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EXTERNALIZING

Participation Patterns among Mexican American Parents Enrolled in a Universal Intervention  
and their Association with Child Externalizing Outcomes

Participation Patterns among Mexican American Parents Enrolled in a Universal Preventive Intervention and their Association with Youth Externalizing Outcomes

Abstract

This study used growth mixture modeling to examine attendance trajectories among 292 Mexican American primary female caregivers enrolled in a universal preventive intervention and the effects of health beliefs, participation intentions, cultural influences, and intervention group cohesion on trajectory group membership as well as trajectory group differences on a distal outcome, immediate posttest teacher report of child externalizing (T2). Results supported four trajectory groups – Early Terminators (ET), Mid-Program Terminators (MPT), Low-Risk Persistent Attenders (LRPA), and High-Risk Persistent Attenders (HRPA). Compared with LRPA, caregivers classified as HRPA had weaker familism values, less parenting efficacy, and higher externalizing children with lower GPAs. Caregivers in the two persistent attender groups reported strong group cohesion and providers rated these caregivers as having strong participation intentions. Children of caregivers in the LRPA group had the lowest T2 child externalizing. Children of caregivers in the MPT group had lower T2 externalizing than did those of the ET group, suggesting partial intervention dosage can benefit families. Despite high levels of attendance, children of caregivers in the HRPA had the highest T2 externalizing, suggesting this high-risk group needed either more intensive services or a longer period for parents to implement program skills to evidence change in child externalizing.

Key words: Universal intervention, Mexican-American, parent participation, child externalizing

Preventive interventions that teach parents positive parenting skills and promote positive parent-child relationships have demonstrated efficacy in preventing a broad range of negative child and adolescent outcomes across different populations (NRC/IOM (2009). Unfortunately, poor participation rates significantly reduce the effect sizes and subsequent public health impact of efficacious interventions. In addition to seemingly poor outcomes, the target population's failure to participate may deter community settings from adopting efficacious interventions, threatening successful dissemination (Rogers, 2003).

Universal interventions that target all parents rather than parents of children already exhibiting problem behaviors may be particularly vulnerable to poor participation (Garvey, Julion, Fogg, Kratovil, & Gross, 2006). Despite evidence that parenting interventions protect against the onset of child mental health and substance abuse problems (NRC/IOM, 2009), parents whose children are not yet exhibiting problem behaviors may not perceive a need for services. This is unfortunate because 46% of U.S. youth may be diagnosed with a mental health disorder and 22% with a substance use problem by age 18 (Merikangas et. al., 2010), and prevention is much more cost-effective than treatment (McCollister & French, 2003).

Mexican-American (MA) children are disproportionately exposed to poverty and corresponding risk factors (Pew Hispanic Center, 2006); increasing their vulnerability to mental health and substance use disorders (U.S. Dept. of Ed., 2000). This vulnerability is particularly concerning given that ethnic minority parents participate in preventive interventions at even lower rates than do Caucasian parents (Nix, Bierman, & McMahon, 2009; Reyno & McGrath, 2006). Knowing what factors influence MA parents' participation in preventive interventions can inform development of evidence-based engagement strategies to increase participation and the public health impact of preventive interventions. However, few studies have examined predictors

that may be especially influential in predicting intervention attendance among Latino parents (e.g., Carpentier et al., 2007; Coatsworth, Duncan, Pantin, & Szapocznik, 2006a).

### **Examining Patterns of Attendance among Parents Enrolled in Preventive Interventions**

Most studies on parent attendance in preventive interventions have operationalized attendance as a dichotomous outcome (i.e., attended versus did not attend) or as the number of sessions attended (e.g., Carpentier et al., 2007; Winslow, Bonds, Wolchik, Sandler, & Braver, 2009; Prado, Pantin, Schwartz, Lupei, & Szapocznik, 2006). These operationalizations inform rate and frequency but fail to highlight patterns of attendance. Examining attendance patterns and their predictors can highlight when (e.g., early or mid-program) attendance is vulnerable to declines and what predicts these declines; this information can help identify which families need to be targeted when for incentives that maintain participation (e.g., personalized telephone call).

The few studies that have modeled attendance patterns used methods that do not account for unobserved heterogeneity in attendance across sessions and cannot model trajectories while also accounting for the influence of predictors on trajectories (e.g., Coatsworth, Duncan, Pantin, & Szapocznik, 2006b; Gorman-Smith et al., 2002). To address these limitations and also build on the limited research examining predictors of intervention participation among MA parents, the current study used growth mixture modeling (GMM; Muthen, 2002; Nagin 2005) to simultaneously model attendance patterns and examine predictors of patterns among MA parents enrolled in Bridges to High School (*Bridges*), a school-based universal intervention to prevent problem behaviors and academic disengagement following the middle school transition (Gonzales et al., 2012a). By estimating trajectories while also accounting for the influence of predictors, GMM increases the substantive understanding of variables that influence trajectories. Because GMM can also model associations between trajectories and distal outcomes, this also

builds on extant research by examining associations between attendance trajectories and child externalizing, a key *Bridges* outcome. A reasonable expectation is children of parents who attend less frequently will have worse outcomes than will children of parents who attend more frequently. However, consistent with treatment literature suggesting clients may prematurely end treatment because they are satisfied with progress (Howard, Lueger, Maling, & Martinovich, 1993), perhaps some parents stop attending because they observe positive behavioral changes in their child and feel they have reaped all potential intervention benefits.

### **Predictors of Attendance Trajectories**

Predictor selection was informed by the Health Beliefs Model (HBM; Janz & Becker, 1984), the Theory of Planned Behavior (TPB; Ajzen & Fishbein, 2000), and by research on the influence of culture (Carpentier et al., 2007; Prado et al., 2006) and group psychotherapy process (Burlingame, McClendon, & Alonso, 2011; Duncan, Miller, Wampold, & Hubble, 2010) on parent program participation.

**Health beliefs model.** The HBM is a widely used conceptual framework for research on predictors of intervention participation. According to the HBM, parent perceptions about child susceptibility to intervention-targeted problem behaviors and program benefits influence their participation. However, expected participation barriers temper the influence of problem susceptibility and intervention benefits on parent participation (Spath & Redmond, 1995).

***Child susceptibility to problem behaviors.*** Parents who perceive their child is susceptible to intervention-targeted problem behaviors may value that intervention more strongly and be more likely to participate (Spath & Redmond, 1995). Although some research shows parents of high-risk children enroll in preventive interventions at higher rates than do those of low-risk children (Winslow et al., 2009), other research shows high levels of child problem behaviors

challenge retention (Kazdin, Holland, Crowley, & Breton, 1997). The parent of a child with high levels of externalizing behaviors may be likely to enroll and attend initial sessions but also likely to end participation prematurely. In this study, parent report of child externalizing and school-reported child GPA were indices of child susceptibility to problem behaviors. These indicators are relevant to *Bridges*' focus to prevent academic failure and promote positive child behaviors.

***Parent perceptions of participation benefits.*** Because a key component of the *Bridges* program is parent skills training, parents who believe they lack parenting skills may expect to yield greater benefits from *Bridges* and thus be more likely to participate. Alternatively, parents who believe they already possess strong parenting skills may assess few benefits from participating and thus be less likely to participate (Perrino, Coatsworth, Briones, Pantin, & Szapocznik, 2001; Gorman-Smith et al., 2002). Accordingly, we examined the influence of parenting efficacy and parent self-report on two intervention-targeted parenting behaviors (monitoring and involvement in child's education) on attendance trajectories.

***Participation barriers.*** We examined the effects of two types of barriers to intervention participation: sociodemographic factors and parent stress and well-being.

***Sociodemographic barriers.*** Family income, parent education, and number of children in the home are three sociodemographic barriers to intervention attendance. Some research shows parents with less income and less education are at risk for premature termination (Coatsworth et al., 2006b; Reyno & McGrath 2006), but other studies do not support these associations (Garvey et al., 2006; Nix et al., 2009). Retention may also be lower among parents with many children compared to parents with fewer children due to childcare needs and parenting responsibilities.

***Parent stress and well-being.*** Although high levels of stress may motivate parents to enroll in services (Perrino et al., 2001), the demands of coping with multiple life stressors can be

a barrier to consistent attendance (Gorman-Smith et al., 2002). Depressed parents may experience greater difficulty participating in activities beyond daily necessities, so higher levels of parent depression could translate to less participation. When depressed parents do enroll in an intervention, they may be unable to maintain participation (Kazdin et al., 1997, Nix et al., 2009).

**Theory of Planned Behavior: Participation intentions.** According to TBP, intention to engage in a behavior is an immediate determinant of action (Ajzen & Fishbein, 2000). The TPB is a widely used conceptual framework to support links between intentions to participate in a health behavior and actual participation (Conner & Armitage, 1998). Similarly, parent intent to participate may predict actual program participation. Although extensive research links behavioral intentions to actual health behaviors, fewer studies have examined effects of parent intent to participate on actual intervention participation (e.g., Perrino et al., 2001).

**Cultural influences.** Cultural influences may also affect MA parents' participation. Although some research shows Latino parents are less likely to enroll and more likely to prematurely terminate services than Caucasian parents (McCabe, 2002), other research shows that when interventions are adapted to meet the needs of Latinos, parents participation rates are high (Carpentier et al., 2007). We modeled acculturation and familism values as indices of cultural influence on parents' participation in *Bridges*. Less acculturated parents may feel marginalized from mainstream US culture and experience negative attitudes toward mental health services, translating to lower enrollment rates and premature termination (McCabe, 2002). Familism includes an expectation that one should provide support to family members during emotionally challenging times (Knight et al., 2010). In this regard, MA parents may feel they are violating family expectations by seeking help outside the family. Alternatively, for programs such as *Bridges* that emphasize family cohesiveness, strong familism values may contribute to

participation. Moreover, consistent with the notion of biculturalism, participation rates may be highest among MA parents who are highly acculturated while having retained strong familism values (Gonzales, German, & Fabrett, 2012).

**Group psychotherapy process.** Although there is extensive support in psychotherapy research that treatment process influences engagement (for review see Duncan et. al., 2010), fewer studies have examined how participants' experiences of intervention process predict participation in preventive interventions. Group psychotherapy research suggests group process is pivotal to treatment engagement and client ratings of process more strongly influence outcomes than therapeutic techniques (Duncan et al., 2010). For group interventions, group cohesiveness is central to engagement and necessary for positive outcomes (Carpentier et al., 2007; Prado et al., 2006). Understanding how perceptions of the intervention experience relate to participation can inform adaptation of preventive interventions so they are responsive to the target population's needs and preferences (Castro, Barrera, & Martinez, 2004).

### **Study Hypotheses**

We hypothesized that our data would support multiple attendance trajectories and that these trajectories would be differentially associated with post-intervention teacher report of child externalizing. Specifically, we expected externalizing to be lower for children of mothers classified in trajectory groups representative of more frequent attendance. Because teachers were blind to what families were *Bridges'* participants, we assume expectancy effects did not bias teacher assessments. We also hypothesized that parents classified in trajectory groups with higher versus lower rates of attendance would: 1) rate their child higher on externalizing behaviors and have a child who does poor academically, 2) have poorer perceptions of their parenting abilities and as such perceive greater benefits from *Bridges*, 3) have fewer participation



barriers, 4) have stronger participation intentions, 5) be more acculturated but also have stronger familism values, and 6) report stronger intervention group cohesion.

## Method

### Participants

Participants were 292 primary female caregivers (FCG) from families recruited for the *Bridges*' randomized clinical trial (RCT) that were randomly assigned to the treatment condition and attended at least one session (Gonzales et al., 2012a). Of the 542 families in the RCT, 353 were assigned to treatment; 83% (292) of FCGs from these families attended 1 or more sessions. FCGs included biological and adoptive mothers (94%), stepmothers (2%), and other female caregivers (e.g., aunts; 4%). At pretest, ages ranged from 23 to 70 ( $M = 37.39$ ,  $SD = 6.67$ ); 62% were born in Mexico and 38% were born in the U.S. or another country. Forty-five percent had a GED or high school diploma; 17% had a 4-year college degree; and average household income was \$35,577. Adolescents participating in *Bridges* with FCGs were 51% female and 49% male; ages at pretest ranged from 11 to 14 ( $M = 12.36$ ;  $SD = .60$ ).

### Intervention: *Bridges to High School Program (Bridges)*

*Bridges* is a family-focused, skills-based universal intervention that reduces problem behaviors and academic disengagement following the middle school transition (Gonzales et al., 2012a). *Bridges*' design was guided by an ecodevelopmental framework (Szapocznik & Coatsworth, 1999) that recognizes youth need to adapt to multiple contexts (e.g., families, schools) and unique cultural factors (e.g., acculturation). *Bridges* has nine group sessions and two home visits (HVs), for 11 total sessions. HVs were sessions one (S1) and six (S6) during which providers met with caregivers and adolescents to identify and assess progress on intervention goals and problem solve attendance barriers. All other sessions were after school at

the child's middle school. We offered *Bridges* in English and Spanish and families chose the language of participation. Across four schools and three cohorts, there were 23 intervention groups (English,  $n = 11$ ; Spanish,  $n = 12$ ) and no school or cohort effects (Gonzales et al., 2012a).

## **Procedures**

We conducted in-home interviews with participants, after completing informed consent. Participants received \$30 for pretest (T1) and immediate posttest (T2) interviews. Providers documented attendance after each session and FCG participation intentions immediately after S1. Teachers completed paper-pencil questionnaires on child behavior; they received \$5 for each questionnaire. The Arizona State University Institutional Review Board approved all procedures.

## **Measures**

### **Predictors of attendance patterns.**

*Child susceptibility to problem behaviors.* Indices of child susceptibility included T1 FCG report of child externalizing and adolescents' 1<sup>st</sup> semester 7<sup>th</sup> grade GPA. We used the Externalizing Subscale of Child Behavior Checklist (CBCL; Achenbach, 1999; e.g., “[my child] breaks rules at home, school, or elsewhere”) to assess externalizing ( $\alpha = 0.90$ ). To compute average GPA, we transformed letter grades from four classes-Language Arts, Math, Social Studies, and Science-into numbers ranging from 13 (A+) to 1 (F).

*Parent perceptions of participation benefits.* Indicators of parent perceptions of participation benefits were T1 FCG self-report of parenting efficacy, parental monitoring, and involvement in child's education. Ten items from the Multicultural Inventory of Parenting Self-Efficacy (Dumka, Prost, & Barrera, 2002; e.g., “How good are you at praising and giving your child encouragement?”) with a 5-point scale from “1 = not good at all” to “5 = very good” assessed efficacy ( $\alpha = 0.88$ ). Seven items adapted from Small and Kerns' (1993) Parental

Monitoring scale (e.g., “I knew how my child was spending his/her time”) with a 5-point scale from “1= almost never or never” to “5=almost always or always” assessed monitoring ( $\alpha = 0.77$ ). Six items developed for the *Bridges* RCT (e.g., I asked my child what he/she did at school) and four items adapted from Gottfried, Fleming and Gottfried’s (1994) Extrinsic Motivation subscale of the Parent Motivational Practices Scale (e.g., “I helped my child get involved with extra programs or classes”) assessed FCG involvement in child’s education. The items represented intervention-targeted parenting practices (e.g., emphasis on school attendance and performance); FCGs reported if they had done each practice (0 = no, 1 = yes) in the past month ( $\alpha = 0.68$ ).

***Participation barriers.*** Participation barriers included sociodemographic factors and FCG self-report of stress and well-being at T1.

***Sociodemographic factors.*** We included: 1) family income, comprised of wages, child support, state and federal assistance, 2) number of biological as well as relative and non-relative children living in the same home as FCG, and 3) FCG self-reported education level.

***Stress and well-being.*** To assess stress, we adapted the Critical Events subscale of the Barriers to Treatment Participation Scale to compute a count of 18 stressful events (e.g. job loss, divorce) that had occurred in the past 12 months (Kazdin et al., 1997;  $\alpha = 0.65$ ). To assess FCG well-being, we used the Center for Epidemiologic Studies Depression Scale (Radloff, 1977), which has 20 items (e.g., “You were bothered by things that usually don’t bother you”) on a response scale from “1 = rarely or none of the time” to “4 = most or all of the time” ( $\alpha = 0.87$ ).

***Participation intentions.*** Immediately after the first home visit (S1), during which FCG’s participation goals, motivations, and intentions were discussed, providers responded to a single item using a 5-point Likert scale from “1 =not at all likely to participate” to “5 = very likely to participate” to provide a global rating of FCGs’ intent to participate in *Bridges*.

**Cultural influences.** Cultural influences included FCG's self-report on acculturation and familism values at T1. Acculturation was assessed with the 3-item 1Anglo Orientation subscale of the Acculturation Rating Scale for Mexican Americans-II (Cuellar, Arnold, Maldonado, 1995; e.g., "I enjoy listening to English language music") on a 5-point scale from "1 = not at all" to "5 = extremely often or almost always" ( $\alpha = 0.95$ ). We used the 14-item familism subscale of the Mexican American Cultural Values Scale to assess familism (Knight et al., 2010; e.g., "it is important family members show love and support to one another"). FCGs rated how much they believe each statement on a 5-point scale from "1 =not at all" to "5 = completely" ( $\alpha = 0.78$ ).

**Group cohesion.** At T2, FCGs completed a 6-item measure using a 5-point scale from "1 = not at all true" to "5 = very true" adapted from the Moos Group Environment Scale (1981; e.g., "there was a strong feeling of belongingness in this group";  $\alpha = 0.90$ ).

**Outcomes.** Attendance, the binary repeated observed outcome in the GMM, (attended = 1; did not attend = 0) was measured at 11 time points. The distal outcome, T2 teacher report of child externalizing, was a composite of two teachers' raw scores on the externalizing subscale of the Teacher Report Form (TRF; Achenbach, 1991; e.g., "doesn't seem to feel guilty after misbehaving";  $\alpha = 0.81$ ); a 2-teacher composite of T1 raw scores on the externalizing subscale was a covariate ( $\alpha = 0.71$ ). The teachers' scores correlated .48 (T1) and .59 (T2).

### **Data Analytic Method**

We used MPLUS 7.11 to conduct GMM to estimate attendance trajectories (Muthen & Muthen, 2013; Nagin, 2005). Like traditional growth modeling, GMM estimates latent growth factors (i.e., intercept and slope) to model trajectories of repeated observed outcomes; but GMM assumes unobserved heterogeneity in the population and models multiple trajectories with

unique intercepts and slopes to capture this heterogeneity. GMM classifies persons into trajectory groups based on posterior probabilities of assignment to each group.

We estimated models with varying numbers of trajectory groups (i.e., classes) beginning with a 1-class model that successively increased by one to a 5-class model. For each k-class model, we estimated a model with intercept and linear slope factors and then compared the linear model to a model with an added quadratic slope factor. GMM proceeded in 2 phases. In phase 1, we ran 7 GMMs to determine the most robust indicator from each group of conceptually related predictors: (1) child susceptibility to problem behaviors, (2) program participation benefits, (3) sociodemographic participation barriers, (4) FCG stress and well-being, (5) FCG participation intentions, (6) cultural influences, and (7) group cohesion. We included the distal outcome in these models, controlling for T1 scores. In phase 2, we estimated a final model that included all the phase 1 significant predictors to assess the unique association between these predictors and class membership, while also testing between-class differences on the distal outcome. We used the model constraint and model test procedures in Mplus to examine between-class differences on the distal outcome. First, we constrained outcome scores to be equal across all classes to conduct an omnibus test. A significant Wald test ( $p < .05$ ) indicates significant differences on the outcome between classes and warrants conducting follow-up tests to examine all pairwise comparisons by constraining every pair of means to be equal. Data on the distal outcome, T2 teacher report of child externalizing, were missing for 4% of the sample; we used full information maximum likelihood estimation to adjust for missing data (Enders & Bandalos, 2001). We adjusted standard errors to account for participant clustering in intervention groups.

To avoid local maximum solutions, we generated 500 sets of random starting values for the initial stage and specified 50 optimizations for the final stage of maximum likelihood

optimizations. We determined the optimal number of classes using: 1) Log likelihood (LL) values, 2) the sample-adjusted Bayesian Information Criterion (SABIC; Sclove, 1987), 3) the adjusted Lo Mendell Rubin Likelihood Ratio Test (LMR LRT; Lo, Mendell, & Rubin, 2001) and 4) substantive usefulness (Nagin, 2005). Decreasing LL and SABIC values with the addition of classes indicate that adding classes improve model fit. The adjusted LMR LRT is a nested model test to assess if the specified model is better than a model with one-less class. A *p*-value less than 0.05 indicates the null hypothesis, that the restricted model with *k*-1 classes fits the data as well as the model with *k* classes, can be rejected and the specified model better represents the data. Substantive usefulness also informed model selection. If the *k*-class and *k*-1 class models did not differ in substantive meaning, we selected the more parsimonious solution with *k*-1 classes.

## Results

### GMM: Phase 1 Analyses

We chose the 4-class solution with the quadratic slope factor. The classes were: 1) Early Terminators (ET), 2) Mid-program Terminators (MPT), 3) Low-Risk Persistent Attenders (LRPA), and 4) High-risk Persistent Attenders (HRPA; see Figure 1, graphs 1-7). For all models, the LMR LRT *p* value was not significant but the LL and SABIC was lowest for the 4-class solution with the quadratic slope factor (see Table 1). The HRPA class also scored significantly higher than the LRPA class on T2 teacher report of externalizing (see Figure 1, graphs 1-7); this conceptually meaningful difference between the two high-attending groups supported the 4-class solution. Class posterior probabilities ranged from .84-.99. The 5-class solution did not converge or the LL was not replicable, despite using 1000 sets of random starting values.

Table 2 presents the associations between predictors and membership in the four classes. FCGs in the MPT and HRPA classes rated their children higher on T1 externalizing than did FCGs in

the ET class, and FCGs in the LRPA class rated their children lower on T1 externalizing than did FCGs in the MPT and HRPA classes. The children of FCGs in the LRPA class had the highest T1 GPAs of all four classes. The LRPA class had more parenting efficacy than the ET and HRPA classes, and involvement in child's education was marginally higher for the HRPA class compared with the MPT class. Sociodemographic barriers had no effects on class membership; the MPT class was more depressed than the HRPA and ET (marginal) classes. The HRPA class had stronger participation intentions than the ET and MPT classes; intentions of the LRPA class were marginally stronger than the MPT class. The LRPA class had stronger familism values than the HRPA and MPT (marginal) classes. FCGs in the MPT, LRPA, and HRPA classes reported more group cohesion than the ET class, and cohesion distinguished the LRPA and HRPA classes from the MPT class.

### **GMM: Phase 2 Analyses**

Phase 2 results supported the ET, MPT, LRPA, and HRPA classes (see Figure 1, phase 2 graph). Posterior probabilities for the ET, MPT, LRPA, and HRPA classes were .92, .92, .96, and .87, respectively. The ET class was less likely to attend S1 than the HRPA ( $t = -3.21, p < .001$ ) and LRPA ( $t = -1.96, p < .05$ ) classes and initiated a rapid decline in attendance in early sessions, with probability of attendance at 5% by S6. Attendance for the MPT class was strong in early sessions but initiated a steep decline mid-program and was only 2% by S11. The MPT class had less probability of attendance S1 than the LRPA ( $t = -3.14, p < .001$ ) and HRPA ( $t = -8.88, p < .001$ ) classes. S1 probability of attendance did not differ for the LRPA and HRPA classes.

Table 3 presents associations between trajectory group membership and each significant Phase 1 predictor, after accounting for other predictors in the model. The LRPA class reported less T1 child externalizing than the MPT and HRPA classes, stronger familism values than the

ET and MPT classes, and children of FCGs in the LRPA class had higher GPAs than all other classes. FCGs in the MPT class were more depressed than were FCGs in the HRP class. Stronger participation intentions predicted LRPA and HRP class membership, compared with the ET and MPT classes. The ET class reported less intervention group cohesion than other classes; the MPT class reported less cohesion than the LRPA and HRP classes. Parenting efficacy and involvement in child's education were unassociated with class membership.

T2 teacher report of child externalizing, after controlling for T1, for the ET, MPT, LRPA, and HRP classes was 2.691, 0.915, 0.410, and 5.701, respectively, and the omnibus Wald chi-square supported between-class differences ( $\chi^2(3) = 32.553, p < .001$ ; see Figure 2). Wald chi-square tests examining all pairwise comparisons showed that T2 teacher report of child externalizing for the LRPA class was lower than the MPT ( $\chi^2(1) = 4.602, p < .05$ ), ET ( $\chi^2(1) = 5.145, p < .05$ ) and HRP classes ( $\chi^2(1) = 15.498, p < .001$ ). The MPT class was lower than the HRP ( $\chi^2(1) = 11.362, p < .001$ ) and marginally lower than the ET classes ( $\chi^2(1) = 3.388, p < .10$ ). The ET and HRP classes did not differ on the distal outcome.

### Discussion

This study used growth mixture modeling (Muthen, 2002; Nagin 2005) to examine attendance trajectories among MA primary female caregivers enrolled in a universal preventive intervention. Latent methodologies such as GMM that estimate unobserved heterogeneity as multiple, unique trajectories can inform expectations about differential intervention responses and provide a better representation of the target population's adoption of a program. Because latent methodologies minimize measurement error, tests of predictor effects on participation are also more robust than when attendance is modeled as an observed outcome. Illustratively, in a previous study with this study's sample in which authors modeled attendance as the number of



sessions attended, parent ratings of child externalizing were unrelated to attendance (Carpentier et al., 2007); in this study, parent ratings of externalizing were a strong predictor of attendance.

**Predictor effects on attendance trajectories.** Except sociodemographic participation barriers, all predictor constructs were associated with attendance trajectories. Results showed mixed support for the Health Belief Model (HBM). Results that caregivers who terminated *Bridges* very early (ET) perceived their child to have less externalizing symptoms than the MPT and HRPA classes is consistent with the HBM that child susceptibility to problem behaviors motivates participation. However, inconsistent with the HBM, results show caregivers that terminated mid-program reported higher child externalizing at pretest than did one persistent attender group (LRPA). Findings regarding the effects of participation barriers on attendance also provided mixed support for the HBM. For example, results that caregivers in the MPT class were more likely to be depressed than those in the HRPA class were consistent with the HBM supposition that poor parent emotional health can be a barrier to participation; but the finding that the ET class was less depressed than the MPT class is inconsistent with the HBM.

The finding that familism predicted membership in the LRPA class shows that culture-related factors affect parent engagement. Our finding was not surprising given that *Bridges* emphasizes family as a source of strength to help children succeed, which may have been appealing to caregivers with strong familism values and a powerful motivation to maintain engagement. We also expected more acculturated caregivers to participate at higher rates due to more accepting values about receiving services. Perhaps our data did not support this hypothesis because *Bridges* was developed and adapted through an iterative process of piloting and redesign to ensure the program was congruent with the values and preferences of Mexican American families (Gonzales et al., 2012a). We included both familism and acculturation in the model

because we expected that parents in trajectory groups with higher rates of attendance would be highly acculturated but also have stronger familism values. This hypothesis is consistent with biculturalism, in which persons acculturate to mainstream culture while retaining the positive, protective factors of their traditional culture (Gonzales et al., 2012b). Future research should include measures of biculturalism to test directly the effects of biculturalism on participation.

Provider ratings of caregivers' participation intentions distinguished the ET from the two high-attending groups. This finding has important implications; it suggests providers are able to identify participants vulnerable to premature termination to target for reminder calls and other motivational engagement strategies. Intervention group cohesion was positively associated with attendance. However, because we assessed cohesion at T2, it is impossible to discern if cohesion preceded attendance or attendance preceded cohesion. Because participants who attended more sessions had more opportunities to connect with group members, differences in cohesion are potentially attributable to attendance rather than vice versa. Albeit, the MPT class attended consistently through session five, providing substantial opportunities for connection among group members, but still reported less cohesion than did both persistent attenders groups.

#### **Caregiver attendance trajectories and post-intervention child externalizing.**

Trajectory group differences on the distal outcome demonstrate timing of parent dropout has implications for child outcomes (see Figure 2). Based on teacher reports of child externalizing, the children of caregivers who dropped out early had more externalizing symptoms post-intervention than did the children of caregivers in the MPT class, suggesting even partial intervention dosage may yield benefits for families. The result that one of two persistent attender groups had the lowest score on T2 teacher-reported externalizing also supports a dose-response association. However, scores on externalizing for the other group of persistent attenders were

higher than the group that terminated mid-program. These results are consistent with psychotherapy research suggesting that the dose-response relationship is not always uniform or linear. Different persons yield different benefits, despite receiving the same dose, and some persons show improvement with a small dose, whereas others require a stronger dose (Baldwin et al., 2009). Benefits from a universal preventive intervention are likely contingent on pre-intervention symptomatology; more symptomatic children may require services beyond a universal intervention, despite high levels of caregiver participation. Results that the children of caregivers in the HRPAs class had lower GPAs and more externalizing symptoms pre-intervention suggest these children were more symptomatic than those of caregivers in other classes. Perhaps the HRPAs' strong participation intentions were due to the accurate perception their child was at-risk for the intervention-targeted problem behaviors. High ratings of intervention group cohesion suggest support from group members and the provider perhaps motivated continued participation for the HRPAs group. Their *Bridges* experience may foster positive attitudes towards mental health services and motivate caregivers in the HRPAs group, who may be reluctant to use mental health services for cultural reasons (McCabe, 2002), to enroll their child in the additional treatment.

**Limitations and future research.** Attendance assessed in the context of an efficacy trial may limit generalizability to real-world delivery settings. In the *Bridges* efficacy trial, childcare, transportation, and weekly reminder calls were used to maximize participation; attendance patterns when the program goes-to-scale may not parallel those found in the efficacy trial, given these strategies will not be maintained. Moreover, the insignificant effects of sociodemographic barriers may be attributable to the provision of childcare and transportation, which minimizes the effects of such barriers. This study should be replicated in the context of a real-world delivery

setting. This study should also be replicated with a larger sample. Additional differentiation of trajectory groups could emerge with a larger sample. For example, a larger sample may support further differentiation of the ET group into two groups distinguished by high and low scores on the distal outcome, similar to the persistent attenders. Conclusions about the effect of group cohesion on attendance trajectories are limited given the assessment of cohesion did not temporally precede attendance assessments. Future research should collect time series data on cohesion and other group processes to link group processes to attendance more conclusively.

**Conclusions.** This study offers insight on how to motivate increased retention of minority populations who are disproportionately at risk for mental health and substance use disorders (U.S. Dept. of Ed., 2000). Knowing when parents are vulnerable to premature termination and what predicts this vulnerability can inform the timing of engagement strategies. Incentivizing participation precisely when parents are vulnerable to drop out is a more efficient use of resources, than targeting all parents at multiple points throughout the intervention. Information about what families are likely to terminate lengthier programs prematurely can also help prioritize family referral to modules or sessions they most need. This study's results also emphasize the importance of including pretreatment variables that influence dose as covariates in intervention outcome analyses to minimize the effects of selection bias and related distortion of intervention effects (McGowan et al, 2010). The results of this study also suggest that parent's mental health may affect dosage and thus outcomes. Offering information about mental health resources and facilitating referral to resources may improve parent engagement. Informing parents that parenting interventions targeting youth outcomes can also decrease parents' depressive symptoms (Wong, Gonzales, Montano, Dumka, & Millsap, 2014) could also motivate engagement among parents vulnerable to drop out due to their own depression.

Table 1.

*Fit Indices for growth mixture models estimating attendance trajectories of Primary Female Caregivers (FCGs) attending the Bridges to High School program with 1- 4 trajectory groups and linear and slope quadratic factors.*

Model	No of Classes	Linear LL	Quadratic LL	Linear SABIC	Quadratic SABIC	Linear Adjusted LMR LRT,	Quadratic Adjusted LMR LRT, <i>p</i>
1. Child susceptibility	1	-4507.05	-4486.54	9036.65	8998.13	n/a	n/a
	2	-2360.49	-2348.59	4753.56	4734.76	908.14, <i>p</i> < .01	893.44, <i>p</i> < .01
	3	-2239.84	-2225.41	4532.30	4510.95	236.10, <i>p</i> < .05	241.62, <i>p</i> < .05
	4	-2183.06	-2161.91	4438.77	4406.49	111.12, <i>p</i> = .29	124.57, <i>p</i> = .27
2. Participation benefits	1	-4123.40	-4102.89	8274.36	8235.85	n/a	n/a
	2	-2361.98	-2350.14	4759.04	4740.37	907.39, <i>p</i> < .01	892.01, <i>p</i> < .01
	3	-2262.25	-2246.19	4582.13	4557.52	195.63, <i>p</i> = .10	204.31, <i>p</i> = .07
	4	-2194.59	-2183.89	4469.37	4457.98	132.95, <i>p</i> = .24	132.71, <i>p</i> = .20
3. Sociodemographic participation barriers	1	-4760.95	-4740.44	9549.467	9510.95	n/a	n/a
	2	-2363.35	-2351.63	4761.780	4743.34	904.711, <i>p</i> < .01	889.186, <i>p</i> < .01
	3	-2267.33	-2251.40	4592.286	4567.95	188.357, <i>p</i> = .16	196.972, <i>p</i> < .01
	4	-2212.611	-2187.88	4505.39	4465.96	107.336, <i>p</i> = .17	124.843, <i>p</i> = .43
4. Stress and well-being	1	-4563.47	-4542.96	9149.49	9110.97	n/a	n/a
	2	-2362.73	-2350.91	758.03	4739.41	903.76, <i>p</i> < .01	888.89, <i>p</i> < .01
	3	-2266.69	-2250.73	4586.00	4561.59	187.93, <i>p</i> = .10	196.21, <i>p</i> = .05
	4	-2208.14	-2187.05	4488.94	4456.78	114.58, <i>p</i> = .25	124.91, <i>p</i> = .25
5. Participation intentions	1	-3344.85	-3324.34	6707.25	6668.73	n/a	n/a
	2	-2359.58	-2347.67	4749.23	4730.41	907.12, <i>p</i> < .01	893.10, <i>p</i> < .01
	3	-2263.52	-2247.38	4574.64	4549.89	187.14, <i>p</i> = .13	196.24, <i>p</i> = .21
	4	-2204.74	-2183.29	4474.63	4441.75	119.77, <i>p</i> = .15	125.42, <i>p</i> = .27
6. Cultural influences	1	-3467.83	-3447.32	6958.21	6919.69	n/a	n/a
	2	-2362.07	-2350.12	4756.70	4737.82	905.06, <i>p</i> < .01	890.43, <i>p</i> < .01
	3	-2264.59	-2248.66	4581.80	4557.45	190.75, <i>p</i> = .09	199.03, <i>p</i> = .05
	4	-2203.03	-2185.99	4478.72	4454.68	120.46, <i>p</i> = .34	122.91, <i>p</i> = .46
7. Intervention group cohesion	1	-3398.23	-3377.72	6814.01	6775.49	n/a	n/a
	2	-2328.46	-2316.69	4687.00	4668.46	967.83, <i>p</i> < .01	953.71, <i>p</i> < .01
	3	-2232.53	-2217.16	4512.65	4489.45	187.16, <i>p</i> < .05	194.77, <i>p</i> = .05
	4	-2175.27	-2154.15	4415.69	4383.46	112.55, <i>p</i> = .21	123.32, <i>p</i> = .19

*Note.* LL = Log Likelihood; SABIC = Sample-adjusted Bayesian Information Criterion; LMR LRT = Lo-Mendell-Rueben Likelihood Ratio Test. We fit 5-group models but the 5-group solution did not converge for any of the seven models or we could not replicate the LL, despite using 1000 sets of random starting values.

Table 2.

Logistic coefficients (Logits) and Odds Ratio(OR) representing associations between predictors and trajectory group membership in phase 1 models.

	Class	ET Referent Class				MPT Referent Class				LRPA Referent Class					
		Logit	SE	t	OR	Logit	SE	t	OR	Logit	SE	t	OR		
1. Child Susceptibility	T1FCG Report of Child Externalizing	MPT	0.056*	0.025	2.287	1.058									
		LRPA	-0.020	0.029	-0.778	0.980	-0.080***	0.026	-3.01	0.923					
	Child 7 <sup>th</sup> Grade 1 <sup>st</sup> Semester GPA Reported by School	HRPA	0.056*	0.025	2.193	1.058	0.001	0.029	0.009	1.000	0.078*	0.031	2.483	1.081	
		MPT	0.139	0.122	1.140	1.149									
		LRPA	0.400***	0.115	3.51	1.492	0.270**	0.103	2.581	1.310					
		HRPA	-0.012	0.094	-0.125	0.988	-0.151†	0.083	-1.810	0.860	-0.415***	0.095	-4.380	0.660	
		<hr/>													
		2. Participation Benefits	T1 FCG Self-Report of Parenting Efficacy	MPT	0.090	0.420	0.200	1.094							
LRPA	0.900*			0.460	1.960	2.460	0.810	0.590	1.390	2.248					
HRPA	-0.330			0.410	-0.810	0.719	-0.420	0.310	1.360	0.657	-1.230*	0.510	-2.430	0.292	
T1 FCG Self-Report of Monitoring	MPT		-0.290	0.500	-0.590	0.748									
	LRPA		-0.500	0.500	-1.230	0.607	-0.200	0.390	-0.510	0.819					
	HRPA		-0.060	0.460	-0.140	0.942	0.230	0.350	0.660	1.259	0.430	0.320	1.340	1.537	
T1 FCG Self-Report of Involvement In Their Child's Education	MPT		-0.060	0.100	-0.620	0.942									
	LRPA		-0.070	0.100	-0.630	0.932	-0.020	0.100	-0.020	0.980					
	HRPA		0.090	0.090	1.020	1.094	0.160†	0.090	1.730	1.174	0.160	0.080	1.970	1.174	
<hr/>															
3. Sociodemographic Barriers	T1 FCG Report of Family Income		MPT	0.068	0.183	0.373	1.070								
			LRPA	0.135	0.180	0.749	1.145	0.067	0.130	0.513	1.069				
		HRPA	0.036	0.128	0.279	1.037	-0.032	0.099	-0.329	0.969	-0.099	0.111	-0.893	0.906	
	T1 FCG Report of Number Of Children In The Home	MPT	-0.014	0.111	-0.125	0.986									
		LRPA	-0.174	0.169	-1.033	0.840	-0.160	0.189	-0.846	0.852					
		HRPA	-0.066	0.109	-0.604	0.936	-0.052	0.128	-0.404	0.949	0.108	0.193	0.562	1.114	
	T1 FCG Self-Report of Education Level	MPT	-0.076	0.099	-0.770	0.927									
		LRPA	-0.075	0.077	-0.973	0.928	0.001	0.069	0.020	1.001					
		HRPA	-0.052	0.070	-0.751	0.949	0.024	0.060	0.394	1.024	0.022	0.055	0.408	1.022	
	<hr/>														
	4. Stress And Well-Being	T1 FCG Self-Report of Depression	MPT	0.040†	0.020	1.740	1.041								
			LRPA	0.010	0.020	0.610	1.010	-0.030	0.020	-1.450	0.970				
HRPA			0.010	0.020	0.230	1.010	-0.030**	0.010	-2.600	0.970	-0.010	0.020	-0.470	0.990	
T1 FCG Self-Report of Stressful Events In Past 12 Months		MPT	-0.090	0.120	-0.810	0.914									
		LRPA	-0.060	0.080	-0.780	0.942	0.040	0.110	0.340	1.041					
		HRPA	-0.120	0.090	-1.260	0.887	-0.020	0.070	-0.260	0.980	-0.060	0.080	-0.730	0.942	
<hr/>															
5. Provider Report of FCG Participation Intentions <sup>1</sup>		MPT	-0.080	0.190	-0.420	0.923									
	LRPA	0.250	0.150	1.620	1.284	0.330†	0.190	1.760	1.391						
	HRPA	0.390**	0.150	2.580	1.477	0.470*	0.200	2.360	1.600	0.150	0.180	0.810	1.162		
<hr/>															
6. Cultural Influences	T1 FCG Self-Report of Acculturation	MPT	-0.110	0.380	0.300	0.896									
		LRPA	-0.200	0.270	-0.720	0.819	-0.080	0.270	-0.300	0.923					
		HRPA	-0.220	0.280	-0.780	0.803	-0.110	0.160	-0.650	0.896	-0.020	0.200	-0.120	0.980	
	T1 FCG Self-Report of Familism Values	MPT	-0.390	0.740	-0.520	0.677									
		LRPA	0.650	0.650	1.000	1.916	1.030†	0.540	1.910	2.801					
		HRPA	-0.260	0.710	-0.360	0.771	0.130	0.390	0.320	1.139	-0.900*	0.380	-2.370	0.407	
<hr/>															
7. T2 FCG Report of Intervention Group Cohesion	MPT	0.250*	0.120	2.130	1.284										
	LRPA	0.910***	0.230	3.980	2.484	0.660*	0.270	2.400	1.935						
	HRPA	0.740***	0.150	4.940	2.096	0.490**	0.160	2.980	1.632	-0.170	0.320	-0.530	0.844		

Note. † < .10, \*p < .05. \*\*p < .01. \*\*\* p < .001; OR = Odds Ratio; ET = Early Terminators, MPT = Mid-program Terminators; LRPA = Low-Risk Persistent Attenders; HRPA = High-risk Persistent Attenders. FCG = Female Caregiver. T1 = Time 1, pretest; T2 = Time 2, immediate posttest. <sup>1</sup> = assessment completed by provider immediately after first program session. Logistic coefficients (i.e., logits) represent associations between predictors and classes and OR are equal to the exponentiation ( $e^b$ ) of logistic coefficients.

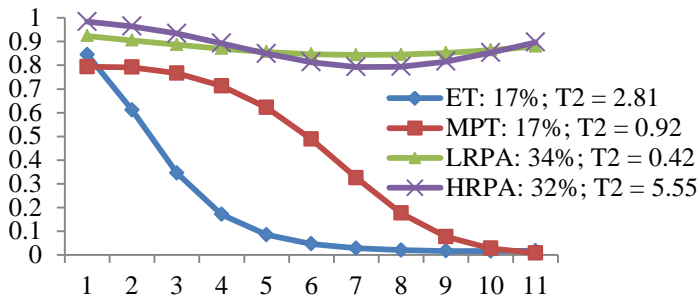
Table 3.

Logistic coefficients (Logits) and Odds Ratio(OR) representing unique effects of all significant phase 1 predictors on membership in the ET, MPT, LRPA, and HRPA trajectory groups for the phase 2 final model.

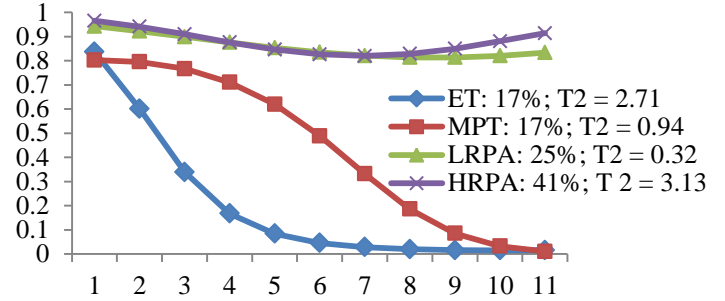
	Class	ET Referent Class				MPT Referent Class				LRPA Referent Class			
		Logit	SE	t	OR	Logit	SE	t	OR	Logit	SE	t	OR
1. Child Susceptibility													
T1FCG Report of Child Externalizing	MPT	0.032	0.037	0.882	1.032								
	LRPA	-0.049	0.033	-1.471	0.952	-0.081**	0.033	-2.480	0.922				
	HRPA	0.055	0.040	1.381	1.056	0.023	0.043	0.526	1.023	0.104***	0.026	3.925	1.110
Child 7 <sup>th</sup> Grade 1 <sup>st</sup> Semester GPA Reported by	MPT	0.177	0.136	1.303	1.193								
	LRPA	0.471***	0.155	3.031	1.601	0.294***	0.136	2.156	1.342				
	HRPA	0.059	0.114	0.516	1.060	-0.118	0.089	-1.324	0.889	-0.412***	0.117	-3.526	0.662
2. Participation Benefits													
T1 FCG Self-Report of Parenting Efficacy	MPT	0.187	0.621	0.301	1.205								
	LRPA	-0.469	0.610	-0.769	0.625	-0.656	0.537	-1.221	0.519				
	HRPA	-0.320	0.490	-0.652	0.726	-0.507	0.403	-1.258	0.602	0.149	0.464	0.321	1.161
T1 FCG Self-Report of Involvement In Their	MPT	-0.122	0.099	-1.226	0.885								
	LRPA	-0.086	0.104	-0.827	0.917	0.036	0.109	0.328	1.037				
	HRPA	0.035	0.096	0.365	1.035	0.157	0.112	1.394	1.170	0.121	0.095	1.273	1.129
3. Stress And Well-Being													
T1 FCG Self-Report of Depression	MPT	0.034	0.023	1.451	1.034								
	LRPA	0.021	0.035	0.589	1.021	-0.013	0.030	-0.425	0.987				
	HRPA	-0.018	0.027	-0.668	0.982	-0.051*	0.025	-2.055	0.950	-0.039	0.034	-1.153	0.962
4. Provider Report of FCG Participation Intentions													
	MPT	-0.010	0.157	-0.067	0.990								
	LRPA	0.206†	0.120	1.681	1.228	0.217*	0.103	2.107	1.242				
	HRPA	0.363†	0.209	1.735	1.437	0.373†	0.203	1.842	1.452	0.156	0.189	0.827	1.169
5. Cultural Influences													
T1 FCG Self-Report of Familism Values	MPT	0.136	0.700	0.914	1.145								
	LRPA	1.284*	0.604	2.128	3.611	1.148†	0.681	1.685	3.152				
	HRPA	0.637	0.486	1.311	1.890	0.501	0.533	0.940	1.650	-0.647	0.549	-1.178	0.524
6. T2 FCG Report of Intervention Group Cohesion													
	MPT	0.327**	0.130	2.523	1.386								
	LRPA	0.948***	0.179	5.308	2.580	0.620***	0.187	3.317	1.859				
	HRPA	0.796***	0.180	4.420	2.216	0.469**	0.192	2.444	1.598	-0.151	0.268	-0.565	0.860

Note. † < .10, \*p < .05, \*\*p < .01, \*\*\* p < .001; OR = Odds Ratio; ET = Early Terminators, MPT = Mid-program Terminators; LRPA = Low-Risk Persistent Attenders; HRPA = High-risk Persistent Attenders. FCG = Female Caregiver. T1 = Time 1, pretest; T2 = Time 2, immediate posttest. <sup>1</sup> = assessment completed by provider immediately after first program session. Logistic coefficients (i.e., logits) represent associations between predictors and classes and OR are equal to the exponentiation ( $e^b$ ) of logistic coefficients.

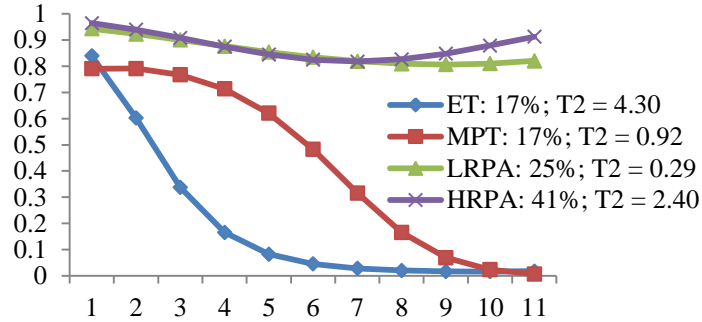
Phase 1 Graph 1: Child susceptibility to problem behaviors



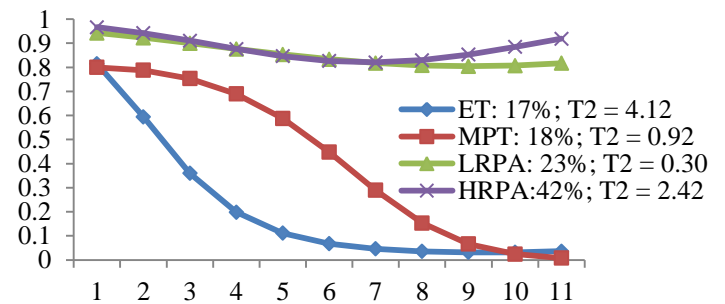
Phase 1 Graph 2: FCG perceptions of participation benefits



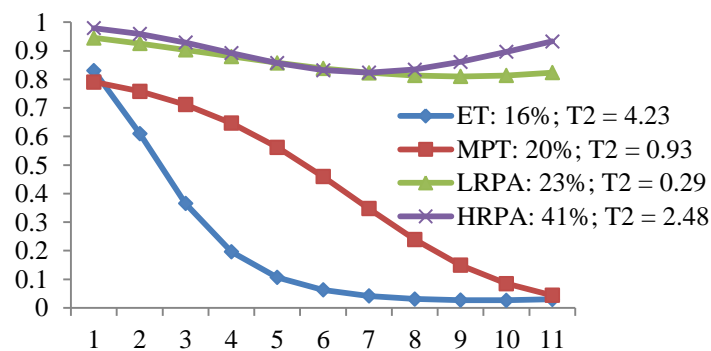
Phase 1 Graph 3: Sociodemographic participation barriers



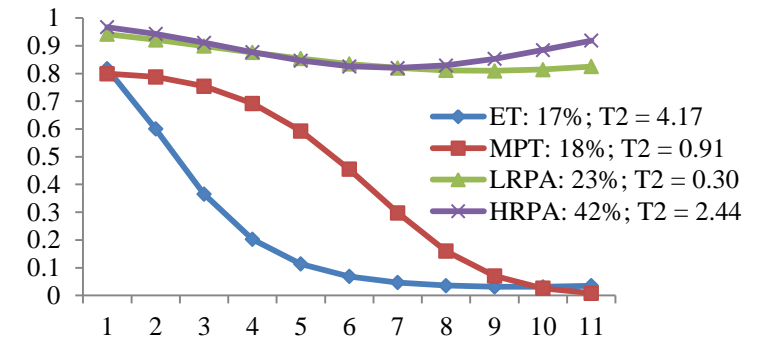
Phase 1 Graph 4: FCG stress and well-being



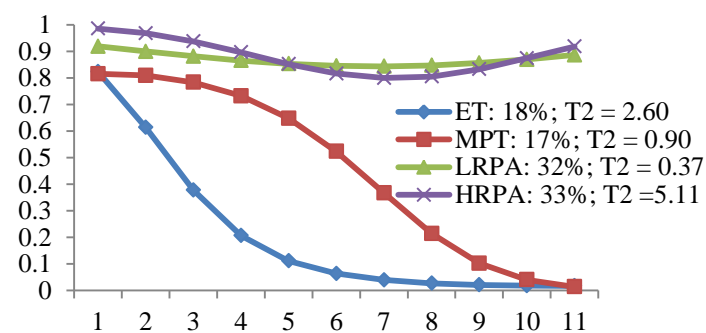
Phase 1 Graph 5: Participation intentions



Phase 1 Graph 6: Cultural influences



Phase 1 Graph 7: Group cohesion



Phase 2 Graph: Final model with all significant phase 1 predictors

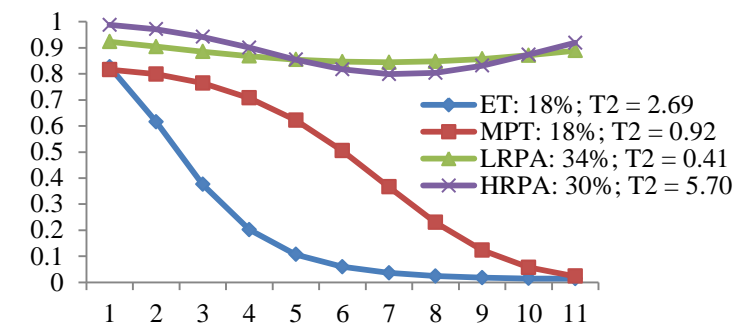


Figure 1. Graphs for GMM results for seven phase 1 preliminary models testing each group of conceptually related predictors (graphs 1-7) and for phase 2 final model with all phase 1 significant predictors to account for predictors' unique effects.

Note: ET = Early terminators, MPT = Mid-program terminators, LRPA = Low-risk persistent attenders, HRP = High-risk persistent attenders high-risk. T2 = Time 2 teacher report of child externalizing controlling for T1 scores. Horizontal axis = session number, Vertical axis = probability of session attendance.



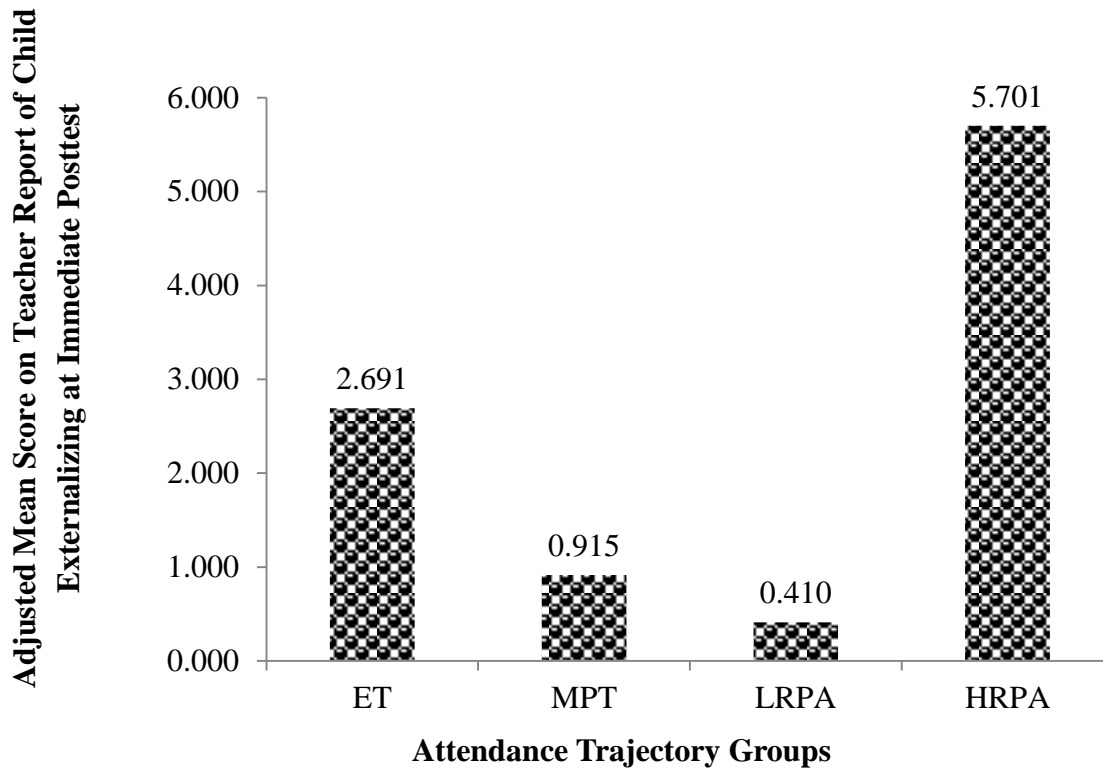


Figure 2. Trajectory group mean scores on teacher report of child externalizing at immediate posttest (the distal outcome) adjusting for teacher report of child externalizing at Time 1.

Note: ET = Early terminators, MPT = Mid-program terminators, LRPA = Low-risk persistent attenders, HRPA = High-risk persistent attenders high-risk. Between trajectory group differences on adjusted mean scores for T2 teacher report of child externalizing included the following: the LRPA class was lower than the MPT ( $\chi^2(1) = 4.602, p < .05$ ), ET ( $\chi^2(1) = 5.145, p < .05$ ) and HRPA classes ( $\chi^2(1) = 15.498, p < .001$ ); the MPT class was lower than the HRPA class ( $\chi^2(1) = 11.362, p < .001$ ) and marginally lower than the ET class ( $\chi^2(1) = 3.388, p < .10$ ). The ET and HRPA classes did not differ on the distal outcome.

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