4 averaged 80%. Analyses revealed that respondents and nonrespondents differed significantly only in that a slightly higher percentage of Mormons responded. The present study utilizes data from Waves 1 through 4 and restricts the sample to youth who responded to questions concerning both their father and their mother ( $n = 644$ ).

### *Measures*

*Parental support.* The Acceptance subscale of the Child Report of Parent Behavior Inventory (Schaefer, 1965) was used to assess youth report of mother's and father's support. Youth rated each parent on a 3-point scale (1 = *not at all like her/him*; 2 = *somewhat like her/him*; 3 = *very much like her/him*) on a series of 10 items. Sample items include "makes me feel better after talking over my worries with her/him" and "enjoys doing things with me." The 10 items were averaged to construct separate maternal and paternal support scales.

*Parental behavioral control.* Parental knowledge of youth behavior, one component of parental behavioral control, was measured by a five-item scale frequently used in family research with adolescents (e.g., Brown et al., 1993). As noted above, these items have previously been considered measurements of monitoring, but recent clarifications and reconceptualizations support the label parental knowledge (Crouter & Head, 2002; Kerr & Stattin, 2000; Stattin & Kerr, 2000). Youth responded on a 3-point scale from 1 = *doesn't know* to 3 = *knows a lot* concerning how much their parents "really know" (a) "Where you go at night," (b) "Where you are most afternoons after school," (c) "How you spend your money," (d) "What you do with your free time," and (e) "Who your friends are." Again, separate maternal and paternal scales were constructed by averaging the five items.

*Parental psychological control.* The eight-item Psychological Control Scale—Youth Self-Report (Barber, 1996) was used to assess mothers' and fathers' psychological control. Respondents were asked to evaluate on a 3-point scale (1 = *not like her/him*; 2 = *somewhat like her/him*; 3 = *a lot like her/him*) the extent to which their mother/father "is a person who . . ." behaves a particular way. Sample items include "changes the subject, whenever I have something to say," "is always trying to change how I feel or think about things," and "brings up my past mistakes when he/she criticizes me." The items were averaged to create separate scales for youth report of mothers' and fathers' psychological control.

*Adolescent social initiative.* A 13-item scale from the Monitoring the Future Study (Bachman, Johnston, & O'Malley, 1993; Barber &

Erickson, 2001) was used as a measure of social initiative. Subjects responded on a 5-point scale from 1 = *never/almost never true* to 5 = *very often/always true*. Items included "I share feelings and ideas with peers," "I talk to teachers and staff about things other than class," and "I actively participate in topic clubs (e.g., political, history, Honor Society)."

*Adolescent antisocial behavior.* Antisocial behavior was measured by the Delinquent subscale of the Child Behavior Checklist—Youth Self-Report (Achenbach & Edelbrock, 1987). Response categories ranged from 0 = *not true* to 2 = *very true or often true*. Sample items include "I steal things from places other than home," "I lie or cheat," and "I use alcohol or drugs for nonmedical purposes." Again, these items were averaged to construct the scale.

*Adolescent depression.* Depression was measured with a 10-item version of the Child Depression Inventory (Kovacs, 1992). Respondents were asked to mark one of three phrases for each of 10 items. One sample item asked respondents to choose between the following three statements: (a) "I am sad once in a while," (b) "I am sad many times," and (c) "I am sad all the time." These items were averaged to construct a scale.

#### *Dominance Analysis*

Dominance analysis (Budescu, 1993) provides a method of assessing the relative importance of predictor variables in situations where a theoretically justified hierarchy is not possible. In contrast to the unique contributions approach, which parses out the unique contributions beyond any effect shared with another predictor, this relatively new technique explicitly considers the shared variance by assessing the unique variance and any partial joint variance contributed by each predictor in a multiple regression equation. Thus, one learns which predictor is more powerful overall. A useful measure of variable importance must (a) be based on the extent to which the predictor variable reduces error in a criterion variable; (b) allow for a direct comparison of the relative importance of a variety of predictors; and (c) include direct effects, total effects, and partial effects (Budescu). Dominance analysis meets these criteria by performing a pairwise compari-

son of all predictors, evaluating their contribution to  $R^2$  in all possible subset models. In other words, this statistical approach evaluates the explanatory power of each predictor individually (as bivariate predictors) as well as in the context of all possible combinations of other predictors (i.e., in all possible subset models).

Thus, this methodology is designed for disentangling correlated predictors such as mothering and fathering. Rather than ignoring the shared variance or arbitrarily assigning the shared predictive ability to either mothering or fathering as hierarchical and stepwise methods do, dominance analysis provides a logical, meaningful way to apportion the shared, overlapping predictive ability to individual predictors based on their overall usefulness in predicting the outcome of interest. For example, in a simple multiple regression with two predictor variables—mothers' support and fathers' support—predicting youth social initiative, if mothers' support has a unique effect on social initiative and fathers' support does not (i.e., if mothers' support significantly predicts social initiative in a model with both mothers' support and fathers' support as predictors, but fathers' support does not), then mothers' support can be said to dominate fathers' support in predicting social initiative. In more complex models that more accurately reflect the situations of youth in families (i.e., where youth are reporting on multiple forms of parenting from both mothers and fathers), however, a parenting dimension that is shown to contribute uniquely to a particular outcome might not actually be the most important predictor in an overall, explanatory sense when considering the patterns of shared variance among the several predictors.

Budescu (1993) suggested that variable *A* can be said to dominate variable *B* if it is a stronger predictor in all subset regressions (i.e., if the additional contribution of *A* to  $R^2$  is greater than or equal to the additional contribution of *B* to  $R^2$  in all possible subset models). More recently, Azen and Budescu (2003) have refined Budescu's definition and have established criteria whereby three levels of dominance can be evaluated. Budescu's original criteria are now considered a test of *complete dominance* (Azen & Budescu, p. 135), and two less stringent levels of dominance are also outlined. *Conditional dominance* (p. 136) is calculated by first averaging additional contributions to  $R^2$  across all same-size subsets. Then, if variable *A* makes a greater

additional contribution, on average, to models of all sizes than variable *B* does, it can be said that variable *A* dominates variable *B* conditionally. *General dominance* (p. 137), the least stringent, is calculated by averaging the paired  $R^2$  comparisons across subset models of all sizes (i.e., regardless of the number of predictors in the models). These three levels are hierarchical in nature, meaning that if *A* dominates *B* completely, it also dominates *B* conditionally and generally. The average contributions to  $R^2$  of each predictor across all subset models (i.e., the statistics that are used to compare predictors at the general dominance level) sum to equal the  $R^2$  of the overall model. In other words, at the general dominance level, dominance analysis breaks down the model's  $R^2$  into its constituent parts.

As an example of these three levels of dominance, consider a scaled-down version of the research question addressed in the present study: the relative importance of paternal support, paternal behavioral control, and paternal psychological control in predicting adolescent social initiative. If the results of the dominance analysis indicate that the contribution of paternal support to  $R^2$  is greater than the contribution of paternal psychological control to  $R^2$  in every subset model (i.e., bivariate, all models with two predictor variables, and the model with three predictor variables), then it can be said that paternal support completely dominates paternal psychological control in predicting social initiative (it dominates at the conditional and general levels as well). If there are some models in which paternal support does not make a greater additional contribution than psychological control, but paternal support still contributes more on average to the models of each subset size (i.e., contributes more bivariate and in the three-variable model, and contributes more on average to the two-variable models), paternal support will be said to dominate paternal psychological control conditionally in predicting social initiative (thus, it also dominates generally). If paternal support does not dominate psychological control completely or on average (e.g., if paternal support makes a greater bivariate contribution and a greater additional contribution to the two-variable models on average, but psychological control makes a greater additional contribution to the three-variable model), it is still possible that paternal support dominates paternal psychological control gener-

ally if paternal support makes a greater additional contribution than psychological control on average when averaging across all subset models (see Azen & Budescu, 2003, for a detailed explanation of dominance levels and additional examples).

First, dominance analysis assesses which of these three levels of dominance applies to each pair of predictors within the sample only (i.e., in the sample, does *A* dominate *B* completely, conditionally, or generally in predicting *Y*?). By design, one of these three situations must exist for every pair of predictors. Then, Azen and Budescu (2003) also introduce a bootstrapping procedure designed to assess "the confidence one can have in making inferences about the population from the observed sample" (p. 139). This procedure resamples the data with replacement and measures the degree to which the dominance pattern of the sample is reproduced in the resamples. (For a detailed discussion, see Azen & Budescu.) Returning to the example used above, if support makes a greater average additional contribution to  $R^2$  than behavioral control and psychological control in each and every subset model, then support would be said to dominate psychological control and behavioral control completely in the sample. Then, the bootstrapping procedure would resample from these data 1,000 times and produce a reproducibility statistic that measures the proportion of the resamples in which the sample result (complete dominance) was obtained for each pair of predictors. So, if support dominated behavioral control completely (i.e., in every subset regression) in 874 of the resamples, the reproducibility statistic of complete dominance of support over behavioral control would be .874. Similarly, if support dominated psychological control completely in 629 of the resamples, the reproducibility statistic of complete dominance of support over psychological control would be .629. We would therefore be more confident that support dominates behavioral control in the population (in predicting a particular outcome) than we are that support dominates psychological control in the population in predicting the same outcome.

Overall, then, dominance analysis considers the predictive ability of each predictor variable, alone and in every possible combination with other theoretically meaningful variables, assessing the additional contribution to  $R^2$  made by each variable when added to each model. By

doing so, dominance considers the overlapping predictive abilities of the correlated predictors and meaningfully determines the usefulness or relative importance of each predictor. This analysis produces several pieces of information to be considered when interpreting the results: (a) the number of variables each predictor dominated in the sample (which creates a sample ranking of predictor importance because the predictor given a sample rank of 1 dominated five predictors, the predictor given a sample rank of 2 dominated four predictors, etc.); (b) the level at which each predictor dominated each other predictor in the sample (completely, conditionally, or generally); and (c) the reproducibility of that particular level of dominance (associated with each pair of predictors) across 1,000 bootstrap samples.

Then, given that it is difficult to make meaning out of a large number of pairwise reproducibility statistics (i.e., a first-ranked predictor in an analysis with six predictors would have five distinct reproducibility statistics associated with it, one for the reproducibility of its dominance over each of the other five variables in the model), in consultation with others (D. V. Budescu, personal communication, April 13, 2004) we propose a new measure, *mean reproducibility (rank)*, that effectively communicates in one number the stability of each predictor's ranking across the bootstrap analyses. Conceptually, this statistic provides an indication of how certain we can be that the predictor has a given ranking in the population (i.e., first, second, third, etc.) in relation to the other predictors in the model. For any given predictor *A*, the mean reproducibility (rank) represents a weighted average of the "mean reproducibility (low)" (the mean reproducibility of *A* with predictors that are dominated by it) and the "mean reproducibility (high)" (the mean reproducibility of *A* with the predictors that dominate it; D. V. Budescu).

For the present study, dominance analyses predicting youth depression, antisocial behavior, and social initiative were conducted. Three different 1-year lags were evaluated, separately for gender and cohort of youth, with parenting measures constructed from the earlier year's data and adolescent functioning measures constructed from the latter year's data. Thus, as an example of one cohort-gender-lag combination, we examine the relative importance of younger girls' 1994 perceptions of mothering and father-

ing on their 1995 reports of their own functioning. Although it is possible that the explanatory power of the models could be improved via the inclusion of concurrent perceptions of parenting, we are not testing a causal model, and we wanted a consistent emphasis on the influence of prior parenting on current adolescent outcomes. In each of the resulting 36 analyses, the predictors consisted of maternal and paternal support, maternal and paternal behavioral control, and maternal and paternal psychological control. Additionally, each analysis was run on 1,000 bootstraps to assess the reproducibility of the results and thus the confidence one should have in making inferences about the population from each sample.

## RESULTS

Cronbach's alpha scale reliabilities for all constructed scales range from .80 to .90, with one lower reliability of .75 (Year 1 mother's behavioral control). Given the large number of analyses, Table 1 indicates the medians of the means, standard deviations, and correlations of all variables across all 36 data sets. Although dominance was assessed for each pair of predictors at all three levels of dominance (general, conditional, and complete) within each of 36 analyses (three younger male, three older male, three younger female, and three older female models, each predicting three different outcomes), we selected for presentation a combination of general dominance results and mean rank reproducibilities. Space limitations prohibit us from presenting all three mean reproducibilities at all three levels of dominance. Thus, by choosing the least stringent level of dominance, but presenting mean rank reproducibility information, we offer a richer information yield. We believe that in a model with six theoretically meaningful predictors vying for dominant status, a finding of general dominance of one predictor over the other five with moderately strong reproducibility statistics is noteworthy, regardless of the dominant predictor's ability to dominate the other five variables conditionally or completely. In other words, all reported occurrences of dominance indicate that the dominant predictor's overall, average contribution to  $R^2$  across all subset models (i.e., all possible combinations of predictors) was greater than the overall, average contribution of the dominated predictor. Detailed results for one sample model are

TABLE 1. MEDIANS OF THE MEANS, STANDARD DEVIATIONS, AND CORRELATIONS OF ALL VARIABLES (MEDIAN  $N = 145.5$ )

Variables	1	2	3	4	5	6	7	8	9
1. Mothers' support	1.00								
2. Fathers' support	.56	1.00							
3. Mothers' behavioral control	.44	.28	1.00						
4. Fathers' behavioral control	.29	.51	.49	1.00					
5. Mothers' psychological control	-.47	-.32	-.34	-.22	1.00				
6. Fathers' psychological control	-.27	-.44	-.26	-.30	.64	1.00			
7. Youth depression	-.19	-.26	-.18	-.21	.25	.25	1.00		
8. Youth antisocial behavior	-.24	-.25	-.32	-.22	.26	.22	.33	1.00	
9. Youth social initiative	.17	.28	.19	.19	-.12	-.13	-.22	-.30	1.00
<i>M</i>	2.50	2.28	2.57	2.17	1.45	1.48	1.28	.48	2.95
<i>SD</i>	.47	.53	.44	.62	.45	.48	.32	.46	.80

presented in Table 2, and summary results for female and male youth are presented in Tables 3 and 4, respectively.

Before discussing the overall results with regard to our research questions, we offer a detailed explanation of the results of one dominance analysis to better acquaint the reader with the interpretation of dominance analysis results. Consider the results of the analysis predicting antisocial behavior for girls in the older cohort who reported in 9th grade on their parents' behaviors and in 10th grade on their own behaviors (see Table 2). The predictors are listed in order of dominance in the bootstraps, from the most important (dominating all other five predictors at the general level) to the least important. Then, the average additional contribution of each predictor to  $R^2$  across each subset model (i.e., every different combination of the

six predictors) is listed. Next, the three reproducibility statistics are listed, with *high* indicating the mean reproducibility of each predictor with the predictors that dominate it, *low* indicating the mean reproducibility of each predictor with predictors that are dominated by it, and *rank* indicating the overall stability of the stated ranking (i.e., the weighted average of the low and high mean reproducibilities).

Notice that the  $R^2$  for the model is the sum of the average, additional contributions to  $R^2$  of each predictor (with rounding error). For this model, fathers' behavioral control dominated all other predictors (at the general level) in predicting daughters' antisocial behavior on average over the 1,000 bootstraps. This means that regression models were estimated for all possible combinations of the six predictors (mothers' and fathers' support, behavioral control, and

TABLE 2. DETAILED RESULTS FOR A SAMPLE MODEL: GENERAL DOMINANCE RESULTS PREDICTING ANTISOCIAL BEHAVIOR AMONG 10TH-GRADE GIRLS ( $n = 159$ ;  $R^2 = .31$ )

Parental Measures in Order of Dominance	Contribution of Predictor to Model $R^2$	<i>M</i> (High) Reproducibility	<i>M</i> (Low) Reproducibility	<i>M</i> (Rank) Reproducibility
1. Fathers' behavioral control	.11	n/a	0.931	0.931
2. Mothers' behavioral control	.07	0.776	0.860	0.843
3. Fathers' psychological control	.04	0.867	0.639	0.730
4. Fathers' support	.04	0.776	0.711	0.750
5. Mothers' psychological control	.04	0.741	0.868	0.766
6. Mothers' support	.02	0.900	n/a	0.900

*Note:* All relationships are in the anticipated direction: Lower levels of behavioral control and support and higher levels of psychological control are related to higher levels of antisocial behavior.

n/a indicates that the statistic was not calculable (i.e., no variables dominate the first-ranked predictor, so their average reproducibilities cannot be calculated).

TABLE 3. GENERAL DOMINANCE RESULTS FOR FEMALE YOUTH

Dependent Variable	Cohort	Grades	Dominant (1st Ranked) Predictor	<i>n</i>	Model <i>R</i> <sup>2</sup>	Contribution to Model <i>R</i> <sup>2</sup>	<i>M</i> (Rank) Reproducibility
Antisocial behavior	1	5th–6th	Fathers’ support	147	.17	.06	.738
	1	6th–7th	Mothers’ behavioral control	129	.24	.06	.729
	1	7th–8th	Mothers’ behavioral control	123	.25	.06	.741
	2	8th–9th	Mothers’ behavioral control	170	.25	.07	.780
	2	9th–10th	Fathers’ behavioral control	159	.31	.11	.931
	2	10th–11th	Fathers’ behavioral control	147	.09	.03	.754
Social initiative	1	5th–6th	Fathers’ support	147	.11	.06	.927
	1	6th–7th	Fathers’ support	129	.12	.04	.813
	1	7th–8th	Fathers’ support	123	.23	.08	.845
	2	8th–9th	Nonsignificant <i>F</i>	171	.02	—	—
	2	9th–10th	Fathers’ support	159	.14	.04	.799
	2	10th–11th	Fathers’ behavioral control	147	.12	.04	.804
Depression	1	5th–6th	Fathers’ support	148	.27	.17	.991
	1	6th–7th	Mothers’ behavioral control	129	.16	.04	.615
	1	7th–8th	Fathers’ psychological control	123	.21	.06	.794
	2	8th–9th	Mothers’ psychological control	171	.16	.06	.846
	2	9th–10th	Fathers’ support	159	.18	.07	.874
	2	10th–11th	Mothers’ psychological control	147	.11	.07	.805

Note: All relationships are in the anticipated direction: Lower levels of behavioral control and support and higher levels of psychological control are related to higher levels of antisocial behavior and depression and lower levels of social initiative.

psychological control), the additional contribution to *R*<sup>2</sup> was calculated for each predictor in each model, and fathers’ behavioral control contributed the most, on average, to those models. In fact, as Table 2 indicates, when fathers’ behavioral control was added to each subset model, the *R*<sup>2</sup> for the model increased an average of .11. The next most important predictor, mothers’ behavioral control, increased the *R*<sup>2</sup> an average of .07.

The next three columns of Table 2 present the mean reproducibility (high, low, and rank) of the bootstrap ranking. Because dominance analysis is in its infancy and we are among the first to apply this methodology to multiwave, multi-cohort data using a large number of predictors, we introduce the notion of mean reproducibilities to allow us to discuss overall trends rather than only findings from individual, isolated models. For example, the mean reproducibility (rank) figure associated with the #1 bootstrap rank of fathers’ behavioral control (.931) indicates the average reproducibility of this predictor’s general dominance over the predictors of lesser rank. In other words, the reproducibility of the first-ranked predictor’s dominance over the second-ranked predictor (i.e., the proportion of bootstraps in which the first-ranked predictor

made a greater average additional contribution to *R*<sup>2</sup> than the second-ranked predictor) is averaged with the reproducibility of the dominance of first over third, first over fourth, first over fifth, and first over sixth to arrive at the predictor’s average reproducibility of its bootstrap rank. This can be interpreted as a measure of the confidence we have that the predictor dominates those of lesser rank in the population. The highlighted analysis indicates that we can be very confident about making inferences from the sample to the population regarding the dominance of fathers’ behavioral control over all other predictors. We can be confident that mothers’ behavioral control is the second most important predictor (mean rank reproducibility = .843) and that mother’s support is the least important predictor (mean rank reproducibility = .900). We are less confident about the relative importance (in the population) of the third, fourth, and fifth predictors. With this detailed explanation of dominance results, we turn now to broader results, as they pertain to our research questions.

With regard to the hypothesized specialized effects of particular parenting dimensions with specific aspects of youth functioning, the results suggest strong support for all three

TABLE 4. GENERAL DOMINANCE RESULTS FOR MALE YOUTH

Dependent Variable	Cohort	Grades	Dominant (1st Ranked) Predictor	<i>n</i>	Model <i>R</i> <sup>2</sup>	Contribution to Model <i>R</i> <sup>2</sup>	<i>M</i> (Rank) Reproducibility
Antisocial behavior	1	5th–6th	Mothers' psychological control	179	.13	.04	.740
	1	6th–7th	Mothers' behavioral control	165	.20	.10	.912
	1	7th–8th	Mothers' behavioral control	145	.12	.03	.773
	2	8th–9th	Mothers' behavioral control	142	.11	.07	.951
	2	9th–10th	Mothers' behavioral control	121	.16	.09	.934
	2	10th–11th	Mothers' behavioral control	110	.12	.06	.843
Social initiative	1	5th–6th	Fathers' support	180	.09	.03	.817
	1	6th–7th	Nonsignificant <i>F</i>	164	.06	—	—
	1	7th–8th	Fathers' support	145	.15	.05	.836
	2	8th–9th	Nonsignificant <i>F</i>	142	.06	—	—
	2	9th–10th	Fathers' support	122	.12	.05	.843
	2	10th–11th	Fathers' support	110	.15	.08	.896
Depression	1	5th–6th	Mothers' psychological control	183	.11	.04	.825
	1	6th–7th	Mothers' behavioral control	165	.13	.06	.895
	1	7th–8th	Mothers' psychological control	146	.14	.05	.745
	2	8th–9th	Nonsignificant <i>F</i>	142	.08	—	—
	2	9th–10th	Nonsignificant <i>F</i>	122	.07	—	—
	2	10th–11th	Fathers' behavioral control	111	.19	.09	.882

*Note:* All relationships are in the anticipated direction: Lower levels of behavioral control and support and higher levels of psychological control are related to higher levels of antisocial behavior and depression and lower levels of social initiative.

hypothesized relationships. Specifically, parental support dominates other parenting dimensions in predicting youth social initiative in eight of the nine significant models, with an average mean rank reproducibility (AMRR) of .847. Parental behavioral control dominates other parenting dimensions in predicting youth antisocial behavior in 10 of 12 significant models (AMRR = .835). And, although suggesting somewhat less support for the specialized effects hypothesis, parental psychological control dominates other parenting dimensions in predicting youth depression in 5 of 10 significant models (AMRR = .803) and is ranked second in 7 of the 10 models (AMRR = .711).

Turning now to the potential differential effects of fathering and mothering on these selected youth outcomes, over the 31 analyses for which the model is significant, 16 of the most important predictors are fathering measures (AMRR = .847) and 15 are mothering measures (AMRR = .809). Eighteen of the second-ranked predictors are fathering measures (AMRR = .731), and 13 are mothering measures (AMRR = .749). Although this indicates that fathering is slightly more important than mothering within this framework in explaining

youth outcomes, it is perhaps more useful to consider mother/father differences separately by youth outcome and gender of youth.

A summary of the results of the 36 dominance analyses for girls and boys is presented in Tables 3 and 4, respectively. In explaining adolescent boys' antisocial behavior, these results suggest that mothering is more important than fathering, with all six first-ranking predictors (AMRR = .859) and four of six second-ranking predictors (AMRR = .731) being mothering measures. In five of these six models predicting boys' antisocial behavior, maternal behavioral control reliably dominates all other predictors. In explaining adolescent girls' antisocial behavior, however, mothering and fathering are roughly equally important, with mothering ranked first in three of the six models (AMRR = .750) and fathering ranked first in the other three (AMRR = .808).

Although this parenting framework is less able to predict youth social initiative than youth antisocial behavior (as is evidenced by a comparison of model *R*<sup>2</sup> statistics), the results suggest that fathering is more important than mothering in explaining the social initiative of both male and female adolescents, ranking first

across all nine significant models (AMRR = .842). Fathers' support, specifically, is the most important (i.e., first ranked) predictor in eight of these nine significant models and is the second-ranked predictor in the remaining model.

With regard to youth depression, the results suggest that youth reports of mothering and fathering are both important, with fathering ranked first in four models (AMRR = .885) and mothering ranked first in the remaining six significant models (AMRR = .789). The results also suggest a trend toward a cross-gendered effect on depression within the younger cohort only, with mothering measures (psychological control in two models and behavioral control in the third model) ranked first in all three young male models, and fathering ranked first in two of the three young female models, with no reliably reproducible pattern of dominance observed in the remaining young female model. Although fathering appears to be relatively more important than mothering with regard to younger girls' depression, no particular fathering construct dominates more so than the others; rather, different dimensions of fathering appear to be more important over different 1-year lags.

## DISCUSSION

This study employed dominance analysis to assess the relative importance of maternal and paternal support, behavioral control, and psychological control in explaining youth depression, antisocial behavior, and social initiative. We drew attention to the lack of replicated findings concerning differential effects of mothers and fathers, and we employed an approach that considered mothers' and fathers' overlapping predictive abilities in determining their relative importance. This approach allows us more adequately than in past research to appropriately isolate and identify fathers' and mothers' contributions to their youth.

In general, dominance results indicate the relative importance, or rank ordering, of predictors on the basis of their overall explanatory power, rather than their unique explanatory power. Thus, it is possible that a dominance analysis would reveal that a variable is quite important in explaining an outcome, whereas a multiple regression framework would suggest that it is redundant (nonsignificant) because it failed to add significant explanatory power to the model

beyond the other variables considered. Overall explanation of a given youth outcome is more important for both policy and practice than identification of unique contributions to the outcome, because an approach that focuses on overall explanation of an outcome identifies all meaningful intervention targets, but an approach that identifies the most parsimonious model (i.e., that identifies only those predictors that contribute uniquely) often overlooks them.

The results of the dominance analyses offer strong support for the specialized effects hypotheses and also suggest differential effects of mothers and fathers in several areas of youth functioning. Behavioral control is particularly important in explaining youth antisocial behavior. In other words, parental efforts to provide structure to youth behaviors, set and enforce limits, and monitor youth seem particularly predictive of decreased fighting, destruction of property, and other antisocial behaviors. With regard to the dominance of maternal (over paternal) behavioral control in predicting boys' antisocial behavior, the more sons report that their mother knows who their friends are and where they spend their time and money, the less likely sons are to subsequently engage in antisocial behaviors such as substance use and theft. This finding runs contrary to the "dad the disciplinarian" popular image as well as to the view that fathers are uniquely suited to discipline offspring (see Popenoe, 1996). Knowledge of sons' activities and friends appears to be more powerful when possessed by a mother.

Another area in which the specialized effects framework is supported and differential effects of mothers and fathers are noted concerns the relationship of parental support to youth social initiative. At the overall parental level, youth who report that their parent smiles at them, likes doing things with them, and makes them feel better are able to extend from this firm foundation outward in a positive manner. With regard to differential effects, father's support dominates all other predictors in explaining both sons' and daughters' social initiative. In other words, the more sons and daughters of all ages report feeling supported by their fathers, the more likely they are to show initiative in engaging prosocially outside the home. It is possible that this finding is culture bound, rather than a reflection of a fundamental, underlying, psychological process. In the United States, the father has traditionally been considered the

parent who represents the family's interests to the broader community. Thus, it is possible that paternal support is either interpreted as or correlated with encouragement of prosocial behaviors outside the home.

This finding is interesting and contributes both to our goal of identifying what it is fathers do that benefits their children and to our interest in illustrating the benefits of appropriately isolating fathers' contributions within an existing *parenting* framework. It is noteworthy that the most robust, overall finding of the present study is the demonstrable effect for both girls and boys of feeling that their fathers genuinely care about them. The last decade of research on fathers has witnessed a variety of attempts to identify what it is fathers do and to determine how these contributions affect youth (see Marsiglio, Amato, Day, & Lamb, 2000, for a review). In part, this has been an effort to identify the salient fathering behaviors that have been overlooked in mother-based research. Although that effort is indeed important, the dominance of fathers' support in the present study demonstrates that it is also necessary to evaluate the contributions of fathers when they are engaging in behaviors that mothers also commonly enact.

Results predicting youth depression also support the theorized specialized effect at the overall parental level, in that youth reports of psychological control seem particularly bound up in their reports of their own depression. With regard to differential effects, the results of these analyses suggest that positive mothering (primarily lower levels of psychological control and higher levels of behavioral control) tends to be particularly predictive of subsequent lower levels of younger boys' depression, but positive fathering is important in explaining subsequent lower levels of younger girls' depression. Although the results do support an interpretation of cross-gendered influence within this younger cohort only, no particular fathering construct consistently dominates across waves in explaining girls' subsequent depression. Rather, fathers' support, behavioral control, and psychological control all appear to be relatively important in predicting lower levels of girls' depression in sixth and seventh grades. As these youth transition to eighth grade, the cross-gendered influence on depression remains, but both maternal behavioral control (in the boys' model) and paternal behavioral control (in the

girls' model) drop to the position of least important predictor (sixth out of six), and both maternal psychological control (in the boys' model) and paternal psychological control (in the girls' model) dominate (i.e., are ranked first in) the explanation of depression. One explanation for the increased importance of psychological control over the seventh- to eighth-grade years might be that as these youth initially transition from a focus on industry to a focus on identity (Erikson, 1950), the extent to which they perceive their parents as respecting their need for psychological autonomy becomes more important to psychological well-being.

Several limitations warrant consideration in interpreting these results and planning future work on the differential contributions of mothers and fathers. First, because we focused on an overall parenting framework, it is possible that important fathering or mothering dimensions have been omitted from consideration. It will be important for proponents of specific fathering or mothering theories to operationalize salient constructs for mothers and fathers and to assess their effects within a combined relative importance framework.

Also, these data stem from a sample that is 46% Mormon and predominantly White, middle class; Barber et al. (2005), however, found no differences by religious affiliation in structural equation analyses of these data. Thus, it will be important to employ a relative importance procedure to test for differential effects of mothers and fathers with a variety of sources of information (observation, parent report, school records, etc.) and across a wide range of contexts. Because some of the reported findings might well be culture bound, tests for differential effects of mothering and fathering across diverse cultures are under way (Barber et al., 2005).

It is also possible that mothering and fathering function in an interactive manner, such that fathering has a different effect on youth who are receiving high levels of a maternal commodity than on youth who are receiving low levels of that commodity. Additionally, it is possible that, individually, mothering or fathering (or both) dimensions interact with each other in explaining youth outcomes. Efforts are under way to test for interactions of mothering dimensions and fathering dimensions (separately), employing the same framework as that of the present study (see Barber et al., 2005). It is also possible that mothering and fathering are experienced differently by

different types of youth. This question has been addressed elsewhere with the data used in the present study, and few replicable patterns of differential moderation of fathering and mothering were reported (Stolz, Barber, & Olsen, 2005). In sum, published research suggests no pattern of interactions that warrants inclusion in the conceptual framework.

Additionally, the present study utilized adolescent report of both parent and youth behaviors. Although we believe that the adolescent is the most valid source of each separate construct employed, it is possible that the correlations between parenting dimensions and youth outcomes are inflated because of this same-source bias, thus introducing nonrandom measurement error. Given that our goal was to assess the relative importance of youth report of mothering and fathering, however, the nonindependence of the data is less concerning. Specifically, there is no reason to believe that correlations between parenting and youth functioning measures are inflated more so for one gender of parent than for the other.

Although dominance analysis has much to offer, particularly to the question of mother-father differential importance, it has noteworthy limitations as well, with corresponding limitations on the interpretation of our findings. First, dominance analysis is based on multiple regression analysis, an approach that assumes that independent variables are measured without error. Indeed in our case, the independent variables are measured with error, as evidenced by the high, but imperfect, scale reliabilities. The potential problems are analogous to those of ordinary regression analysis.

Given that our basic question is a comparative one (i.e., assessing the relative importance of mothering and fathering rather than testing a causal model), however, the most significant risk with regard to random measurement error is that correlation coefficients, contributions to  $R^2$ , dominance rankings, and reproducibilities might all be misestimated in analyses containing constructs with differential amounts of error, because measurement error attenuates correlation coefficients. In the present analyses, youth reports of mothers' and fathers' support are measured with similar amounts of error, as are youth reports of mothers' and fathers' psychological control (i.e., never more than 2% difference). We were unable to measure mothers' behavioral control as reliably as fathers' behav-

ioral control, however, thus introducing differential mother/father error. The differential error of mothers' and fathers' behavioral control does not particularly qualify our findings, because the construct with greater error was found to consistently dominate the other. In other words, it is possible that mothers' behavioral control is even more important relative to fathers' than our results suggest.

Next, traditional statistical tests provide  $p$  values from a known probability distribution. The problems of statistical hypothesis testing and confidence interval estimation, however, have not been worked out in the context of dominance analysis. In the absence of formal tests of significance based on statistical theory, bootstrapping offers the best alternative, and the reproducibility statistics offer the best available analogs to  $p$  values. But, no matter how much one bootstraps, the smaller the sample, the greater the likelihood of capitalizing on the chance properties of a given sample. Thus, large samples are much preferable to small ones in dominance analysis. We believe, however, that a replication of a finding across small samples provides a cross-validation of findings. This suggests that multiple small samples (such as the ones on which the present analyses are based) are much preferable to an individual small sample and, combined with the bootstrapping technique, substantially address the basic limitation of the methodology.

Further, effect size analogs have not been developed for dominance analysis and are not consistent with the primary aims of the methodology. Dominance answers the question of importance in a ranking sense. The overall  $R^2$  of the model and the mean rank reproducibility of the first-ranked predictor, considered in combination, provide information about the meaningfulness of the differential importance of the competing predictors, but they do not provide one measure that communicates in commonly understood statistical language how large or how meaningful the finding is. This being the case, until methodological improvements are made that combine some of the advantages of dominance analysis with some of the advantages of other methods, and until results are available from additional relative importance studies utilizing different measures in different contexts, the results reported in the present studies are best seen as descriptive rather than prescriptive.

Overall, we discussed conceptual and methodological challenges to answering the simple question, "Do fathers and mothers influence their adolescent children differently?" We drew attention to the need for approaches that appropriately include mothering with fathering and assess their unique as well as shared contributions to youth outcomes. We employed one such approach to one parenting framework and revealed support for three specialized relationships of parenting with youth functioning as well as three noteworthy areas of differential effects of mothers and fathers. First, there is support here for the relative importance of fathers' (as compared to mothers') support of both sons and daughters. Youth who report feeling supported by their fathers are better able to engage prosocially outside the home. Second, boys in our sample who report that their mother knows what they do with their time and money are particularly less likely to report later antisocial behavior. Lastly, positive fathering tends to be linked to lower levels of later depression for early adolescent girls, whereas positive mothering tends to be linked to lower levels of later depression for early adolescent boys.

#### NOTE

This study was supported in part by a FIRST Award from the National Institute of Mental Health (R29-MH47067-03) to Brian K. Barber.

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