



Early life experiences as determinants of leadership role occupancy: The importance of parental influence and rule breaking behavior

Bruce J. Avolio^{a,*}, Maria Rotundo^{b,1}, Fred O. Walumbwa^{c,2}

^a Management and Organization Department, Michael G. Foster School of Business, P.O. Box 353200, Seattle, WA 98195-3200, USA

^b Joseph L. Rotman School of Management, University of Toronto, 105 St. George Street, Toronto, Ontario, Canada M5S 3E6

^c Department of Management, W.P. Carey School of Business, Arizona State University, P.O. Box 874006, Tempe, AZ 85287-4006, USA

ARTICLE INFO

Keywords:

Leader heritability

Rule breaking

Parental influence

ABSTRACT

The limited behavioral genetics research reported in the leadership literature has not investigated the degree to which early life experiences predict future emergence into leadership roles. This is the first study to focus on parenting style and early life experiences of rule breaking, and their relationships to leadership roles assumed in adulthood, while controlling for genetic and personality contributions. Using a sample of male twins reared together, we found that authoritative parenting practices was negatively related to modest and serious rule breaking, while being positively related to emergence in leadership roles into adulthood. We also found that modest rule breaking behavior positively predicted the number of leadership roles taken on by individuals, while serious rule breaking negatively predicted the number of leadership roles. Implications for future leadership research and practice are discussed.

© 2009 Elsevier Inc. All rights reserved.

Human behavioral genetics is defined as the attempt to characterize and define the hereditary basis for human behavior. Preliminary leadership research evidence using a behavioral genetics approach suggests that approximately 30% of the variation in leadership style and emergence into leadership roles is accounted for by genetic factors, while the remaining variation is attributed to non-shared environmental influences such as individuals being exposed to different role models and early opportunities for leadership development (Arvey, Rotundo, Johnson, Zhang, & McGue, 2006; Arvey, Zhang, Avolio, & Krueger, 2007; Ilies, Gerhardt, & Le, 2004). The general observations drawn from these research findings are in line with Plomin and Daniels' (1987, p. 1) conclusion that, "behavioral-genetic research seldom finds evidence that more than half of the variance in complex behavioral traits is due to genetic differences among individuals...most behavioral variability among individuals is environmental in origin." Consequently, we adopt the position taken by Mumford, Stokes, & Owens (1990) who suggested that, "hereditary and environmental influences often work in tandem" (p. 48).

Prior behavioral genetics research has not yet investigated which experiential factors predict who assumes leadership roles, even though there is widespread belief that certain experiences trigger leadership emergence in individuals (Avolio, 2005; Avolio, Gardner, Walumbwa, Luthans, & May, 2004). In this paper, we focus on parenting style and rule breaking behavior exhibited early in life and their relationship to the number of leadership roles/positions occupied into adulthood, not performance within these roles. A focus on leadership roles moves beyond the traditional emphasis on leader traits or leader style, as it takes into consideration the position an individual occupies as opposed to the type of leader they are. This approach is especially relevant for the current study because we are interested in whether or not they are a leader and not in whether they are transformational or transactional leaders, for example. Furthermore, the environmental influences that we consider and how we study them here are potentially important antecedents of who emerges in leadership positions. Also, using occupancy in leadership roles avoids some of the inherent biases associated with

* Corresponding author. Tel.: +1 206 543 4367; fax: +1 206 616 0790.

E-mail addresses: bavolio@u.washington.edu (B.J. Avolio), Rotundo@Rotman.Utoronto.Ca (M. Rotundo), Fred.Walumbwa@asu.edu (F.O. Walumbwa).

¹ Tel.: +1 416 946 5060.

² Tel.: +1 602 543 6240; fax: +1 602 543 6221.

measuring leadership styles or leader performance measures (Yukl, 2006). That is, self and other report measures of leadership style or effectiveness have their own limitations. Also, several recent research studies have recommended the use of leadership role occupancy as a “first step” towards examining subsequent leadership effectiveness (Ilies et al., 2004).

Family experiences and more specifically parental practices have been shown to influence important individual outcomes including rule breaking behaviors. However, the rule breaking and parenting literatures have focused mainly on outcomes in childhood and adolescence, with limited research on outcomes in adulthood.

The present study addresses a gap in the leadership literature by investigating the impact of different types of childhood and adolescent rule breaking behavior on whether individuals ascend into adult leadership roles and the influence of parenting practices on rule breaking behavior in adolescence and leadership in adulthood. We control for several key personality factors and heritability that have been related to leadership role occupancy in earlier research (Arvey et al., 2006; Judge, Bono, Ilies, & Gerhardt, 2002). Our intent here is to use personality and genetic predispositions as control factors so that we can examine how parenting style and rule breaking behavior uniquely predict the level of leadership role occupancy over an individual's career. Furthermore, as noted in our introductory paragraph, we realize that most behavioral geneticists today understand that genetics and the environment interact in a dynamic way to shape individual development. We do not intend to undervalue this interaction, but rather to provide a base study where we can begin to tease out the influence of individual differences attributable to heritability to examine unique contributions of the environment to assuming leadership roles. Below, we first provide the conceptual basis and rationale for choosing the core predictors in our investigation.

1. Building upon a social learning theory perspective

One of the essential characteristics of individuals who assume leadership roles is a firm belief in what they are striving to accomplish, and a belief in their own capabilities and motivation to do so (White, 1982). Bandura (2008) refers to such confidence as resilient self-efficacy whereby the individual understands the odds are tough, but remains focused on achieving the objective. Such resilient self efficacy requires successfully persisting at and overcoming challenging experiences, while maintaining persistent effort in order to succeed.

Bandura (2008) suggests that the type of personal agency described above can be developed through observing others, personal experiences, being coached and/or some combination of the three. We suggest that a key element in building such personal agency is the role that parents play in shaping early individual leadership development (Bandura, 1986). Furstenberg, Eccles, Elder, Cook, & Sameroff (1999) suggest that a higher degree of personal agency results from parenting that provides social enabling environments for positive development of children. Using this rationale, they argue that one of the reasons why children who have grown up in impoverished, crime-ridden environments can do so well in adulthood is due in part to the discipline and concern exhibited by parents in positively shaping the child's development and future success.

Remarkably, most children end up as productive adults in spite of the impoverished environments they have grown up in over time (Werner & Smith, 1992). Bandura and other advocates of social learning theory, suggest that parents who take on a more positive self-regulatory role ultimately improve the successive choices made by the child that can position them for longer term success in life. For example, research indicates when parents promoted pro-social behavior with their children, the children overcame early aggressiveness and delinquent behavior, which positively predicted academic achievement and positive peer relationships (Caprara, Barbaranelli, Pastorelli, Bandura, & Cimbaro, 2000). To the degree that early role models such as parents can develop a child's self-efficacy generally and moral agency in particular the more likely the child as an adult will be resistant to stressors that deter them from achieving success and doing what's right.

In sum, the broad conceptual basis we are using to examine how parenting style and rule breaking behavior predicts subsequent ascension into leadership roles is based on social learning theory. Specifically, how parents enable their children to address challenges such as avoiding or recovering from breaking rules is in our view critical to how the child develops a sense of agency for doing what is not only expected later in life, but also going beyond expectations to do what the individual believes is right. We suggest these experiences will predict ascension into leadership roles later in life above and beyond one's personality and heritability. Fig. 1 summarizes the relationships investigated in the present study.

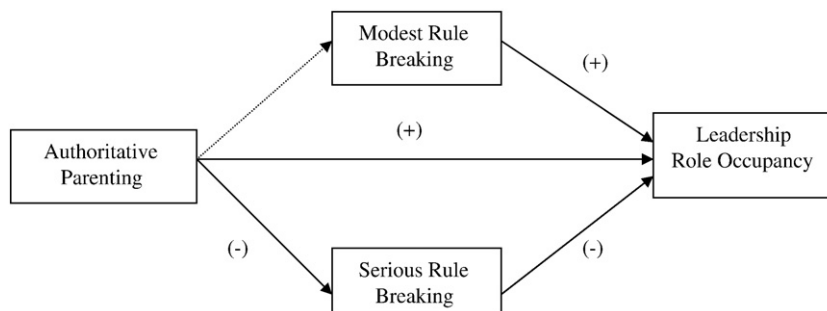


Fig. 1. Hypothesized relationships and research questions. *Note.* We have not hypothesized a relationship between authoritative parenting and modest rule breaking, in that we felt there was not a sufficient base of research to do so.

2. Theoretical development and hypotheses

2.1. Parental orientation

Although individuals inherit the genetic blueprint of their parents, which perhaps sets boundaries on the range of situations those individuals are likely to engage in and develop from, the environment in which these individuals grow and develop helps to determine which behavior patterns actually emerge and are reinforced over time. Taylor, McGue, & Iacono (2000) reported that approximately 82% of the variation in adolescent delinquency is due to environmental factors. In many respects, the parent is the first leadership trainer who teaches the child how to make sense of experiences, how to treat others, how to persevere under challenging conditions, how to develop, and how to perform (Avolio, 2005). This form of socialization associated with effective parenting processes focuses on how children come to understand the values, beliefs and perspective that guide their thinking and behavior later on in life (Ashford & Saks, 1996). For example, one of the ways we come to learn about our identity and to switch to other more mature identities over time is through such socialization processes with parents (Ibarra, 2003). The socialization process includes how children perceive and address challenges and the support they receive from their parents when trying to figure them out (Kegan, 1994).

The outcomes of parental orientation have long been reported in the literature. For example, McCord (1986) reported results of a 30 year longitudinal study of 506 males, concluding that those individuals who had “beat the odds” in terms of growing up in difficult environments, had parents who exhibited a lot of discipline and affection towards the child. Werner & Smith (1992) concluded from their longitudinal study that, “the life stories of the resilient youngsters now grown into adulthood teach us that competence, confidence, and caring can flourish, even under difficult circumstances, if children encounter persons who provide them with the secure basis for the development of trust, autonomy and initiative” (p. 209).

The bulk of parenting research lends support to the benefits of authoritative versus authoritarian parenting (Baumrind, 1991). Authoritative parents can be described as being demanding (challenging), responsive, rational, considerate, consistent, and assertive yet not restrictive. Whereas authoritarian parents are controlling, lacking in warmth, support and consistency, authoritative parents set clear standards of conduct and use supportive disciplinary methods, which Cairns & Cairns (1994) referred to as the “iron glove” approach to parenting. Children exposed to this parenting style have been shown to be advantaged over children of other parenting styles, especially authoritarian parents.

2.2. Linking parental orientation and leadership roles

Authoritative parenting style has been positively related to characteristics that predict ascendance into leadership roles (Bass, 1990; Yukl, 2006). For example, research has shown that children who experience authoritative parenting have higher achievement orientation, self-confidence, internal locus of control, levels of moral reasoning, industriousness, independence, self-efficacy, and generativity (greater sense of care and concern for others) (Baumrind, 1991; Darling & Steinberg, 1993; Lawford, Pratt, Hunsberger, & Pancer, 2005; Parker & Gladstone, 1996; Pratt, Skoe, & Arnold, 2004; Rest, 1979). Research has also shown that authoritative parenting predicts college students' academic grades and work orientation, and that the positive effects of authoritative parenting were maintained over time (Strange & Brandt, 1999; Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994).

Early leadership research was driven by interest in deriving a formula for “what makes a great leader” (Bass, 1990). During this period of time in the leadership research literature, there was a dominant emphasis on examining the relatively stable traits or qualities of leaders that distinguished them from the otherwise, “average” person or non-leader (Judge et al., 2002). Conclusions emerging from this work spanning nearly 100 years showed there are some traits that people in leadership roles possess (Den Hartog & Koopman, 2001). For example, Stogdill (1948) reported that there were personal dispositions repeatedly associated with leadership that included energy level, cognitive ability, persistence, and sense of responsibility. Some additional traits include tolerance for ambiguity, self-confidence, drive, desire to lead, honesty and integrity, internal locus of control, achievement motivation, neuroticism, extraversion, openness to new experience, conscientiousness, and need for power (Chan & Drasgow, 2001; Judge et al., 2002; Kirkpatrick & Locke, 1991; McClelland, 1975; Stahl, 1983).

Authoritative parenting practices also have been shown to positively relate to other outcomes in adulthood that reflect self-efficacy such as entrepreneurial competence, academic achievement, and pro-social behavior (Kasser, Koestner, & Lekes, 2002). Schmitt-Rodermund (2004) investigated the impact of personality and authoritative parenting on adolescents' and business founders' self-reports of early entrepreneurial competence and reported support for the positive effect of authoritative parenting. Children whose parents used authoritative parenting reported higher levels of entrepreneurial competence (operationalized as leadership in high school, curiosity, and entrepreneurial skill).

Although the parenting practices that one is exposed to and the relationships that are established with parents during one's early formative years appear to remain and have a potential impact later in life (Kasser et al., 2002), prior research on the consequences of different parenting orientations has largely targeted outcomes in high school and college, but not beyond. The present study considers the consequences of parenting orientation in adulthood and more specifically the roles or positions of leadership that are assumed.

In sum, parenting orientation is expected to impact a wide range of outcomes through its influence on individual development, pro-social and antisocial behavior, academic achievement, goals, etc. It is through these mechanisms that we believe that parenting practices experienced early in life are likely to influence leadership roles assumed into adulthood. We have chosen to focus on

authoritative parenting as it has demonstrated the most consistent relationship with variables that have been associated with emergence in leadership roles.

Hypothesis 1. Controlling for heritability and personality, authoritative parenting positively predicts the number of leadership roles an individual assumes into adulthood.

2.3. Linking parental orientation and rule breaking experiences

Parental orientation has been repeatedly used to explain how children come to learn discipline to make the right choices later in life when confronted with challenging circumstances. [Socolar \(1997\)](#) describes two types of discipline used by parents to positively shape the socialization of their children. Proactive discipline to curb the emergence of inappropriate behaviors and reactive discipline where the parent uses the child's misbehavior as an opportunity to teach the child what shouldn't have been done, and what should be done in the future. Both forms of discipline require active involvement on the part of parents, and are described by [Baumrind \(1991\)](#) as being both authoritative and responsive. These parents provide constraints and punishment as needed consistently applying the rules, but they do so in measured ways that respects the child and shows concern for his or her continued development.

[Patterson \(1986\)](#) argues that parents early on in a child's development may inadvertently create the conditions in the home environment that make it easier for children to be influenced by deviant peer group behavior. They suggest that consistency in parental supervision in terms of setting standards and providing support can be instrumental in developing the child's personal agency to avoid succumbing to serious deviant behavior later on in life. Their work is based on the premise that the child who is involved very early in life in less critical antisocial behaviors and rule breaking, will be much more at risk to engage in serious rule breaking and deviant behaviors later in adolescence and on into adulthood. This is supported by longitudinal research conducted by [Osborn & West \(1978\)](#), who reported that at age 10 or less, those children who became more chronic offenders later in life, experienced very poor parenting.

[Martin \(1981\)](#) argues that the early tolerance shown by parents with children for deviant behaviors can manifest later on in the child's development in noncompliant and deviant behaviors. Early starts to positive social development requires effective family and parental management practices rooted in concern for the child coupled with discipline that distinguishes between serious and not so serious rule breaking. Through this social learning process, children learn to distinguish coercive and deviant behaviors from those responsible for positively developing their future potential ([Ramsey, 1989](#)).

Another aspect of the developmental process involves children learning how to move from hedonistic reasoning where it's all about satisfying their needs, to taking other's needs into consideration based on how parents and other significant role models "teach" them to adhere to rules and to ascend to higher levels of moral authority ([Eisenberg, Carol, Murphy, & Van Court, 1995](#)). This does not represent a "natural" course of development, but development that is shaped over time whereby the child is taught what is the appropriate response to challenges and dilemmas. The basic gist of such development is to teach the child to take responsibility for their actions and that requires parents who are consistent in applying discipline, while also demonstrating their positive concern for the child's welfare. This is a particularly critical point because only 10% of adolescents actually see themselves as the source of the problem when they have broken rules ([Cairns & Cairns, 1994](#)).

[Kegan \(1982, 1994\)](#) has argued that individuals develop their ability to make sense of such challenging and difficult experiences becoming their own "self authors" in determining their future course of action. [Avolio & Gibbons \(1988\)](#) reported that by successfully confronting these challenges early in life with the support of one's parents and their resolution was positively correlated with these individuals emerging in senior leadership roles and being evaluated by others as more effective leaders.

Hypothesis 2. Controlling for heritability and personality, authoritative parenting negatively predicts serious rule breaking behavior.

2.4. Rule breaking behavior and leadership role occupancy

We know that in the turbulent environment that most leaders operate today, they must be able to address problems with flexibility to succeed. Such leaders must learn from prior experiences including mistakes they've made, in order for those individuals to challenge and change their assumptions, beliefs and ultimately mental models about influencing others ([Mumford & Connelly, 1991](#); [Yukl, 2006](#)). [McCauley \(2001\)](#) suggested that how one interprets, confronts and resolves earlier life barriers or problems is one mechanism that contributes to subsequent leadership emergence. One of the goals of the present study is to investigate how differences in rule breaking behavior occurring earlier in life impact future ascension into leadership roles well into adulthood.

There appears to be considerable order in the patterns associated with the development of deviant behavior in early childhood and into adulthood ([Cairns & Cairns, 1994](#)). In this regard, [Cairns and Cairns \(1994, p. 238\)](#) state, "lives seem not to be predestined so much as they are kept on course by correlated forces within and without. Yet, there are remarkable and durable shifts in trajectory." This sort of shift is evidenced by the fact that although approximately 80% of adolescents engage in some form of antisocial behavior, this type of behavior persists for only about 5% ([Moffitt, 1993](#); [Willoughby, Chalmers, & Busseri, 2004](#)).

This and other research suggests that because adolescents are involved in one type of problem behavior, does not necessarily mean they will be involved in other more serious problem behaviors ([Willoughby et al., 2004](#)). [Moxley \(1998\)](#) argues that some

negative experiences can actually enhance learning through the process of self-reflection. Such self-reflection can lead to greater sense of self-awareness of the ways an individual constructs reality ultimately leading to a change in perspective-taking capacity to a higher level of complexity and moral reasoning. Hence, although youth may test or challenge various systems by engaging in modest rule breaking behavior, one may argue that it is less likely that this behavior persists over time and negatively impacts opportunities and outcomes in the long term. In fact, it may be that the very same drivers that prompted them to question and challenge also predict leadership.

Yet, we also have learned that certain problem behaviors and exposure to multiple risk factors during childhood and adolescence may tip an individual towards impairing his or her long-term psychological well-being and adult functioning (e.g., Capaldi & Stoolmiller, 1999; Sameroff, Bartko, Baldwin, Baldwin, & Siefer, 1998). For example, early alcohol dependence has been shown to lead to low academic achievement, poor school adjustment, health problems, antisocial behaviors, and low psychosocial functioning (Clark, 2004). These risk factors have been shown to have a cumulative negative influence on youth on into adulthood.

Research indicates that problem behaviors such as group fighting, shoplifting, and selling drugs predict similar behaviors 1–2 years later (e.g., Gerard & Buehler, 2004). Behavior problems at age six (6) to eight (8) years have been shown to negatively impact high school degree attainment and college enrollment (McLeod & Kaiser, 2004). Since educational attainment has been shown to be a predictor of future opportunities in life, the extent to which rule breaking behaviors impede subsequent educational attainment is likely to affect future occupational and life opportunities, including emergence in leadership roles.

A lot of prior research has examined early adolescence through what has been referred to as the “general problem syndrome lens” (Jessor & Jessor, 1977). Research in this area has generally supported the notion that a variety of problem behaviors such as rule breaking could be subsumed under this one general label that many authors suggested put adolescents at risk of going down the wrong path (Zhang, Welte, & Wieczorek, 2002). However, more recent research and discussions of the contribution of problem behaviors to later development and success indicate that not all problem behaviors may have the same long-term effects or risks (White & Labouvie, 1994). In fact, some authors suggest that certain problem experiences may have time-limited effects whereas others may be persistent across the life span. That is, certain problem behaviors interfere with educational attainment and balanced psychological functioning, whereas some forms of rebellious behavior could lead to career success if channeled into developmental opportunities (Bandura, 2008; Moffitt, 1993; Willoughby et al., 2004). We suspect that such rebellious behavior may help individuals learn the limits of what is right versus wrong when the consequences are not as severe as they might be later in adulthood. Hence, it appears that high risk and serious rule breaking behaviors are more limiting in the long term than modest rule breaking behaviors. This leads to our last two hypotheses to be tested in the current study.

Hypothesis 3. Controlling for heritability and personality, modest rule breaking behavior positively predicts the number of leadership roles an individual assumes into adulthood.

Hypothesis 4. Controlling for heritability and personality, serious rule breaking behavior negatively predicts the number of leadership roles an individual assumes into adulthood.

3. Method

3.1. Sample

The participants in this study were part of an ongoing longitudinal study, the Minnesota Twin Family Study (MTFS) of twins and their parents, which began in 1989. The general goal of the MTFS is to understand and explain the extent to which genes and the environment influence the development of psychological traits or psychopathology and to identify specific genetic and environmental factors that influence these traits. Participants are asked to answer questions about ability, personality, interests, family/social relationships, physical health, or psychological traits. The data are gathered on an ongoing basis and using different methods for gathering the information. Periodically participants are asked to visit the university to complete a series of assessments, as well as being contacted by telephone and asked to participate in a telephone interview, or by mail and asked to complete a questionnaire. The method that is chosen for use at any given time depends on the physical, mental, or social change that the researcher is interested in assessing.

The sample used in the present study was drawn from the broader pool of participants and was restricted to reared together male twins born between 1961 and 1964. Our total sample consisted of 109 pairs of identical or monozygotic twins and 87 pairs of fraternal or dizygotic twins. These criteria permitted us to control for gender and age, while also drawing a representative sample of twin men who were at an age where they would have had opportunities to serve in leadership roles at work. Details of how twin pairs are determined as either identical or fraternal are described by Lykken, Bouchard, McGue, & Tellegen (1990).

3.2. Measures

All of the data used in this study have been gathered as part of the MTFS. The individual differences and leadership measures were completed during different time periods in the participant's life and by different methods. Information about rule breaking behavior and parenting practices was obtained using the self-report questionnaire method and structured telephone interviews. Information on leadership roles and personality was obtained using self-report questionnaire methods. Specifics about the measures and time periods follow.

3.2.1. Rule breaking

Rule breaking behavior was assessed in 1995 using a 45-item self-report questionnaire developed for use in the MTFS. It consisted of a four-point response scale ranging from 1 “never” to 4 “very often” and assessed five different forms of rule breaking behaviors engaged in before high school. The five forms of rule breaking are delinquency (e.g., deliberately break a school window or damage school property), family and school offenses (e.g., skip school without parents permission), official contact (e.g., picked up by police), serious crime (e.g., take something not belonging to you), and drug use (e.g., buy marijuana or other illegal drug) (see [Hindelang, Hirschi, & Weis, 1981](#); [Krueger, Hicks, & McGue, 2001](#) for details on this measure and our [Appendix](#)).

We conducted an exploratory factor analysis (EFA) with 218 of the identical twins, using principle axis and varimax rotation. Two factors emerged with Eigen values greater than 1.0, explaining 79% of the variance, with all factor loadings of .51 or above. We labeled the first factor “modest rule breaking” consisting of delinquency and family/school offenses ($\alpha = .81$). The second factor was labeled “serious rule breaking”, which included official contact, serious crime, and drug use ($\alpha = .75$). Sample items are included in the [Appendix](#).

Finally, using another independent sample of 174 fraternal twins, we performed confirmatory factor analysis (CFA) using AMOS maximum likelihood estimation ([Arbuckle, & Wothke, 1999](#)) to evaluate the validity of the above two-factor structure. The fit indexes showed a very good fit to our data ($\chi^2/df = 2.04$, GFI = .94; CFI = .96; RMSEA = .05 for modest rule breaking; $\chi^2/df = 1.87$, GFI = .96; CFI = .98; RMSEA = .04 for serious rule breaking). Thus, in all subsequent analyses, we used the first factor consisting of delinquency and family/school offenses as indicators of modest rule breaking and the second factor consisting of official contact, serious crime, and drug use as indicators of serious rule breaking.

3.2.2. Parenting practices

The parenting practices experienced by the twins were assessed using two approaches. First, a 50-item self-report questionnaire titled the Parental Environment Questionnaire (PEQ) that was developed for use in the MTFS was administered at a second session in 1995. This questionnaire assessed five characteristics of parenting (conflict, involvement, regard for parent, regard for son, and structure) and had a four-point response scale ranging from 1 “definitely false” to 4 “definitely true”. Details on the development of the PEQ can be found in [Elkins, McGue, & Iacono \(1997\)](#). Second, a structured telephone interview was used to assess parenting practices in 1995 with 43 items. The items from the two instruments were combined to form the parenting factors.

Based on the parenting literature noted above (e.g., [Baumrind, 1991](#)), the two factors of involvement ($\alpha = .94$) and structure ($\alpha = .72$) were used in the present study as indicators of authoritative parenting. To further justify using these factors as indicators, we conducted a CFA on the two-factors, with each item being allowed to load on its appropriate factor and the results revealed a good fit to our data ($\chi^2/df = 1.98$; GFI = .96; CFI = .98; RMSEA = .05). Sample items are included in the [Appendix](#).

3.2.3. Personality

Participants completed the 198-item version of the MPQ ([Tellegen, 1982](#)) in 1995. Since personality was used as a control variable, only the four scales that most closely linked to leadership, aggression, harm avoidance, achievement, and social potency were included in subsequent analyses ([Judge et al., 2002](#)).

3.2.4. Leadership role occupancy

Leadership was measured using role occupancy as the primary measure. [Bass \(1990\)](#) classified studies of leadership using role occupancy as one measure of leadership indicating that leaders were identified as “persons occupying positions of leadership” (p. 59). [Bass \(1990\)](#) notes that people in such roles, “lead as a consequence of their status—the power of the position they occupy” (p. 19). Other studies using leadership role occupancy include [Arvey et al. \(2007\)](#), as well as [Judge et al. \(2002\)](#) who coded leadership studies based on positional components (e.g., held a position of leadership in high school compared to others that did not). Similarly, [Day, Sin, & Chen \(2004\)](#) used the captain’s position or role on a hockey team as indicative of leadership role occupancy and studied the impact of role occupancy on subsequent individual performance. Further support for choosing leadership role occupancy as our dependent variable, comes from [Ilies et al. \(2004\)](#) who suggested that when examining heritability and leadership emergence genetic underpinnings should be investigated first (i.e., first investigate what type of person becomes a leader and then examine who performs better as a leaders).

Approximately 5 years after the personality, parenting, and rule breaking measures were completed, participants responded to questionnaire items in 2000 that asked them about formal and informal leadership roles they occupied in work settings (17 items), and in the community (6 items). For example, participants indicated whether they had ever served as leaders of professional associations, led a work group or team, been a shift supervisor, manager, vice-president etc. ($\alpha = .72$). Community measures asked participants about leadership roles in the community ($\alpha = .70$). This approach uses a bio-history methodology (e.g., [Chan & Drasgow, 2001](#); [Mumford & Stokes, 1992](#)) and is consistent with recent work by [Day et al. \(2004\)](#) and [Judge et al. \(2002\)](#). The [Appendix](#) includes sample items.

To verify the fit of the two factors as an overall measure of leadership role occupancy latent variable, we conducted a CFA, allowing each item to load on its respective factor (e.g., work or community). This analysis showed an acceptable fit for our two-factor solution ($\chi^2/df = 1.42$; GFI = .98; CFI = .99; RMSEA = .02). On the basis of these fit indexes, we used the two factors as indicators of leader role emergence.

3.2.5. Genetics

The fraternal or zygosity of the twins was obtained at the onset of the MTFs, using a five-item questionnaire. This method achieves a 95% accuracy rate compared to serological methods (see Lykken et al., 1990).

3.3. Data analysis

A two-step process of analysis (Anderson & Gerbing, 1988) with AMOS maximum likelihood estimation (Arbuckle & Wothke, 1999) was used to test our hypotheses. We first estimated a measurement model to assess the relationships between the latent variables and the manifest variables that serve as their indicators, including all the main variables of interest in the study (e.g., authoritative parenting, modest rule breaking, serious rule breaking, and leadership role occupancy). This measurement model did not include personality and genetic factors, but they are introduced in the structural equation modeling discussed below. For authoritative parenting, we used the two factors of involvement and structure as its indicators. For modest rule breaking, we used the two factors of delinquency and family/school offenses as its indicators. For serious rule breaking, we used the three factors of contact, drug, and crime as its indicators. Finally, for leadership role occupancy, we used community and work role leadership factors as its indicators.

In the second step, we used structural equation modeling to test the relationships proposed in the study. We considered structural equation modeling analysis the most appropriate analytical strategy because the procedure allows for the examination of direct relationships, while also accounting for potential measurement error (Byrne, 2001). For authoritative parenting, modest and serious rule breaking, and leadership role occupancy, we used the indicators described in the measurement model above. For personality, we used the four personality factors (e.g., aggression, harm avoidance, achievement, and potency) as its indicators.

To account for genetic influence, we followed the standard behavioral genetics method of controlling for the degree of similarity/difference between individual twins (Plomin, DeFries, McClearn, & McGuffin, 2001). To do this, we decomposed the within-pair covariance with regard to focal latent variables into three parts, namely, A, C and E. The “A” factor refers to genetic

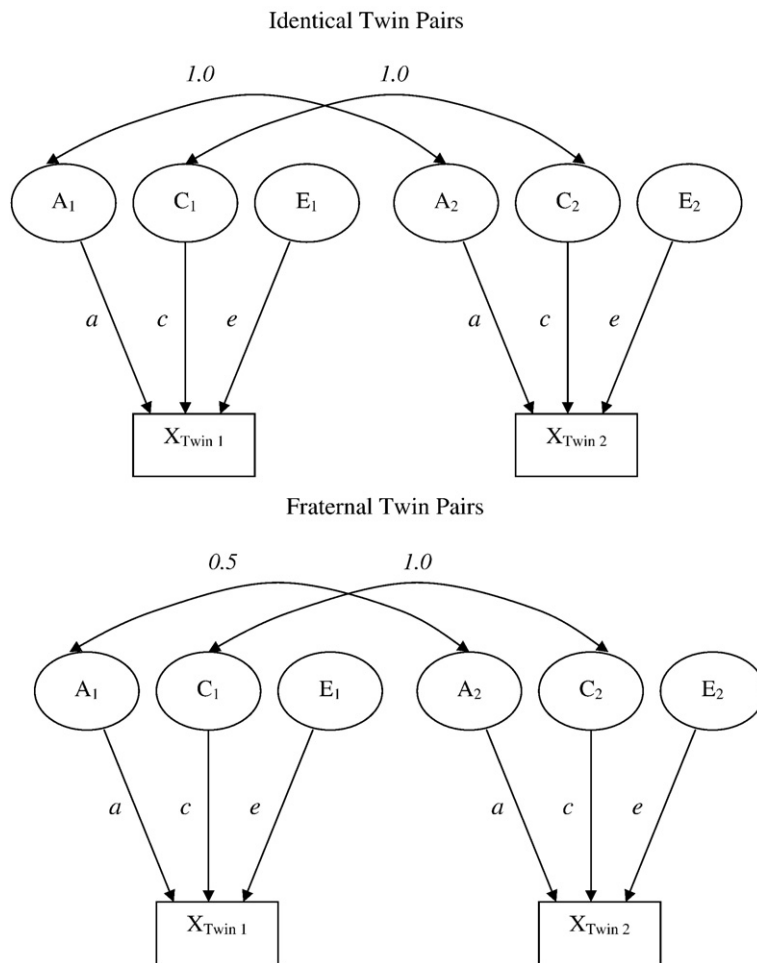


Fig. 2. Decomposed genetic effects. A = Genetic factor; C = Common (shared) environmental influence shared by the twins; E = Unique environmental influence for the focal person and measurement error.

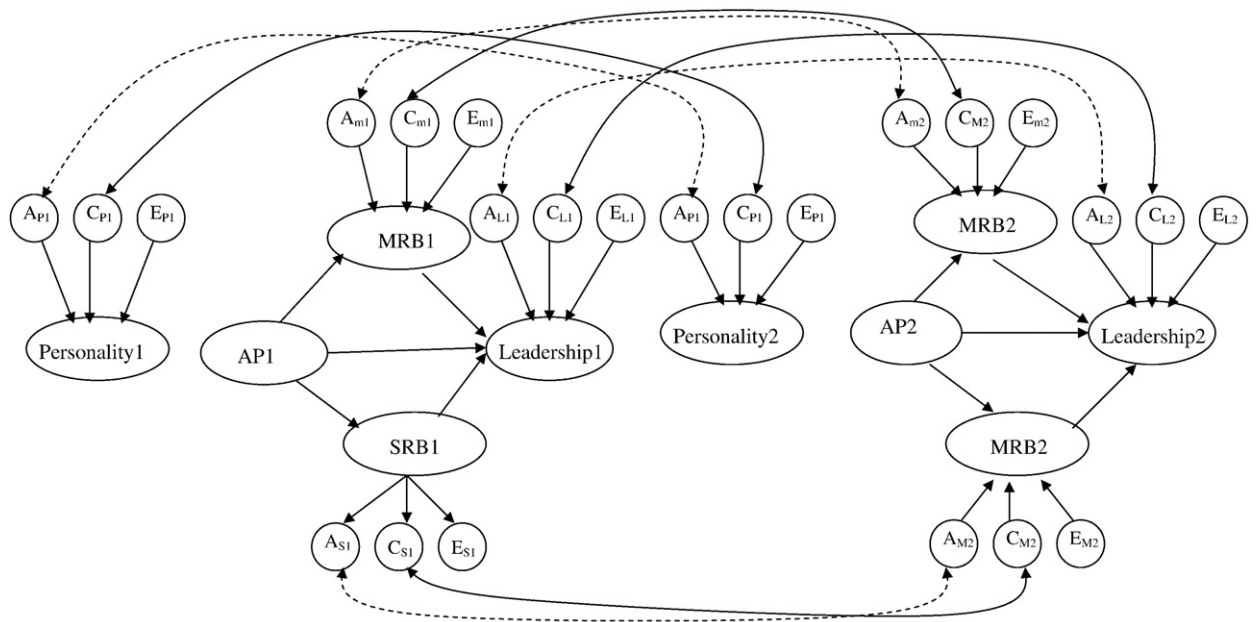


Fig. 3. Proposed structural equation analysis for twin pairs. AP = Authoritative parenting; MRB = Modest rule breaking; SRB = Serious rule breaking; A = Genetic factor; C = Common (shared) environmental influence shared by the twins; E = Unique environmental influence for the focal person and measurement error. *Note.* For clarity purposes, we do not show the paths from personality to modest rule breaking, serious rule breaking, and leadership role occupancy. Also, path coefficients for the dashed double-headed arrows are fixed at 1 (for identical twins group) or .50 (for fraternal twins group) whereas the path coefficients for the solid arrows are fixed at 1 for both groups.

effects, “C” refers to the shared-environmental factor (i.e., influences shared by members of the same family such as income level, number of books in the home, same high school, etc—those features of the environment shared by each twin of a pair). The “E” factor or non-shared environmental effects includes unique environmental influences as well as measurement error.

An example of a univariate genetic decomposition of both identical and fraternal twin pairs is shown in Fig. 2. As indicated in Fig. 2, the correlations between A_1 (e.g., first twin in a pair) and A_2 (e.g., second twin a pair) are fixed at 1 or 0.50, and the correlation between C_1 and C_2 is fixed at 1 for both groups. The correlation in the fraternal group is fixed at 0.50 based on behavioral genetics theory, which suggests that fraternal twins share on average 50% of their genetic materials, while the identical twins share all the genetic materials. Similarly, all the correlations between common environmental factors (C) between pair members of both twin types were set to 1.0, to reflect the common shared environmental influences. The non-shared environmental factors path (E) by definition is specified as zero. Finally, the path coefficients a , c , and e are held invariant across the two groups because they are the estimates of interest.

To test our hypotheses while controlling for genetic influence and personality, we tested the structural model presented in Fig. 3, which equivalently decomposed the covariances of the same variable between the two members within twin pairs. This figure shows only the model for the identical twin group. The model for the fraternal twin pairs is the same as Fig. 3, except the dashed double-headed arrows are all fixed at .50. Note that although we do not show paths from personality (1 and 2) to modest rule breaking, serious rule breaking, and leadership role occupancy, the paths are estimated, but omitted from the figure for clarity purposes. All the A, C, E's are latent variables with mean of 0 and variance 1. All the covariance paths (e.g., A_1 and A_2 or C_1 and C_2) are fixed at 1.0 for the identical twins group. The coefficients are also the same and estimated. Thus, we tested a two-group model using AMOS maximum likelihood procedure.

4. Results

Table 1 presents the means, standard deviations, and the zero-order correlations of the study variables, using the entire sample of 392 participants (e.g., 218 identical twins and 174 fraternal twins). Thus, the correlations reported here need to be interpreted with caution given that they do not take into account the extent to which the indicators of each construct share variance and the genetic components of the participants.

4.1. Hypotheses tests

To test the hypotheses, we estimated the structural model presented in Fig. 3 using AMOS maximum likelihood procedure (Arbuckle & Wothke, 1999) and following Byrne's (2001) recommendations for testing invariance across two groups. Before testing our hypotheses, we first estimated a measurement model to assess the relationships between the latent variables and the manifest variables that serve as their indicators, including all the main variables in the study. Results of this model test produced a

Table 1
Means, standard deviations, and correlations among study variables.

	Mean	s. d.	1	2	3	4	5	6	7	8	9	10	11	12
<i>Personality</i>														
1. Potency	48.73	9.69												
2. Achievement	49.36	9.01	.27**											
3. Aggression	49.10	9.02	.02	.02										
4. Harm avoidance	49.23	9.64	.02	.05	-.15**									
<i>Authoritative parenting</i>														
5. Involvement	3.01	.38	.01	.15**	-.09	.08								
6. Structure	3.30	.31	.07	.18**	.01	.06	.69**							
<i>Modest rule breaking</i>														
7. Delinquency	1.22	.34	.02	.02	.02	-.02	-.04	-.10						
8. Family	1.29	.40	.09	.12*	-.02	.06	.06	.05	.50**					
<i>Serious rule breaking</i>														
9. Contact	2.31	.48	.02	.04	.04	-.04	-.04	-.04	.50**	.41**				
10. Crime	1.18	.35	.18**	.01	.01	-.03	-.04	-.09	.42**	.48**	.46**			
11. Drug	1.51	.59	.09	.08	.03	-.01	.06	.02	.45**	.41**	.36**	.41*		
<i>Leadership role occupancy</i>														
12. Community	3.00	.60	.45**	.09	.09	.02	.10	.08	.05	.12*	.06	-.02	.02	
13. Work	2.18	.26	.47**	.28**	-.02	.03	.07	.06	.15**	.11*	.05	-.12*	-.11	.50**

n = 392.
*p < .05; **p < .01.

good fit to our data ($\chi^2/df = 1.98$; GFI = .97; CFI = .98; RMSEA = .03). Having established the link between the observed indicator variables and the underlying constructs they were intended to measure, we then used structural equation modeling to test the relationships proposed in the study. Results of this model are displayed in Fig. 4 ($\chi^2/df = 2.11$; GFI = .96; CFI = .97; RMSEA = .05).

Hypothesis 1 predicted that authoritative parenting would positively predict the number of leadership roles an individual assumes into adulthood, while Hypothesis 2 predicted that authoritative parenting would negatively predict serious rule breaking, controlling for heritability and personality. Although not shown in Fig. 4 for clarity purposes, our results revealed positive paths from personality to modest rule breaking ($\beta = .18, p < .05$), from personality to serious rule breaking ($\beta = .26, p < .01$), and from personality to leadership role occupancy ($\beta = .29, p < .01$). In support of Hypothesis 1, results shown in Fig. 4 indicates that the path from authoritative parenting to leadership role occupancy is positive and significant ($\beta = .22, p < .01$). Fig. 4 also shows that the path from authoritative parenting to serious rule breaking is negative and significant ($\beta = -.19, p < .01$). Hypothesis 1 and 2 are supported by our data. Our results also revealed a negative path between authoritative parenting and modest rule breaking ($\beta = -.15, p < .01$).

Hypotheses 3 and 4 predicted that modest (serious) rule breaking behavior would positively (negatively) predict the number of leadership roles an individual assumes into adulthood, again controlling for heritability and personality. As shown in Fig. 4, results

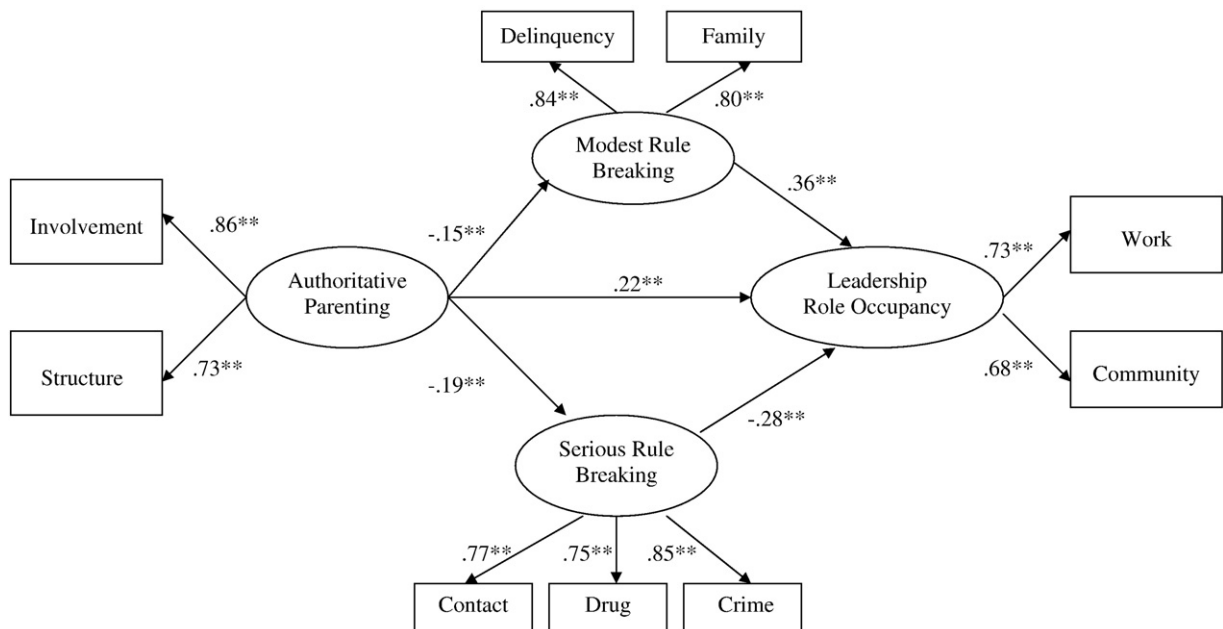


Fig. 4. Summary of AMOS results of the hypotheses and research questions. **p < .01 (two tailed).

revealed a negative path from serious rule breaking to leadership role occupancy ($\beta = -.28, p < .01$), and a positive path from modest rule breaking to leadership role occupancy ($\beta = .36, p < .01$). **Hypotheses 3 and 4** also received support by our data.

4.2. Testing alternative models

The model shown in Fig. 1 suggests that authoritative parenting, modest rule breaking and serious rule breaking directly affects leadership role occupancy. One could envision alternate structures for Fig. 1 that may also have merit. For example, it may be that the effect of authoritative parenting on leadership role occupancy is indirect or mediated being carried through both modest and serious rule breaking. It also may be that authoritative parenting has a potential moderating effect in the relationship between rule breaking and leadership role occupancy. We therefore tested two alternative models that provide different representations of authoritative parenting effects.

First, we compared the fit of our hypothesized model (Fig. 1) to an alternative model where we predicted complete mediation of authoritative parenting, with no direct path from authoritative parenting to leadership role occupancy. The alternative completely mediated model exhibited a poorer fit to the data ($\chi^2/df = 2.99$; GFI = .92; CFI = .93; RMSEA = .09), with the difference in fit being statistically significant ($\chi^2[1] = 33.86, p < .001$). Second, we tested for the potential moderating effect of authoritative parenting in the relationship between rule breaking and leadership role occupancy. To do this, we created additional interaction variables (e.g., authoritative parenting \times modest rule breaking and authoritative parenting \times serious rule breaking), with both the interaction terms mean-centered to reduce multi-collinearity and to increase interpretability (Aiken & West, 1991). In addition, since these two new interaction variables now represented single observed variables to measure latent constructs, we corrected for measurement error by setting an error variance equal to $([1-\alpha] \times \text{s.d.}^2)$ for each interaction term. Results failed to provide evidence of moderating effect of authoritative parenting in the relationship between modest rule breaking and leadership role occupancy ($\beta = .11, ns$) and serious rule breaking and leadership role occupancy ($\beta = -.08, ns$). Taken together, these results provide additional support for the hypothesized model presented in Fig. 1.

5. Discussion

Research has established that both genetic and environmental factors explain variation in the leadership roles and behavior of adults. Limited research has considered the role of specific environmental factors and life experiences. For example, research from the careers literature indicates that an individual's vocational interests in occupations that involve influencing others, helping, creativity, and organizing are also indicative of future leadership style and effectiveness (Campbell, Hyne, & Nilsen, 1992; Schneider, Paul, White, & Holcombe, 1999).

The present study focused on rule breaking behavior early in life and parental orientation to examine how each is related to leadership roles assumed by adult twins, while controlling for genetics and personality. Results provide support for the direct effects of rule breaking behavior and parenting style on adult leadership role occupancy. These findings show how earlier life experiences may contribute to explaining future emergence in leadership roles and could have important implications for leadership research and managerial practices.

In some ways, our findings that modest rule breaking results in a greater frequency of emergence in leadership roles and the important role that parenting practices play parallel some of the limited life span work on leadership development cited earlier by Avolio & Gibbons (1988). Specifically, when individuals challenge the status quo or boundaries of authority/rules early in life they can stand to learn a lot from these experiences if their parents help them understand why the actions they chose are problematic and more importantly how the individuals can achieve the desired goals in ways that do not involve breaking rules. That is, parents can arm their children with more effective strategies for achieving their goals. This may lead to what Bandura (2008) referred to as resilient efficacy.

It might be the case that the predispositions that explain why some individuals question or test the norms for what is considered appropriate behavior (without breaking the law) are also the same qualities that explain why they assume leadership roles in various settings throughout life. However, individuals who go so far as to break the laws do not fare so well. These findings are important, because prior research has mainly focused on rule breaking in childhood and adolescence in terms of being part of an overall problem syndrome, while ignoring that some rule breaking behavior may not be as damaging to future potential successes in adulthood.

In line with our arguments above, our findings may also contribute to future research on leadership development. Results reported here suggest that interventions directed at questioning the status quo or challenging environments early in life might help young adults to develop leadership qualities that are needed to successfully assume leadership roles later in life. Thus, these results are not only consistent with prior research (e.g., Buckingham & Coffman, 1999), they also provide further empirical support for Bass' (1985, 1998) contention that leadership styles that provide followers with challenging environments and encourage their direct reports to challenge the status quo may result in followers taking on additional responsibilities and assuming leadership roles.

However, before necessarily introducing young adults to such challenges further research is needed to examine the nature of those challenging environments and how that impacts later leadership emergence. In the current study, we were able to link the type of challenging behavior exhibited by our sample to later leader role occupancy, as opposed to linking the nature of the specific challenging environment to leadership roles assumed later in one's life span. Some of the leadership literature has implicitly made this connection, such as linking crucible events to leadership based on retrospective interviews (see Bennis & Thomas, 2002).

These findings need to be replicated with further longitudinal research examining more specifically the nature of the context and how it relates to leadership emergence and performance.

Our finding that participants who experienced authoritative parenting engaged in less rule breaking behavior is also consistent with the theorizing and research findings from the parenting literature. Yet, it is interesting that even though authoritative parenting negatively related to modest rule breaking, such rule breaking behavior positively predicted leadership role occupancy. Given the discipline associated with such parenting, we are not surprised that such parents would be more likely to curb *any* rule breaking behavior. However, those same parents also show support for their children, while perhaps helping them to derive a different set of lessons from the rules they ended up breaking. The sort of redirection that comes from the learning experience associated with behavior that broke rules may be an important piece in developing future leadership potential. For example, many revolutionary leaders such as Nelson Mandela, broke numerous rules early in life, but over time came to realize the negative consequences of such behavior and made appropriate adjustments. How individuals change course based on the consequences of effective parenting and rule breaking behavior seems important to examining the ascendance into leadership roles. Also, the type of reflection that we have described above that results in development and growth may also come from other sources other than parents not included in this study, such as mentors, coaches, teachers, etc.

Although speculative, it is possible that authoritative parenting does reduce the incidence of modest rule breaking, however individuals who commit such violations may derive a different learning experience from such violations, contributing to their taking on new and different challenges later in life such as leadership roles. This may explain why there was a positive relationship between parenting practices and the frequency of emergence in leadership roles.

5.1. Strengths, limitations and implications

There are several practical implications of these findings. That modest rule breaking positively predicts leadership roles suggest that possibly questioning or challenging systems early in life is not always as detrimental as it initially appears. Testing the waters may not meet the same fate as serious rule breaking and combined with responsive and consistent parenting may in fact produce individuals who themselves are willing to assume roles of responsibility and that require them to motivate and direct others, particularly under challenging circumstances. Hence, we suggest some degree of caution that these types of behaviors should be met with guidance and direction rather than harsh discipline and embarrassment. These findings also reinforce the important role that the parent plays in a child's life and that supportive disciplinary methods and responsive parenting instills qualities in children that permit them to assume roles that require the same type of behavior from them. Future research can consider whether or not children who experienced authoritative parenting also become certain types of leaders, who themselves are supportive, responsive, rational, considerate, and consistent, while also looking at the leadership styles and success of those leaders.

There are several strengths to this study. First, this is one of the first studies to investigate a specific environmental factor and a life experience that helps to explain adult leadership role occupancy, while controlling for heritability and personality, two variables that are known to explain significant variation in leadership emergence. Second, the data set consisted of twins, which are a unique and important sample to study. A number of the variables of interest in the present study are in part influenced by genetics. A behavioral genetics approach using data gathered from multiple time periods permitted us to conduct the analyses controlling for the genetic influences among the variables, providing for more conservative analyses and effect size estimates. These analyses and findings build upon earlier research conducted in the various relevant literatures. Third, measures of the key predictors and criterion variables were obtained at different times and using different methods, reducing some concerns about method bias. Fourth, the longitudinal nature of some of the measures permitted an assessment of environmental factors as they relate to leadership emergence over time, unlike most leadership research that is cross-sectional in nature.

Some of the limitations of this study include the measure of leadership used. A great deal of the research in the field of leadership has focused on how others perceive and rate leaders in terms of their style and effectiveness. In this study, our focus was on the ascendance into leadership roles/positions and not on whether the leaders were effective or ineffective, transformational or transactional and so forth. Future research now needs to link some of the key environmental experiences early in life to how leaders are viewed by others later in life controlling for such factors as personality and genetic predisposition.

Second, except for parental practices, because our variables were measured with a common method and source, it can be argued that common method and source bias are at least partially responsible for the results. Podsakoff, MacKenzie, Lee, & Podsakoff (2003) suggested several strategies for dealing with mono-method variance. In this study we selected two. First, we tested our measurement model using confirmatory factor analysis. Results indicated the fit indexes fitted our data well. Second, each wave of data collection was separated in time. For example, although rule breaking and family practices data were collected in the same year, they were collected at different times in the same year. In addition, the leadership role data were collected 5 years later. Podsakoff et al. (2003) argued that temporal separation reduces common source variance by allowing previously recalled information to leave short-term memory, reducing respondent's ability and motivation to use prior responses to answer subsequent questions. Taken together, these two design features add some degree of confidence to our conclusions.

Another limitation of this study was the sample being all male, and from a relatively homogeneous population in the United States—the state of Minnesota. Although the results have important managerial implications, future research needs to carefully consider whether the same logic and arguments apply to females as well. We believe that the same sort of modest rule breaking would affect women later in life in terms of emerging into leadership roles as men, however at present there is empirical justification to support this claim. Future research needs also to expand the sample to include a more diverse range of individuals including ethnicity and nationality.

Our focus on the environment, life experiences, and individual differences were limited to variables already available in this extensive longitudinal data base. Clearly, other measures of parenting style would be appropriate to include in future research (e.g., the extent to which the parents themselves are transformational in their parenting). Also, based on our current findings we are unable to fully explain why parenting style relates negatively to modest rule breaking, while modest rule breaking relates positively to leader role occupancy. However, it is important to note that parenting style does not explain 100% of the variation in either leadership roles or rule breaking. Hence, some individuals who experience authoritative parenting will also engage in some forms of rule breaking. But what is important to understanding our findings is that individuals who experience authoritative parenting and also engage in modest rule breaking find themselves in leadership roles. Future research will need to focus on whether children of such parents derive a different sense of meaning from making mistakes associated with modest rule breaking than children who experience a different style of parenting. It may be that going through such difficult experiences, may demonstrate to the individual that one is able to change in line with discussions in the literature regarding how some individuals adhere to an incremental versus entity theory perspective (Maurer, 2002). Specifically, the incremental theorist assumes that change can occur across one's life-span and is not fixed by one's traits.

We also need to do a better job of gauging what constitutes different forms of rule breaking, as well as broadening our scope to examine other challenges confronted early in life that goes beyond simple rule breaking behavior. Again, we were limited by the data that has been collected in this longitudinal study in the sense that the range of rule breaking observed may have been restricted to more negative incidents. With respect to linking our work to social learning theory, it would be useful in future research if measures of self efficacy can be obtained, as we made linkages between challenging life experiences, parenting and leadership role occupancy, but we were unable to obtain measures of the twin's level of self efficacy. We believe it would be very fruitful for future research to focus on what contributes to resilient self-efficacy and how such efficacy predicts leadership role occupancy and performance.

Finally, we only focused on a very narrow set of personality variables, although they have all been linked to leadership emergence and behavior in past research. Nevertheless, examining additional personality variables would help to give us an even clearer understanding of what events contribute to leadership emergence above and beyond personality predispositions.

In total, the accumulated research continues to bring us closer to understanding the antecedents of this important construct we call leadership. The present study contributes to this broad literature by focusing on those early life experiences that can potentially impact future leadership emergence and behavior, while controlling for heritability and personality. In that regard, the results have some implications for leadership research and development. Specifically, a pattern seems to be emerging in this literature and the current study, that reinforcing challenging thinking and behavior may not be all bad. Indeed, reinforcing challenging behavior coupled with supportive parenting may help accelerate the positive emergence and development of leadership potential and behavior. This line of thinking supports the notion that parents have a responsibility to not always make things clear and easy for children. Pushing them towards the boundaries of what they must consider right versus wrong, may prepare them for more difficult dilemmas they will no doubt have to confront later on in adulthood. Yet, it seems fair to say that we are very early in the game in terms of uncovering the crucial antecedents to leadership development and its emergence.

Acknowledgments

This research was supported in part by a grant to the second author from the Social Sciences and Humanities Research Council of Canada. We are deeply indebted for the support provided by Dr. Rich Arvey in helping us to secure the twins data from the University of Minnesota Psychology Department for this study, as well as his advice on earlier drafts and Dr. Zhen Zhang for his advice on our heritability analyses.

Appendix A

Sample items from the parenting practices, rule breaking, and leadership measures

Sample items

Parenting Practices—Involvement

I talked about my problems and experiences with this parent.

This parent comforted me when I was discouraged or had a disappointment.

This parent praised me when I did something well.

This parent tried to keep up on how well I was doing in school or in my job.

Parenting Practices—Structure

This parent wanted me above all to decide what was right and wrong and to do what was right.

This parent made it clear what he/she wanted me to do or not to do.

It was important to this parent that I should always obey the law.

This parent wanted me to get to bed at a certain time on school days.

Modest rule-breaking

Not counting a fight with your brother or sister, how often did you start fights to get something you wanted from someone or to get even with someone?

How many times did you tell a lie about someone in order to get them into trouble?
 How often have you broken something that belonged to another person just for fun?
 While living with your parents, how often did you defy your parents' authority?
 How often did you skip school without your parents' permission?

Serious rule-breaking

How often did you take something not belonging to you?
 Not counting a fight with your brother or sister, how often did you ever use or threaten to use a weapon to get something from someone?
 How often have you broken into someone else's locked car to take something from it?
 How many times did you buy marijuana or some other illegal drug?
 How many times were you picked up by the police?

Leadership Emergence

Have you held or do you hold a position in your work that is considered managerial or supervisory (e.g., work group leader, team leader, manager, director)?
 At work, how often do you tend to guide or direct others in group activities?

References

- Aiken, L. S., & West, S. G. (1991). *Multiple Regression: Testing and Interpreting Interactions*. Newbury Park, CA: Sage. In cases.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, *103*, 411–423.
- Arbuckle, J. L., & Wothke, W. (1999). *Amos 4.0 users guide*. Chicago: SmallWaters Corporation.
- Arvey, R. D., Rotundo, M., Johnson, W., Zhang, Z., & McGue, M. (2006). The determinants of leadership role occupancy: Genetic and personality factors. *The Leadership Quarterly*, *17*, 1–20.
- Arvey, R. D., Zhang, Z., Avolio, B. J., & Krueger, R. (2007). Understanding the developmental and genetic determinants of leadership among females. *Journal of Applied Psychology*, *92*, 693–706.
- Ashford, B., & Saks, A. M. (1996). Socialization tactics: Longitudinal effects on newcomer adjustment. *Academy of Management Journal*, *39*, 149–178.
- Avolio, B. J. (2005). *Leadership development in balance: Made/Born*. NJ: Erlbaum & Associates.
- Avolio, B. J., Gardner, W. L., Walumbwa, F. O., Luthans, F., & May, D. (2004). Unlocking the mask: A look at the process by which authentic leaders impact follower attitudes and behaviors. *The Leadership Quarterly*, *15*, 801–823.
- Avolio, B. J., & Gibbons, T. (1988). Developing transformational leaders: A life-span approach. In J. Conger & R. Kanungo (Eds.), *Charismatic leadership: The elusive factor in organizational effectiveness* (pp. 276–308). San Francisco, CA: Jossey-Bass.
- Bandura, A. (1986). *The social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (2008). An agentic perspective on positive psychology. In S. J. Lopez (Ed.), *Positive psychology: Exploring the best in people, Vol. 1* (pp. 167–196). Westport, CT: Greenwood Publishing.
- Bass, B. M. (1985). *Leadership and performance beyond expectations*. New York: Academic Press.
- Bass, B. M. (1990). *Bass and Stogdill's handbook of leadership*, (3rd ed.). New York: The Free Press.
- Bass, B. M. (1998). *Transformational leadership: Industry, military, and educational impact*. Mahwah, NJ: Lawrence Erlbaum.
- Baumrind, D. (1991). The influence of parenting style on adolescent competence and substance use. *Journal of Early Adolescence*, *11*, 56–95.
- Bennis, W. G., & Thomas, R. J. (2002). *Geeks and geezers: How era, values and defining moments shape leaders*. Boston, Mass.: Harvard Business School Press.
- Buckingham, M., & Coffman, C. (1999). *First, break all of the rules*. What the worlds greatest managers do differently New York: Simon & Schuster.
- Byrne, B. M. (2001). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Cairns, R. B., & Cairns, B. D. (1994). *Lifelines and risks*. Pathways of youth in our time England: Cambridge University Press.
- Campbell, D. P., Hyne, S. A., & Nilsen, D. L. (1992). *Manual for Campbell Interest and Skill Survey*. Minneapolis, MN: National Computer Systems, Inc.
- Capaldi, D. M., & Stoolmiller, M. (1999). Co-occurrence of conduct problems and depressive symptoms in early adolescent boys: Prediction to young-adult adjustment. *Development and Psychopathology*, *11*, 59–84.
- Caprara, G. V., Barbaranelli, C., Pastorelli, C., Bandura, A., & Cimbrado, P. G. (2000). Social foundations of children's academia achievement. *Psychological Science*, *11*, 306–310.
- Chan, K. -Y., & Drasgow, F. (2001). Toward a theory of individual differences and leadership: Understanding the motivation to lead. *Journal of Applied Psychology*, *86*, 481–498.
- Clark, D. B. (2004). The natural history of adolescent alcohol use disorders. *Addiction*, *99*(Suppl. 2), 5–22.
- Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin*, *113*, 487–496.
- Day, D. V., Sin, H., & Chen, T. T. (2004). Assessing the burdens of leadership: Effects of formal leadership roles on individual performance over time. *Personnel Psychology*, *57*, 573–605.
- Den Hartog, D. N., & Koopman, P. L. (2001). Leadership in organizations. In N. Anderson, D. S. Ones, H. K. Sinangil, & C. Viswesvaran (Eds.), *Handbook of industrial, work, and organizational psychology* vol. 2 (pp. 166–187). Thousand Oaks, CA: Sage.
- Eisenberg, N., Carol, G., Murphy, B., & Van Court, P. (1995). Prosocial development in late adolescence: A longitudinal study. *Child Development*, *66*, 1179–1197.
- Elkins, I. J., McGue, M., & Iacono, W. G. (1997). Genetic and environmental influences on parent–son relationships: Evidence for increasing genetic influence during adolescence. *Developmental Psychology*, *33*, 351–363.
- Furstenberg, F. F., Eccles, J., Elder, G. H., Jr., Cook, T., & Sameroff, A. (1999). *Adolescent development in urban communities: How families manage risk and opportunity*. Chicago, Ill.: University of Chicago Press.
- Gerard, J. M., & Buehler, C. (2004). Cumulative environmental risk and youth problem behavior. *Journal of Marriage and Family*, *66*, 702–720.
- Hindelang, M. J., Hirschi, T., & Weis, J. G. (1981). *Measuring delinquency*. Beverly Hills, CA: Sage.
- Ibarra, H. (2003). *Working identity: Unconventional strategies for reinventing your career*. Boston: Harvard Business School Press.
- Ilies, R., Gerhardt, M. W., & Le, H. (2004). Individual differences in leadership emergence: Integrating meta-analytic findings and behavioral genetics estimates. *International Journal of Selection and Assessment*, *12*, 207–219.
- Jessor, R., & Jessor, S. L. (1977). *Problem behavior and psychological development: A longitudinal study of youth*. New York: Academic Press.
- Judge, T. A., Bono, J. E., Ilies, R., & Gerhardt, M. W. (2002). Personality and leadership: A qualitative and quantitative review. *Journal of Applied Psychology*, *87*, 765–780.
- Kasser, T., Koestner, R., & Lekes, N. (2002). Early family experiences and adult values: A 26-year prospective longitudinal study. *Personality and Social Psychology Bulletin*, *28*, 826–835.
- Kegan, J. (1982). *The evolving self: Problems and process in human development*. Cambridge, MA: Harvard University Press.

- Kegan, J. (1994). *In over our heads: The mental demands of modern life*. Cambridge, MA: Harvard Business Press.
- Kirkpatrick, S. A., & Locke, E. A. (1991). Leadership: Do traits matter? *Academy of Management Executive*, 5, 48–60.
- Krueger, R. F., Hicks, B. M., & McGue, M. (2001). Altruism and antisocial behavior: Independent tendencies, unique personality correlated, distinct etiologies. *Psychological Science*, 12, 397–402.
- Lawford, H., Pratt, M. W., Hunsberger, B., & Pancer, S. M. (2005). Adolescent generativity: A longitudinal study of two possible contexts for learning concern for future generations. *Journal of Research on Adolescence*, 15, 261–273.
- Lykken, D. T., Bouchard, T. J., Jr., McGue, M., & Tellegen, A. (1990). The Minnesota Twin Family Registry: Some initial findings. *Acta Geneticae Medicae et Gemellologiae*, 39, 35–70.
- Martin, J. (1981). A longitudinal study of the consequences of early mother–infant interaction: A micro-analytic approach. *Monographs of the Society for Research in Child Development*, 46, 3.
- Maurer, T. (2002). Employee learning and developmental orientation: Toward an integrative model of involvement in continuous learning. *Human Resource Development Review*, 1, 9–44.
- McCauley, C. D. (2001). Leader training and development. In S. J. Zaccaro & R. J. Klimoski (Eds.), *The nature of organizational leadership* (pp. 347–382). San Francisco, CA: Jossey-Bass.
- McClelland, D. A. (1975). *Power: The inner experience*. New York: Irvington.
- McCord, J. (1986). Investigation and insulation: How families affect antisocial aggression. In D. Olweus, J. Block, & M. Radke-Yarrow (Eds.), *Development of antisocial and prosocial behavior: Research, theories and issue* (pp. 343–358). NY: Academic.
- McLeod, J. D., & Kaiser, K. (2004). Childhood emotional and behavioral problems and educational attainment. *American Sociological Review*, 69, 636–658.
- Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, 100, 674–701.
- Moxley, R. S. (1998). Hardships. In C. D. McCauley, R. S. Moxley, & E. Van Velsor (Eds.), *The center for creative leadership handbook of leadership development* (pp. 194–213). San Francisco, CA: Jossey-Bass.
- Mumford, M., & Connelly, M. S. (1991). Leaders as creators: Leader performance and problem-solving in ill-defined domains. *The Leadership Quarterly*, 2, 289–315.
- Mumford, M. D., & Stokes, G. S. (1992). Developmental determinants of individual action. In M. D. Dunnette, M. Leatta, & Hough (Eds.), *Handbook of industrial and organizational psychology* Vol. 3 (pp. 61–138). Palo Alto, CA: Consulting Psychologists Press.
- Mumford, M., Stokes, G. S., & Owens, W. A. (1990). *Patterns of life history: The ecology of human development*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Osborn, S. G., & West, D. J. (1978). The effectiveness of various predictors of career criminals. *Journal of Adolescence*, 1, 101–117.
- Parker, G., & Gladstone, G. L. (1996). Parental characteristics as influences on adjustment in adulthood. In G. R. Pierce, B. R. Sarason, & I. G. Sarason (Eds.), *Handbook of social support and the family* (pp. 193–218). New York: Plenum Press.
- Patterson, G. R. (1986). Performance models for antisocial boys. *American Psychologist*, 44, 432–444.
- Plomin, R., & Daniels, D. (1987). Why are children in the same family so different from each other? *Behavioral and Brain Sciences*, 10, 1–16.
- Plomin, R., DeFries, J. C., McClearn, G. E., & McGuffin, P. (2001). *Behavioral genetics* (4th ed.). New York: Worth Publishers.
- Podsakoff, P. M., MacKenzie, S. C., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88, 879–903.
- Pratt, M. W., Skoe, E. E., & Arnold, M. L. (2004). Care reasoning development and family socialization patterns in later adolescence: A longitudinal analysis. *International Journal of Behavioral Development*, 28, 139–147.
- Ramsey, E. (1989). *Generation of antisocial behavior in boys from home to school*. Unpublished manuscript, Oregon Social Learning Center, Eugene.
- Rest, J. (1979). *Development in judging moral issues*. Minneapolis, MN: University of Minnesota Press.
- Sameroff, A. J., Bartko, W. T., Baldwin, A., Baldwin, C., & Siefer, R. (1998). Family and social influence on the development of child competence. In M. Lewis & C. Feiring (Eds.), *Families, risk and competence* (pp. 161–185). Mahwah, NJ: Erlbaum.
- Schmitt-Rodermund, E. (2004). Pathways to successful entrepreneurship: Parenting, personality, early entrepreneurial competence, and interests. *Journal of Vocational Behavior*, 65, 498–518.
- Schneider, B., Paul, M. C., White, S. S., & Holcombe, K. M. (1999). Understanding high school student leaders, I: Predicting teacher ratings of leader behavior. *The Leadership Quarterly*, 10, 609–636.
- Socolar, R. R. S. (1997). A classification scheme for discipline: Type, mode of administration, context. *Aggressive and Violent Behavior*, 4, 355–364.
- Stahl, M. J. (1983). Achievement, power, and managerial motivation: Selective managerial talent with the job choice exercise. *Personnel Psychology*, 36, 775–789.
- Steinberg, L., Lamborn, S. D., Darling, N., Mounts, N. S., & Dornbusch, S. M. (1994). Over-time changes in adjustment and competence among adolescents from authoritative, authoritarian, indulgent, and neglectful families. *Child Development*, 64, 754–770.
- Stogdill, R. M. (1948). Personal factors associated with leadership: A survey of the literature. *Journal of Psychology*, 25, 35–71.
- Strange, A., & Brandt, T. S. (1999). Authoritative parenting and college students' academic adjustment and success. *Journal of Educational Psychology*, 91, 146–156.
- Taylor, J., McGue, M., & Iacono, W. G. (2000). Sex differences, assortative mating, and cultural transmission effects on adolescent delinquency: A twin family study. *Journal of Child Psychology and Psychiatry*, 41, 433–440.
- Tellegen, A. (1982). *Brief Manual for the Differential Personality Questionnaire*. Minneapolis: University of Minnesota.
- Willoughby, T., Chalmers, H., & Busseri, M. A. (2004). Where is the syndrome? Examining the co-occurrence among multiple problem behaviors in adolescence. *Journal of Consulting and Clinical Psychology*, 72, 1022–1037.
- Werner, E., & Smith, R. S. (1992). *Overcoming the odds: High risk children from birth to adulthood*. Ithaca, NY: Cornell University Press.
- White, J. (1982). *Rejection*. Reading, MA: Addison-Wesley.
- White, H. R., & Labouvie, E. W. (1994). Generality versus specificity of problem behavior: Psychological and financial differences. *Journal of Drug Issues*, 24, 55–75.
- Yukl, G. (2006). *Leadership in organizations* (6th ed.). Upper Saddle River, NJ: Prentice-Hall.
- Zhang, L., Welte, J. W., & Wieczorek, W. F. (2002). Underlying common factors of adolescent problem behaviors. *Criminal Justice Behavior*, 29, 161–182.