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Observed Parenting Behavior with Teens: Measurement Invariance and Predictive Validity Across Race

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Abstract

Previous reports supporting measurement equality between European American and African American families have often focused on self-reported risk factors or observed parent behavior with young children. This study examines equality of measurement of observer ratings of parenting behavior with adolescents during structured tasks; mean levels of observed parenting; and predictive validity of teen self-reports of antisocial behaviors and beliefs using a sample of 163 African American and 168 European American families. Multiple-group confirmatory factor analyses supported measurement invariance across ethnic groups for 4 measures of observed parenting behavior: prosocial rewards, psychological costs, antisocial rewards, and problem solving. Some mean-level differences were found: African American parents exhibited lower levels of prosocial rewards, higher levels of psychological costs, and lower problem solving when compared to European Americans. No significant mean difference was found in rewards for antisocial behavior. Multigroup structural equation models suggested comparable relationships across race (predictive validity) between parenting constructs and youth antisocial constructs (i.e., drug initiation, positive drug attitudes, antisocial attitudes, problem behaviors) in all but one of the tested relationships. This study adds to existing evidence that family-based interventions targeting parenting behaviors can be generalized to African American families.

Keywords

parenting; early adolescence; measurement equivalence; racial minority families; substance use; problem behavior

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Research underlying family-focused prevention programs has been conducted primarily with European American families (Amato & Fowler, 2002). To what extent do models established with European American families generalize to other racial/ethnic groups? From a methodological perspective, measurement equivalence, the degree to which a measure reflects the same construct across racial/ethnic groups, must be established before investigating whether there are group differences in the mean level of a construct, or whether there are group differences in the relationship between the construct and a hypothesized outcome (Raykov, 2004; Whiteside-Mansell, Bradley, Little, Corwyn, & Spiker, 2001). Without examining measurement equivalence across racial/ethnic groups, conclusions regarding similarities and differences in parenting and its relationship to child adjustment may be based on invalid measures (Harachi, Choi, Abbott, Catalano, & Bliesner, 2006; Whiteside-Mansell, Bradley, Little, Corwyn, & Spiker, 2001).

Multiple-group confirmatory factor analysis has been used to test measurement equivalence across groups (Cheung & Rensvold, 1999; Vandenberg & Lance, 2000). Noninvariance suggests that a measure does not reliably measure the same construct in both groups. Several levels of measurement invariance have been suggested (Bontempo, Hofer, & Lawrence, 2006; Vandenberg & Lance, 2000), but at the very least should include equivalence in factor loadings across groups. Within the field of prevention science, Gottfredson and colleagues (Gottfredson & Koper, 1996, 1997; Rosay, Gottfredson, Armstrong, & Harmon, 2000) have conducted a number of studies using latent variable structural techniques to assess measurement invariance as well as predictive relationships. In the first two studies (Gottfredson & Koper, 1996, 1997), results supported equivalence of nearly all of the measures of risk factors for drug use (e.g., school attachment, problem behaviors) between African American and European American adolescents. In a third study (Rosay, Gottfredson, Armstrong, & Harmon, 2000), the authors focused on the assessment of invariance of measures of prevention program effectiveness across five racial/ethnic groups (African American, Hispanic American, Asian American, American Indian, and European American). Half of the measures of risk and protective factors were equivalent across race; noninvariance arose typically because a measure was more reliable in the European American than the African American sample.

Measurement of specific parenting behaviors was not the focus of these studies although parenting behaviors are commonly targeted by family-focused prevention programs. Frequently we rely on parents' self-report of their behavior toward their children rather than observing their behavior directly. Third-party observations are considered the gold standard for measuring frequent daily interactions. Researchers argue that the paucity of observational measures validated for racial/ethnic minority families may have limited our understanding of family processes (McLoyd, Cauce, Takeuchi, & Wilson, 2000) which impact problem behaviors, those family processes central to interventions designed to reduce risk and increase protective factors for children and adolescents. However, it is essential that we demonstrate measurement equivalence across racial/ethnic groups before asserting there are or are not group differences in the frequency of particular behaviors or the magnitude of the impact of parent behaviors on child or adolescent outcomes.

The Social Development Model

The social development model (SDM) (Catalano & Hawkins, 1996) describes processes involved in the development of positive and problem behaviors, and identifies parallel but separate causal paths for prosocial and antisocial processes, with each path consisting of

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opportunities, involvement, rewards/costs, bonding, and beliefs. SDM family-focused interventions have targeted specific parenting behaviors as have other interventions. SDM-based interventions have demonstrated efficacy in the reduction of delinquency, drug use, and risky sexual behaviors (Haggerty, Skinner, Fleming, Gainey, & Catalano, 2008; Haggerty, Skinner, MacKenzie, & Catalano, 2007; Hawkins, 1999; Hawkins, Kosterman, Catalano, Hill, & Abbott, 2008; Lonczak, Abbott, Hawkins, Kosterman, & Catalano, 2000). Research has identified parent behaviors as major risk factors for and protective factors against youth antisocial development, especially noncompliant, disruptive behavior and substance use problems. In the SDM, the social developmental causal processes are not hypothesized to differ by demographic group, but rather, gender, ethnicity, and poverty are seen as affecting the opportunity structures (prosocial and antisocial) of children. For example, children in poverty or belonging to minority ethnic groups may have fewer prosocial opportunities and more antisocial opportunities, but the magnitude of the structural links between these opportunities and later developmental outcomes is hypothesized to be comparable across groups.

Tests of differences in the SDM by gender, race/ethnic, or income groups have found very little evidence for differences in the structural relations (Fleming, Catalano, Oxford, & Harachi, 2002; Skinner, Haggerty, & Catalano, 2009), lending some support to the model. However, further tests using invariant measures of parenting are still needed to better illustrate how race/ethnicity influences the social developmental process. For instance, African American parents may use certain culturally sanctioned parenting strategies more frequently than European American parents. They might include more guilt induction or directives without the need for explanations. Such behaviors should be reflected in mean differences in observable behaviors between parents and teens. Likewise the relationship between the key construct of rewards/costs (detailed below) and teen behavior may be different for African Americans than European Americans. If African American parents use important parenting behaviors more frequently, but the expected teen outcomes are not more frequent, then perhaps that is because the relationship between that parenting behavior and the teen outcome is not as strong for African Americans as European Americans. A randomized test of an SDM-inspired intervention designed to improve parent/teen relationships found the effects of the program were stronger among African Americans for some outcomes (Haggerty, Skinner, MacKenzie, & Catalano, 2007). What remains untested is the role of parenting behaviors in the link between the intervention and the outcomes.

Rewards and Costs in Parenting Behaviors

Rewards for prosocial behavior (prosocial rewards) include parental warm and affectionate responses to their teens' positive behaviors, as well as direct verbal agreement and endorsement. Dishion (2003) and others (Dorius, Bahr, Hoffman, & Harmon, 2004; Fletcher, Steinberg, & Williams-Wheeler, 2004; Melby, Conger, Conger, & Lorenz, 1993) have linked rewards for prosocial behavior to reduced youth antisocial behavior. A closely related set of parenting behaviors is the ability to do problem solving with their teen without hostility or protracted argument. Family problem-solving skills reduce the anger and hostility in the family and provide a more rewarding place for teens to grow and experiment. Frequently, skillful positive problem solving provides a reward to the teen for prosocial behaviors such as logical thinking, empathy, and calmly dealing with something painful or difficult. Like more direct rewards for prosocial behavior, problem-solving skills have been found to predict reduced youth antisocial behavior (Dishion, Burraston, & Li, 2003; Hops, Tildesley, Lichtenstein, Ary, & Sherman, 1990; Smetana, Crean, & Daddis, 2002).

Psychological costs include parent responses to child behavior that are critical, highly controlling, and hostile. Some studies have linked psychological costs to increased problem behaviors in both African American and European American children (McLoyd & Smith,

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2002; Whiteside-Mansell, Bradley, Tresch Owen, Randolph, & Cauce, 2003). In Whiteside-Mansell and colleagues' (2003) rare observational study of parenting in African American and European American mothers of 36-month-old children, findings supported measurement equivalence across race, and psychological costs were positively linked to behavior problems in both groups of preschoolers. The inclusion of psychological costs as a target in prevention programs for African American families is somewhat controversial. One study found physical discipline was related to antisocial behavior for European American children, but not for African American children (Deater-Deckard, Dodge, Bates, & Pettit, 1996). Some research suggests that African American parents tend to use more psychological costs than European Americans (C. R. Bradley, 1998; Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000). Other studies have demonstrated no mean differences across race (Hill & Bush, 2001; Whiteside-Mansell, Bradley, Tresch Owen, Randolph, & Cauce, 2003) or that differences may be explained by income (R. H. Bradley, Corwyn, Burchinal, McAdoo, & García Coll, 2001).

Rewards for antisocial behavior (antisocial rewards, i.e., parental under-responsiveness to or permissiveness of youth antisocial behavior) is a well-established risk factor for child and adolescent problem behaviors (National Institute of Mental Health, 2001; Patterson, Reid, & Dishion, 1992). A few studies have examined antisocial rewards in relation to child behavior problems in ethnic/racial minority families. Lindahl and Malik (2001) found a positive link between antisocial rewards and problem behaviors across European American and African American parents of school-aged children living in rural areas. Furthermore, there is some research that suggests that race moderates the relationship between antisocial rewards and substance use among adolescents. For example, Catalano and colleagues (1992) suggest that antisocial rewards are more consistently linked to substance use in European American than African American youth. However, no studies of the relationship between antisocial rewards and observed parenting in African American and European American families have been reported.

This study examines (a) equality of measurement using observer ratings of parenting behavior with adolescents during structured tasks, (b) race differences in mean levels of observed parenting, and (c) predictive validity of observed parenting to teen self-reports of antisocial behaviors and beliefs. The sample includes 163 African American and 168 European American families. We assessed four parenting constructs: prosocial rewards, psychological costs, antisocial rewards, and problem solving. Variables were measured using the Social Development Model-Observational Coding System (Spagnolo et al., 2002). First, we assessed measurement invariance in the four observed parenting constructs and teen-reported outcomes. Then we tested for mean-level differences and the degree to which relationships between parenting and youth outcomes were equivalent across racial/ethnic groups. We focus on teen antisocial behaviors and beliefs because they are frequently the target of family-based prevention efforts (Forehand & McMahon, 1981; Haggerty, Skinner, Fleming, Gainey, & Catalano, 2008).

Method

Procedures

Recruitment—Analyses were conducted on baseline data from a randomized trial of *Parents Who Care*, a universal substance abuse prevention program (Haggerty, MacKenzie, Skinner, Harachi, & Catalano, 2006; Haggerty, Skinner, MacKenzie, & Catalano, 2007). Families with eighth-grade students were recruited from Seattle schools. Interested families received information letters and phone calls. Forty-six percent of contacted families (55% of African Americans and 46% of European Americans) consented to participate during the home visit, a rate comparable to similar family studies (Spoth, Redmond, & Shin, 2001).

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The resulting sample consisted of 163 African American families and 168 European American families with a teen in the eighth grade.

Data collection—Data were collected in the families' homes. Parents and adolescents completed separate audio-computer-administered surveys. Prior to each family interaction task, a trained research assistant set up the video equipment, provided oral and written standardized instructions to each family, then left the room while the family completed the task. Upon completion of a warm-up task, the primary caregiver and the teen completed two structured interaction tasks: (a) a 10-minute problem-solving interaction, and (b) a 5-minute recognition task during which the parent and child complimented one another. Families received up to $100 for completing the research activities. The primary caregiver was identified by each family, and most primary caregivers were female (> 80%), with 71.6% being the adolescent's biological mother (see Table 1).

Measures

Demographic variables—Race was measured as African American (race = 1) or European American (race = 0). Assignment was based on school records of parent report of the student's race when enrolled in school. The study included students from only these two racial/ethnic groups and recruitment and blocking were based on this variable.

Social Development Model-Observational Rating System—The SDM Observational Rating System (Spagnolo et al., 2002) is tailored to measure constructs from the social development model (Catalano & Hawkins, 1996). In past studies, SDM constructs have been measured using survey methodology. Catalano and Hawkins (1996) noted the potential benefit of measuring SDM constructs using direct observations of interactions with important caregivers, and hypothesized that fine-grained analysis of family processes would further clarify how SDM processes impact children, parent-child interactions, and youth outcomes.

The protocols for the interaction tasks and SDM rating system were informed by a variety of previously developed family observation systems (Antony, Nelson, McMahon, & Conduct Problems Prevention Research Group, 1996; Crnic & Greenberg, 1990; Dishion et al., 1987; Eyberg & Robinson, 1983; Hops et al., 1990; McMahon & Estes, 1993; Melby et al., 1998; Rusby, Estes, & Dishion, 1991; Russell, Mize, & Saebel, 2001). Parents and teens were asked to spend 10 minutes in a warm-up activity discussing family expectations. In the problem-solving task, the teen was given a stack of 36 cards with common family problems and asked to select 2 that had come up recently. The dyad was asked to spend 10 minutes discussing the problem and possible solutions. In the recognition task, the parent and teen were asked to think of something they like about the other, or something the other does well, and discuss those things for 5 minutes. A set of cards with 18 suggestions was provided to stimulate recognition for families needing assistance. The digitally recorded video of the interaction was transferred to disk, and coded by trained raters.

Eighteen raters (5 men, 13 women; 28% African American, 66% European American, 6% Hispanic American) completed an average of 93 hours of training. As needed, raters completed additional training to attain acceptable inter-rater reliability and to prevent rater drift. Ratings were made using 5-point Likert scales (e.g., "parent was permissive or laissez faire" was rated: Not at All, A Little, Sometimes, Often, Very Often). This paper focuses on ratings of parenting behaviors and parent-teen problem solving (see Table 2). Average videotape rating time was 5.01 hours. Twenty percent of the videotapes were double-rated to check inter-rater reliability. Intraclass correlations indicated inter-rater agreement was high (ICC M = 88, range .68 to .97) (Lindahl, 2001; McGraw & Wong, 1996).

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Teen self-report items—Self-reported measures of youth drug initiation, problem behaviors, antisocial beliefs, and drug-related beliefs were obtained from computer-administered surveys completed by each adolescent. Drug initiation was measured with three dichotomous questions. All other items were measured on a 4-point Likert scale (YES! Yes, no, NO!).

Analysis—Prior to conducting the confirmatory factory analysis (CFA) models, items with extremely non-normal distribution (i.e., skew ≥ |3.0| or kurtosis ≥ 10.00) (Kline, 1998) in either racial sample were eliminated. In one case (Caregiver nagged the teen) the variable was collapsed into only 2 levels: (1) not at all, and (2) sometimes or more. All analyses were conducted in Mplus v. 3.11.

Missing data were handled with full information maximum likelihood estimation, which yields less biased parameter estimates for data assumed to be missing at random than mean substitution or listwise/pairwise deletion (Schafer & Graham, 2002).

Individual items were grouped into constructs a priori. Single-group confirmatory factor analysis assessed each factor, with individual observer-rated items as measured indicators of each latent variable. Items with nonsignificant factor loadings were removed from the model. Fit was assessed using the χ^2 goodness of fit index, the comparative fit index (CFI), and the standardized root mean square residual (SRMR) (Hu & Bentler, 1998). We used weighted root mean square residual (WRMR) instead of SRMR for models with categorical indicators (Hu & Bentler, 1999); weighted least-squares means-variance adjusted (WLSMV) (B. O. Muthén, du Toit, & Spisic, 1997) estimation; and DIFFTEST to estimate difference in χ^2 statistics (L. K. Muthén & Muthén, 1998–2004). Criteria for assessing model fit included: (a) p value of χ^2 (df) ≥ .05; (b) CFI ≥ .90; and (c) SRMR ≤ .08 or WRMR ≤ 1.00 (Hu & Bentler, 1999; McDonald & Ringo Ho, 2002; Vandenberg & Lance, 2000).

We used multiple-group CFA (MGCFA) to assess measurement equivalence across African American and European American families. Specifically, we compared the fit between models where loadings in the two samples were constrained to be equal to models where they were allowed to differ (unconstrained) using the likelihood ratio test (a χ^2 difference test) and by examining the change in the comparative fit index (Δ CFI). Chi-square difference tests yielding nonsignificant p-values ($p \geq .05$) were interpreted as support of measurement invariance (Bontempo, Hofer, & Lawrence, 2006). Since $\Delta \chi^2$ is more likely to yield erroneous support for invariance in small samples, differences in the Δ CFI, which is not influenced by sample size, were also used. Differences less than or equal to −.01 were interpreted as evidence of noninvariance (Cheung & Rensvold, 2002). Results of these tests are provided in Table 3.

We examined differences in the mean levels of each latent variable across ethnic group. The mean of one group was constrained to zero and values significantly different from zero in the other group indicated a significant difference in the mean of the latent variable across race.

Multiple-group structural equation modeling (MGSEM) (L. K. Muthén & Muthén, 1998–2004) was used to determine if the observed parenting constructs were more predictive of antisocial behaviors and beliefs among African American or European American youth. Models were analyzed in pairs so that differences in model fit could be assessed between constrained and unconstrained models using a χ^2 difference test, Δ CFI test, and fit indices. Model estimation methods, fit indices, and cutpoints were identical to those used in the CFA models.

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Results

Table 1 shows descriptive statistics for demographic and family variables, as well as the results of χ^2 and t-tests of significant race differences. The difference in child age was nonsignificant. Per capita income and parent education were significantly higher for the European American sample. African American youth were more likely to live in single-parent-headed households and to have a primary caregiver who was a non-maternal female relative such as an aunt or grandmother. Table 2 shows indicators for each latent parenting variable.

Factor Invariance

Individual items used as indicators of observed parenting constructs are listed in Table 2. Noninvariance was indicated for prosocial rewards and problem solving (see Table 3). In the case of prosocial rewards, the loading for 'Failed to respond to prosocial behavior or attitude' was negative and significant in both groups, but stronger for African American families. In the case of problem solving, the intercept (mean level holding the level of the latent variable constant) for "Caregiver and child enjoyed each other's company" was significantly higher for European American than African American families. Partially invariant models in which this single parameter was allowed to vary were estimated and found to fit better than fully invariant models but to fit equally well as fully noninvariant models. We consider these measurement models with a single differing parameter to be sufficiently equivalent across groups to compare means.

Mean Differences in Youth and Parenting Constructs

Analyses reveal that there are mean differences in three parenting constructs: prosocial rewards, psychological costs, and problem solving. Specifically, African American parents exhibited lower levels of prosocial rewards ($r = -.34$, $p < .001$), higher levels of psychological costs ($r = .46$, $p < .001$), and lower problem solving ($r = -.19$, $p < .01$) when compared to European Americans. MGCFA models were tested in which the mean is set to zero in the European American group and estimated in the African American group as the deviation from zero. These tests confirmed African American parents demonstrated significantly lower prosocial rewards and problem solving and significantly more psychological costs. No mean-level differences were found for antisocial rewards or for the youth variables of drug expectancies, drug initiation, and antisocial beliefs across African American and European American youth.

Relationships Between Parenting and Youth Constructs

Individual items used as indicators of youth constructs are listed in Table 2. Table 4 shows tests of model fit, race differences, and unstandardized path coefficients based on invariant models with one exception. As expected, prosocial rewards and problem-solving skills were associated with less drug initiation, antisocial beliefs, and problem behaviors. Also as expected, psychological costs and antisocial rewards were significantly associated with more drug initiation (see race difference noted below) and problem behaviors. Furthermore, antisocial rewards were associated with more antisocial beliefs. None of the observed parenting constructs were significantly associated with drug expectancies.

MGSEM results supported no race differences in relationships between prosocial rewards, psychological costs, and problem solving and youth measures of drug expectancies, drug initiation, antisocial beliefs, and problem behaviors. MGSEM supported no race differences in the relationships between antisocial rewards and three youth-reported measures: drug expectancies, antisocial beliefs, and problem behaviors. Race did moderate the relationship between antisocial rewards and drug initiation. Antisocial rewards were positively related to

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drug initiation among European American youth, but the association was nonsignificant among African American youth.

Discussion

Previously tested relationships between parenting behaviors and youth problems need to be validated in African American families using equivalent measures preferably based on observation rather than self-report. We validated observer ratings of parenting behavior during structured interaction tasks using a sample of African American and European American families of early adolescents. Two further questions were addressed: (a) Are there mean differences in the level of each latent construct across race? and (b) Are the relationships between the parenting and youth constructs comparable across race?

Are There Mean Differences in Constructs Across Race?

Parents of African American and European American youth showed comparable levels of antisocial rewards. However, parents in the African American sample demonstrated significantly higher psychological costs and significantly lower prosocial rewards and problem solving than did parents of European American youth. These results support previous research that found higher levels of psychological costs and related behaviors among African American parents than European Americans (C. R. Bradley, 1998; Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000). They lend some further evidence to the notion that there are culturally sanctioned parent behaviors that are used more frequently in some groups than in others. There are income disparities between ethnic groups in this study and we cannot rule out the possibility that group differences in the frequency of particular behaviors are due to differences in income. It is also possible that if observations were less structured, structured differently, or longer in duration, race differences would not be so apparent. The frequency of positive behaviors or evidence of positive regard which were lower in African American families might be specific to the way these observations were conducted. In particular, it could be that African American parents are less likely to display particularly positive emotions while being videotaped with their teen, a situation where they may feel it is important to show strength and control.

Are the Relationships Between Parenting and Youth Variables Comparable Across Race?

As predicted, both prosocial rewards and problem solving were related to less drug initiation, antisocial beliefs, and problem behaviors in both African American and European American youth. Psychological costs were positively and significantly linked to drug initiation and problem behaviors for both African American and European American youth in our sample. Antisocial rewards also increased antisocial beliefs and problem behaviors. We found evidence of only one instance of race moderation. The relationship between antisocial rewards and drug initiation was moderated by race. Although antisocial rewards were positively related to drug initiation for both groups, it was only significant for the European American youth, a finding which has been demonstrated with families with somewhat younger children (Cauce et al., 1992). These findings are consistent with other work which has assessed factorial and structural invariance using similar analytic techniques (Amato & Fowler, 2002; Whiteside-Mansell, Bradley, Tresch Owen, Randolph, & Cauce, 2003). However, previously reported race differences in the relationship between parent-reported discipline practices and teacher-rated behavior problems at school (Deater-Deckard, Dodge, Bates, & Pettit, 1996; Lansford, Deater-Deckard, Dodge, Bates, & Pettit, 2004) were not supported here. African American teens' reports of problem behaviors were positively related to psychological costs, which include harsher forms of discipline, and this relationship was not different than demonstrated in the European American portion of the sample.

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These results suggest more similarities than differences between African American and European American families in relationships between parent-teen interaction variables commonly targeted in preventive interventions and concurrent youth beliefs and behaviors. Overall, these findings support the inclusion of prosocial rewards, problem solving, antisocial rewards, and psychological costs as intervention targets in family-based programs designed to prevent drug initiation and problem behaviors. One interpretation of the moderated relationship between antisocial rewards and drug initiation might be that the emphasis on reducing antisocial rewards in African American families should be lessened in programs that focus narrowly on drug initiation. However, this argument is countered by the fact that antisocial rewards were linked to other beliefs and problem behaviors.

Strengths and Limitations

A major contribution of this study was the use of an observation system assessed for measurement equivalence across race prior to investigating mean differences or moderated effects. Our findings, based on observational measures, were generally comparable to other studies that use latent variable analyses. Our sample size, although large for an observational study, was inadequate to fully investigate contributions of demographic risk to our findings. Larger studies with longitudinal designs are needed to address this issue. The ethnic differences we found in mean levels of parenting variables may be due to differences in income or poverty level, and differences should be interpreted with some caution accordingly. Given the income and other demographic differences between racial/ethnic groups in this sample, it is encouraging that we did not find more instances of nonequivalence in measurement or predictive relationships.

Conclusions

This study sought to assess the degree to which traditional family-focused intervention targets generalize from European American to African American families. These targets were initially based on many studies, conducted over many decades, using both qualitative and quantitative methodologies. Family and intervention research has grown tremendously, both in terms of the number of researchers in the field as well the increased usability and sophistication of available research methodologies. We also continue to improve in other critical areas such as our ability to successfully engage and retain ethnic/racial minority families in research and to reduce barriers to access to evidence-based programs (Brody et al., 2004; Harachi, Choi, Abbott, Catalano, & Bliesner, 2006). Findings from the present study suggest that these family functioning measures can be assessed meaningfully across African American and European American groups. Mean-level differences suggest African American families might benefit from interventions that target these parenting behaviors. Although some racial/ethnic group differences did emerge in tests of the relationships between parent behavior and teen beliefs and behavior, in general the link between parenting and teen outcomes was confirmed. This study supports targeting family factors in preventive interventions for these two ethnic groups.

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Table 1

Descriptive Statistics: Demographics, Primary Caregivers, and Measured Youth Variables

Descriptor	Total		African American		European American	
Demographic variables	*M*	*SD*	*M*	*SD*	*M*	*SD*
Child age	13.67	.44	13.67	0.48	13.67	0.40
Per capita income[1]	15,042	14,932	7807	9390	21,970	15,958
Parent education[2]	4.28	1.51	3.45	1.18	5.07	1.36
Single parent (%)[3]	40.3%	-	56.4%	-	24.4%	-
Primary caregiver	*Total %*		*AA %*		*EA %*	
Biological mother	71.6%		68.1%		75.0%	
Biological father	17.8%		16.0%		19.6%	
Other mother	5.1%		6.7%		3.6%	
Other father	0.9%		0.6%		1.2%	
Other female relative[4]	3.9%		7.9%		0.0%	
Other male relative	0.6%		0.6%		0.6%	

[1] $F(1,322) = 93.46$, $p < .001$

[2] $F(1,327) = 131.54$, $p < .001$

[3] $\chi^2(1) = 35.95$, $p < .001$

[4] $\chi^2(1) = 13.95$, $p<.001$.

AA: African American; EA: European American

Parent education: 1 = less than high school; 2 = GED; 3 = high school diploma; 4 = Associate degree or trade school; 5 = Bachelors; 6 = Masters; 7 = JD, MD, or PhD

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Table 2

Measured Indicators of Latent Construct

Construct	Item description
Prosocial rewards (observed)	Demonstrated genuine warmth/caring toward teen
	Warm and encouraging of teen ideas/opinions
	Expressed positive about teen in response to prosocial behavior/attitude
	Responded to teen prosocial behavior/attitude with physical affection
	Failed to respond to prosocial behavior or attitude
	Reinforced/rewarded prosocial behavior/attitude
	Discounted teen opinions, ideas, or issues
Psychological costs (observed)	Caregiver was controlling
	Identified consequences for not following expectations
	Caregiver interrupted the teen
	Caregiver nagged the teen
Antisocial rewards (observed)	Permissive and laissez-faire
	Failed to respond to negative behavior/attitude
	Reinforced/rewarded negative behavior/attitude
	Discouraged negative behavior/attitude
Problem solving (observed)	There was common agreement about the problem Problem(s) were difficult for the family to solve
	Common agreement on the solution(s)
	Discussions were comfortable and flowed easily
	Overall quality of the dyad's relationship
	Caregiver and child enjoyed each other's company
Drug expectancies (teen report)	Do you think drinking beer, wine, or liquor is a way to make friends with other people?
	Do you think drinking alcohol makes people happier with themselves?
	Do you think drinking alcohol makes people worry less?
	Do you think smoking marijuana is a way to make friends with other people?
	Do you think it's easier to open up and talk about one's feelings after smoking some marijuana?
	Do you think smoking marijuana makes people happier with themselves?
	Do you think smoking marijuana makes people worry less?
	Do you think it's cool if someone drinks beer or other alcohol?
	Do you think it's cool if someone smokes cigarettes?
	Do you think it's cool if someone smokes marijuana?
Drug initiation (teen report)	Have you ever smoked a cigarette? Or used smokeless tobacco? (combined)
	Have you ever had any alcoholic beverages (beer, wine, hard liquor) to drink in your lifetime – more than just a few sips?
	Have you ever used marijuana? Or any other illegal drugs? (combined)
Antisocial beliefs (teen report)	Sometimes it is okay to cheat at school.
	Do you think it's okay to take something without asking if you can get away with it?
	Do you think it's okay to lie if it keeps your friends out of trouble?
	Do you think it's okay for someone your age to stay away from school all day when their parents think they are at school?
	Do you think it is okay for someone your age to have sex?

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Construct	Item description
	Do you think it is okay for someone your age to pick a fight with someone?
	Do you think it is okay for someone your age to steal something worth more than $5.00?
	Do you think it is okay for someone your age to attack someone with the idea of seriously hurting them?
Problem behaviors (teen report)	Do you talk a lot in class when you are not supposed to?
	Do you have trouble paying attention in class?
	I often do things that get me into trouble.
	I ignore rules that get in my way.
	I tell a lot of lies.
	I often take things that aren't mine and keep them.
	I sometimes break things on purpose.

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Table 3

Multiple-group Confirmatory Factor Analysis Tests of Measurement Invariance Across African American and European American Families

	Constrained vs. unconstrained	Constrained vs. partially invariant	Unconstrained vs. partially invariant	Final measurement model
Prosocial rewards	$\Delta \chi^2$ (12) = 27.84* Δ CFI = −0.01	$\Delta \chi^2$ (1) = 17.08* Δ CFI = −0.01	$\Delta \chi^2$ (11) = 10.76 Δ CFI = 0.00	χ^2 (35) = 28.75 CFI = 1.00, SRMR = .04[1]
Psychological costs	$\Delta \chi^2$ (4) = 6.97 Δ CFI = −0.05	N/A	N/A	χ^2 (6) = 10.03 CFI = 0.94, WRMR = .85
Antisocial rewards	$\Delta \chi^2$ (6) = 3.42 Δ CFI = 0.00	N/A	N/A	χ^2 (10) = 8.55 CFI = 1.0, SRMR = .02
Problem solving	$\Delta \chi^2$ (10) = 21. xx* Δ CFI = 0.00	$\Delta \chi^2$ (1) = 12.47** Δ CFI = 0.00	$\Delta \chi^2$ (9) = 8.53 Δ CFI = 0.00	χ^2 (21) = 22.51 CFI = 1.00, SRMR = .04[2]
Drug expectancies	$\Delta \chi^2$ (10) = 11.08 Δ CFI = 0.00	N/A	N/A	χ^2 (88) = 147.57 CFI = 0.97, SRMR = .07
Drug initiation	$\Delta \chi^2$ (1) = 1.42 Δ CFI = 0.00	N/A	N/A	χ^2 (2) = 1.81 CFI = 0.99, SRMR = .05
Antisocial beliefs	$\Delta \chi^2$ (5) = 6.32 Δ CFI = 0.00	N/A	N/A	χ^2 (48) = 67.30 CFI = 0.99, SRMR = .05
Problem behavior	$\Delta \chi^2$ (6) = 5.05 Δ CFI = 0.00	N/A	N/A	χ^2 (36) = 52.26 CFI = 0.97 SRMR = .05

* $p < .05$

[1] Loading for “Failed to respond to prosocial behavior or attitude” stronger for EA than AA. Loading is significant and negative for both groups.

[2] Intercept for “Caregiver and child enjoyed each other’s company” significantly higher for EA than AA.

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Table 4

Tests of Structural Invariance Across Race, Model Fit, and Path Coefficients Between Parenting and Youth Constructs

	Structural invariance tests		Model fit indices				
Youth variable	**Δ χ^2**	**Δ CFI**	**χ^2 (df)**	**CFI**	**WRMR/SRMR**		**Unstandardized path coefficient(s)**
Prosocial rewards							
Drug expectancies	0.05	.01	364.49 (274) **	0.97	-	.07	−0.03
Drug initiation	1.51	.00	34.08 (33)	1.00	0.91	-	−0.22 *
Antisocial beliefs	3.25	.00	215.66 (167) **	0.97	-	.07	−0.14 **
Problem behaviors	2.02	.00	188.27 (168)	0.99	-	.06	−0.18 ***
Psychological costs							
Drug expectancies	0.40	.01	56.84 (38) *	0.89	1.13	-	0.11
Drug initiation Alcohol	0.82	.00	27.78 (19)	0.98	1.06	-	0.40 **
Antisocial beliefs	1.67	.00	35.38 (31)	0.98	1.02	-	0.06
Problem behaviors	0.11	.01	58.27 (43)	0.94	1.13	-	0.28 **
Antisocial rewards							
Drug expectancies	0.02	.00	282.56 (183)	0.95	-	.08	0.16 *
Drug initiation	7.34 *	−.01 *	12.69 (17)	1.00	0.71	-	0.12 AA 1.12 ** EA
Antisocial beliefs	1.45	.00	85.28 (78)	0.99	-	.08	0.30 **
Problem behaviors	0.13	.00	126.6X (101) 1 *	0.96	-	.09	0.37 **
Problem solving							
Drug expectancies	0.01	.00	328.32 (237)	0.97	-	.07	−0.02
Drug initiation	0.88	.00	13.91 (21)	1.00	0.63	-	−0.28 **
Antisocial beliefs	3.63	.00	203.22 (140) ***	0.97	-	.05	−0.17 **
Problem behaviors	0.33	.00	159.14 (141)	0.99	-	.04	−0.19 ***

* $p < .05$;

** $p < .01$;

*** $p < .001$;

AA (African American sample) EA (European American sample)