



## Assessing the Construct Validity of the MPACT-6

### Research Brief

#### A Multi-site Confirmation

As the juvenile justice field continues to reduce its population served and agencies increase their focus on interventions for supervised youth, a greater emphasis is placed on identifying programming needs. However, many risk-needs assessments (RNAs) place extensive importance on the risk side of the equation. Given that risk tools are commonly composed of static, criminal history items, the ability to assess youth in need of early intervention is limited. However, few tools have made efforts to increase the accuracy and validation of their needs assessment tools.

Due to their latent nature, need assessment tools require robust evaluations of construct validity. However, confirmation of construct validity within these tools is rarely completed, disregarding essential strategies for both tool assessment and improvement. Building on prior work (i.e., Hamilton et al., 2019, 2020; Mei et al., 2022), this brief outlines findings related to the assessment of the Modified Positive

#### Summary

As needs assessments are comprised of subscales that include non-observable, latent constructs, the comprehensive assessment of these items and scales is essential. Specifically, to ensure these tools are measuring offender needs as intended, their construct validity must be confirmed. The current project used a multi-level, multi-group analysis of the MPACT with a large, 10-state sample of youth.

Building on previous work (see Mei et al., 2022), authors confirmed the dimensionality and reliability of the six MPACT needs domains. Beyond this, the reliability and validity of the 'Global Needs Factor' was also confirmed. Here, the 'Global Needs Factor' or 'G-Factor' represents a weighted combination of all domain scores, assessing youths' overall needs. This is a substantial advantage for practitioners, seeking to more easily match youth to resources that are likely limited. In particular, agencies without access to criminal history records or non-justice agencies may make use of the MPACT needs tool for case management purposes. Overall, these findings represent a substantial step forward, identifying the MPACT needs assessment as a reliable and valid tool, across justice stages and states. With this, we encourage contemporary RNA developers to similarly assess the construct validity of their assessments, ensuring safe and reliable application and program guidance.

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Achievement Change Tool (MPACT). Specifically, to assess the dimensionality, reliability, and validity of the tool, a multi-level, multi-group analysis was conducted, using a 10-state sample of youth (N=258,464) across multiple justice stages (e.g., probation, parole, diversion).

Overall, results confirmed the validity and reliability of needs domains, and the development of a novel 'Global Needs Factor,' a composite summary score of youth needs. These findings represent a substantial step forward for youth needs assessment tools, identifying the MPACT as a reliable and valid tool. The methods used may also encourage other contemporary RNA developers, to similarly assess the construct validity of their assessments. Through these efforts, RNA tools will be better able to assess offender needs and appropriately match programming.

## Background

As indicated, the current study builds on prior work, where in 2019-2022 the Washington State Administrative Office of the Courts contracted with Nebraska center for Justice Researchers to provide tool updates to one of the most widely used youth tools today, the Positive Achievement Change Tool ([PACT]; Barnoski, 1997). Using of a large sample of Washington State probation youth (N = 50,862), authors customized the tool through several methods, including item weighting, outcome specificity, and gender responsivity (Hamilton et al., 2019; Mei et al., 2022). Through these efforts, the Modified Positive Achievement Change Tool (M-PACT) was developed. Overall, these adjustment to the risk tool demonstrated improved predictive validity, as well as reductions in disparity across race/ethnicity.

Building on this work further updates and refinements to the MPACT youth assessment were completed using exploratory factor analysis (EFA), multi-group confirmatory factor analysis (MGCFA), and higher order modeling. Through this process, authors identified six major needs domains, including "School," "Association," "Family," "Substance Abuse," "Cognitions & Behaviors" and "Mental Health". Furthermore, with this restructuring, authors were able to confirm the tool's convergent/divergent validity, dimensionality, measurement invariance, and reliability. Using a greatly expanded data set form nine additional states, the domains were modified slightly to improve fit for the additional youth sampled. This research brief provides details of the MPACTs construct validity findings (e.g., internal structure), confirmed across a multi-site sample of youth.

## Methods

### Sample

Collected as part of a larger Office of Juvenile Justice and Delinquency Prevention (OJJDP) project, the current study used 258,464 justice-involved youths records, at different justice stages, obtained from 10-states<sup>11</sup>. The sample featured 30.1% females and was 55.9% White, 34.9% Black, 5.6% Hispanic, and 3.6% 'Other' race/ethnicity youth. For additional descriptives on the study's sample, refer to [Table 1](#).

**Table 1. MPACT Multistate Sample Descriptive (N=258,464).**

| State         | Sample% | Male% | White% | Black% | Hispanic% | Other% | Age<br>Mean(SD) |
|---------------|---------|-------|--------|--------|-----------|--------|-----------------|
| Eastern 1     | 3.0     | 78.6  | 44.6   | 41.9   | 4.2       | 9.3    | 15.7 (1.5)      |
| Eastern 2     | 2.4     | 79.7  | 26.5   | 67.6   | 5.0       | 0.9    | 15.2 (1.6)      |
| South-Eastern | 6.8     | 76.5  | 46.6   | 46.5   | --        | 6.8    | 16.2 (1.7)      |
| Southern 1    | 3.7     | 91.3  | 19.7   | 35.2   | 44.4      | 0.7    | 15.5 (1.2)      |
| Southern 2    | 56.5    | 69.3  | 57.4   | 41.8   | 0.1       | 0.8    | 15.9 (1.7)      |
| Midwestern    | 5.2     | 21.2  | 67.7   | 20.2   | 8.8       | 3.2    | 15.4 (1.5)      |
| Mountain 1    | 2.1     | 67.6  | 79.1   | 2.2    | 3.7       | 14.9   | 15.2 (1.7)      |
| Mountain 2    | 1.4     | 82.1  | 86.2   | 5.3    | --        | 8.4    | 15.1 (1.4)      |
| Western 1     | 16.3    | 74.1  | 61.8   | 13.2   | 15.1      | 9.8    | 15.5 (1.5)      |
| Western 2     | 2.6     | 83.3  | 61.1   | 9.2    | 22.1      | 7.6    | 15.9 (1.5)      |
| <b>Total</b>  | --      | 69.9  | 56.3   | 34.5   | 5.5       | 3.6    | 15.8 (1.6)      |

### Modified Positive Achievement Change Tool (M-PACT)

Originated from the Washington State Juvenile Court Assessment (WSJCA-RA), the MPACT was used for the current study, consisting of 10 domains (see [Table 2](#) and [Table 3](#) and for full MPACT items and responses, as well as tool descriptive statistics). Responses were collected via structured interviews with youth and their family, implemented in the 10-state sites and other U.S. agencies. Similar to other multi-site studies, slight variation in data collection process and assessment formulation were observed. Therefore, variations were addressed in a reconciliation process by employing traditional data cleaning techniques, such as collapsing and adjusting responses. Furthermore, the missing data were addressed using random forest

<sup>11</sup> It should be noted that the initial assessment was included for most youth to maximize the number of youths with sufficient follow-up for study inclusion. For confined youth, recidivism exposure in the community is limited and thus, for these youth we utilized their last assessment prior to release from confinement. Further, to retain subject independence, only one assessment per youth was included.

imputation approach via the “misForest” R package. For more information on the reconciliation process see (Hamilton et al., 2020).

### *Analytic Strategy*

To complete assessments of the MPACT’s internal structure validity (a major component of construct validity), several analytical steps were completed. First, exploratory factor analyses (EFAs) were conducted on domain items to assess dimensionality of the six MPACT constructs. Next, Multi-Group Confirmatory Factor Analyses (MGCFAs) were computed, including higher-order tests as well as gender and race invariance. Next, all major forms of group invariance including, configural, metric, scalar, residual, factor variance, and mean invariance were assessed. We preformed these analyses for each of the identified constructs and all analyses were conducted with multi-level framework to account for assessments nested by state.

Latent constructs were then weighted and combined to create a ‘Global Needs Factor’ (‘G-factor’), representing the overall level of youth needs. The ‘G-factor’ was also tested for measurement invariance. Construct reliability was assessed using omega coefficient ( $\omega$ ). EFA and MGCFAs models were evaluated, comparing model fit indices and loadings/cross-loadings with industry-standard thresholds (Tabachnick & Fidell, 2007). EFA domain factor loadings are provided in [Table 4](#).

Model fit was also assessed using Comparative Fit Index (CFI)/Tucker Lewis Index (TLI) and the Root Mean Square Error of Approximation (RMSEA). Higher-order models and those with additional measurement invariance constraints were retained if  $\Delta$ CFI and  $\Delta$ TLI values were acceptable ( $< 0.01$ ), indicating models did not detrimentally impact fit (Little, 2013).

### Results

The design of each MPACT domain is described below, outlining face validity regarding domain item depth needed to assess variability in youth needs, avoid underrepresentation of a construct, and establish perceived linkages to programming and interventions. Refer to [Figures 1-7](#) for factorial patterns of all six domains, as well as the G-factor. Of note, the numbers within these figures represent the item or factor loadings.

The ‘**Education**’ domain is a single-order factor that assesses to what extent the youth has attained their educational goal. Interventions for this domain outline a focus on tutoring, assessment of learning disabilities, and coordination with youths’ schools and family to ensure any attendance and conduct issues are resolved.



The '**Association**' domain assesses the strength of youth' commitment to prosocial activities via a third-order factor. Interventions for this domain are outlined to focus on cognitive programming that will reduce anti-social friendships and establish or extend pro-social relationships via structured/unstructured activities or employment.

The '**Family**' domain is a single-order factor that assesses positive family relationships and the supportive nature of their environment. Interventions for this domain are recommended to improve youth-family relationships (i.e., Functional Family Therapy [FFT]) and provide opportunities for youth to extend a positive network of support.

The '**Alcohol & Drugs**' domain was identified as a single-order factor designed to assess youths' overall substance abuse problems and disruptive consequences. Programming for this domain is outlined to include additional clinical assessment and referral for educational, outpatient, or residential treatment.

The '**Mental Health**' domain is a single-order domains that assess the extent of youths' recent symptoms and issues. Creating a shorter continuum than other MPACT domains, this construct contains only four items, where item responses assess both needs (i.e., issues interfere with working with youth) and protective factors (i.e., compliance with medication). Case managers should refer youth for additional clinical assessment and programming referrals.

The '**Cognition & Behaviors**' domain is a third-order factor and assesses to what extent the youths have internalized pro-criminal definitions and attitudes. Programming for this domain should focus on cognitive-behavioral (i.e., Moral Recognition Therapy [MRT]) or aggression (i.e., Aggression Replacement Training [ART]) programming.

Finally, the '**G-factor**' was extracted, representing a weighted composite score of all six domains. Where some individuals may present high needs in one or two areas, prior findings identify that many justice-involved and cross-over youth present high needs in several domains. This global-needs score provides a metric to identify those youth with the greatest intervention needs, where agencies are outlined to use the G-factor scores to determine eligibility and prioritization when programming slots are limited.

### *Structural Validity*

All six constructs and the 'G-factor' 'passed' gender- and race- invariance tests, where CFA findings exceeded model fit (CFI & TFI >.90, RMSEA<.05) and reliability thresholds for unidimensional ( $\omega$ >.80) and multi-dimensional ( $\omega$ >.65). Additionally, standardized item loadings and gender and race/ethnicity invariance test results are reported in Appendix

Tables 5 and 6. Minor model inconsistencies were identified (i.e., “Education,” “Family;” see [Table 4](#)). Nevertheless, these items represent theoretically important content and were thus retained as, model fit statistics exceeded established thresholds, indicating their inclusion did not adversely impact domain measurement.

## Conclusion

Overall, these findings represent a notable advancement for the MAPCT needs assessment, indicating a reliable and valid tool, across justice stages and states. Further we provide a best practice roadmap for RNA developers seeking to update needs tool and demonstrate construct validity. In doing so, we have ensured the MPACT needs assessment can be appropriately provided to youth across system types and used to guide program referrals. Finally, measurement invariance was identified for all domains and the G-factor, indicating that the MPACT 6 needs assessment tool equivalently measures youth needs across gender and race/ethnicity.



## Appendices.

Table 2. M-PACT Items and Responses.

| Domain/Item  | Percentage |
|--|------------|
| Age  |            |
| 12 or younger  | 2.8        |
| 13   | 5.3        |
| 14   | 10.9       |
| 15   | 18.4       |
| 16   | 26.2       |
| 17   | 30.7       |
| 18 or older  | 5.7        |
| Race   |            |
| White  | 56.3       |
| Black  | 34.5       |
| Hispanic   | 5.5        |
| Other  | 3.6        |
| Recidivism (new chare within 12 months)                                | 48.8       |
| <b>CURRENT SCHOOL STATUS</b>   |            |
| Enrollment status  |            |
| Graduated/GED/Enrolled full-time                                       | 73.7       |
| Enrolled part-time   | 17.0       |
| Suspended  | 2.3        |
| Current status unknown   | 7.1        |
| Believes there is value in getting an education                        |            |
| Believes getting education is of value                                 | 53.1       |
| Somewhat believes education is of value                                | 42.1       |
| Does not believe education is of value                                 | 4.8        |
| Believes school provides an encouraging environment                    |            |
| Believes school is encouraging   | 33.3       |
| Somewhat believes school is encouraging                                | 54.7       |
| Does not believe school is encouraging                                 | 12.0       |
| Teachers, staff, or coaches youth likes/feels comfortable talking with |            |
| Close to 2 or more adults at school                                    | 15.2       |
| Close to 1 adult at school   | 20.3       |
| Not close to any adult at school                                       | 64.5       |
| Involvement in school activities during most recent term               |            |



|  |      |
|--|------|
| <i>Involved in 2 or more school activities</i>   | 10.0 |
| <i>Involved in 1 school activity</i>   | 14.1 |
| <i>Interested but not involved in any activities</i>   | 43.0 |
| <i>Not interested in school activities</i>   | 32.9 |
| <b>Conduct</b>   |      |
| <i>Recognition for good school behavior</i>  | 4.4  |
| <i>No problems with school conduct</i>   | 36.7 |
| <i>School problems reported by teachers</i>  | 15.0 |
| <i>School problem calls to parents</i>   | 43.9 |
| <b>Number of expulsions and suspensions during most recent term</b>                                  |      |
| <i>No recent expulsion/suspension</i>  | 58.0 |
| <i>1 recent expulsion/suspension</i>   | 15.5 |
| <i>2 or 3 recent expulsions/suspensions</i>  | 8.8  |
| <i>Over 3 recent expulsions/suspensions</i>  | 17.7 |
| <b>Attendance</b>  |      |
| <i>No unexcused absences</i>   | 15.0 |
| <i>Some partial-day unexcused absences</i>   | 12.1 |
| <i>Some full-day unexcused absences</i>  | 55.1 |
| <i>Truancy petition/equivalent or withdrawn</i>  | 17.9 |
| <b>Academic performance</b>  |      |
| <i>Honor student (mostly As)</i>   | 4.4  |
| <i>Above 3.0 (mostly As and Bs)</i>  | 36.7 |
| <i>2.0 to 3.0 (mostly Bs and Cs, no Fs)</i>  | 15.0 |
| <i>1.0 to 2.0 (mostly Cs and Ds, some Fs)</i>  | 43.9 |
| <i>Below 1.0 (some Ds and mostly Fs)</i>   |      |
| <b>Assessment of likelihood youth will stay in school and graduate</b>                               |      |
| <i>Assessed as very likely to graduate</i>   | 35.1 |
| <i>Assessed as uncertain to graduate</i>   | 56.7 |
| <i>Assessed as not likely to graduate</i>  | 8.2  |
| <b>CURRENT USE OF FREE TIME</b>  |      |
| <b>Current interest and involvement in supervised, structured pro-social recreational activities</b> |      |
| <i>Currently in 1+ structured activity</i>   | 19.8 |
| <i>Currently not involved in structured activities</i>   | 80.2 |
| <b>Current interest &amp; involvement in pro-social unstructured recreational activities</b>         |      |
| <i>Currently involved in 1+ unstructured activity</i>  | 30.9 |
| <i>Currently not involved in unstructured activities</i>   | 69.1 |



|   |      |
|---|------|
| Understanding of what is required to maintain a job                                   |      |
| <i>Has demonstrated or has knowledge to maintain job</i>                              | 44.4 |
| <i>Lacks knowledge to maintain job</i>  | 55.6 |
| Current positive personal relationship(s) with employer(s) or adult coworker(s)       |      |
| <i>At least 1 current positive job relationship</i>                                   | 10.5 |
| <i>Currently employed: no positive relationships</i>                                  | .6   |
| <i>Not currently employed</i>   | 88.9 |
| <b>CURRENT RELATIONSHIPS</b>  |      |
| Current positive adult non-family relationships not connected to school or employment |      |
| <i>3 or more current positive adult relationships</i>                                 | 6.4  |
| <i>2 current positive adult relationships</i>   | 9.0  |
| <i>1 current positive adult relationship</i>  | 22.3 |
| <i>No current positive adult relationships</i>  | 62.4 |
| Current pro-social community ties   |      |
| <i>Strong pro-social community ties</i>   | 3.8  |
| <i>Some pro-social community ties</i>   | 40.4 |
| <i>No pro-social community ties</i>   | 55.9 |
| Current friends youth spends time with  |      |
| <i>Only pro-social friends</i>  | 15.5 |
| <i>No consistent friends or pro-social and anti-social friends</i>                    | 72.9 |
| <i>Only anti-social friends</i>   | 9.3  |
| <i>Gang member/associate</i>  | 2.3  |
| Currently admires anti-social peers   |      |
| <i>Does not admire anti-social peers</i>  | 56.3 |
| <i>Somewhat admires anti-social peers</i>   | 31.6 |
| <i>Admires, emulates anti-social peers</i>  | 12.1 |
| Current resistance to anti-social peer influence                                      |      |
| <i>Does not associate with anti-social peers</i>                                      | 44.2 |
| <i>Usually resists anti-social peer influence</i>                                     | 26.2 |
| <i>Rarely resists anti-social peer influence</i>                                      | 26.7 |
| <i>Leads anti-social peers</i>  | 2.9  |
| <b>CURRENT LIVING ARRANGEMENTS</b>  |      |
| Currently living  |      |
| <i>Immediate Family – mom or dad</i>  | 59.1 |
| <i>Other – extended family or friends</i>   | 38.4 |
| <i>Foster home, residential placement, or transient</i>                               | 2.4  |



|   |      |
|---|------|
| Annual combined income youth and family   |      |
| <i>Up to poverty line x 3</i>   | 78.2 |
| <i>Up to poverty line x 4 or higher</i>   | 21.8 |
| Individual currently involved in the household has jail/imprisonment history                              |      |
| Yes   | 26.8 |
| No  | 73.2 |
| Problem history of parents currently involved with the household  |      |
| <i>No problem history of parents involved with the household</i>  | 71.2 |
| <i>Alcohol problem</i>  | 12.6 |
| <i>Drug problem</i>   | 6.0  |
| <i>Mental health problem</i>  | 3.0  |
| <i>Physical health problem</i>  | 1.1  |
| <i>Employment problem</i>   | 6.1  |
| Problem history of sibling involved with the household  |      |
| <i>No sibling</i>   | 88.2 |
| <i>Drug problem</i>   | 4.9  |
| <i>Mental health problem</i>  | 1.1  |
| <i>Physical health problem</i>  | .2   |
| <i>Employment problem</i>   | 5.7  |
| Support network for family  |      |
| <i>Strong support network</i>   | 18.1 |
| <i>Some support network</i>   | 36.6 |
| <i>No support network</i>   | 45.3 |
| Family willingness to help support youth  |      |
| <i>Consistently willing to support</i>  | 73.1 |
| <i>Inconsistently willing to support youth</i>  | 23.8 |
| <i>Little or no willingness to support youth</i>  | 3.1  |
| Family provides opportunities for youth to participate in family activities and decisions affecting youth |      |
| <i>Opportunities for involvement provided</i>   | 22.1 |
| <i>Some opportunities for involvement provided</i>  | 63.9 |
| <i>No opportunities for involvement provided</i>  | 14.0 |
| Has run away or been kicked out   |      |
| Yes   | 78.2 |
| No  | 21.8 |
| Family member(s) youth feels close to or has good relationship with                                       |      |
| <i>Not close to anyone</i>  | 55.8 |
| <i>Close to family members</i>  | 44.2 |



|   |      |
|---|------|
| Level of conflict in the household                        |      |
| <i>Some conflict that is well-managed</i>                 | 71.3 |
| <i>Verbal intimidation, yelling, heated arguments</i>     | 21.0 |
| <i>Threats of physical abuse</i>                          | 2.9  |
| <i>Domestic violence: physical/sexual abuse</i>           | 4.8  |
| Parental supervision                                      |      |
| <i>Consistent supervision</i>                             | 39.9 |
| <i>Sporadic supervision</i>                               | 46.5 |
| <i>Inadequate supervision</i>                             | 13.6 |
| Parental authority and control                            |      |
| <i>Youth usually obeys and follows rules</i>              | 34.4 |
| <i>Youth sometimes obeys or obeys some rules</i>          | 51.6 |
| <i>Youth consistently disobeys and/or is hostile</i>      | 14.0 |
| Consistent appropriate consequences for bad behavior      |      |
| <i>Consistently appropriate punishment</i>                | 42.1 |
| <i>Consistently overly severe punishment</i>              | 7.1  |
| <i>Inconsistent or erratic punishment</i>                 | 10.4 |
| <i>Consistently insufficient punishment</i>               | 40.4 |
| Consistent appropriate rewards for good behavior          |      |
| <i>Consistently appropriate rewards</i>                   | 42.5 |
| <i>Consistently overly indulgent/overly protective</i>    | 15.2 |
| <i>Inconsistent or erratic rewards</i>                    | 42.3 |
| Parental characterization of youth's anti-social behavior |      |
| <i>Disapproves of anti-social behavior</i>                | 89.3 |
| <i>Accepts anti-social behavior as okay</i>               | 10.6 |
| <i>Proud of anti-social behavior</i>                      | .1   |

## CURRENT ALCOHOL AND DRUGS

|   |      |
|---|------|
| Current alcohol use                       |      |
| <i>Disrupting education</i>               | 22.1 |
| <i>Causes family conflict</i>             | 23.8 |
| <i>Interferes with pro-social friends</i> | 22.8 |
| <i>Causes health problems</i>             | 9.1  |
| <i>Contributes to criminal behavior</i>   | 24.0 |
| Current drug use                          |      |
| <i>Disrupting education</i>               | 27.2 |
| <i>Causes family conflict</i>             | 28.6 |
| <i>Interferes with pro-social friends</i> | 26.2 |



|  |      |
|--|------|
| <i>Causes health problems</i>  | 10.4 |
| <i>Contributes to criminal behavior</i>                                  | 27.9 |
| Type of drug   |      |
| Marijuana usage  | 40.0 |
| Amphetamines usage   | 2.3  |
| Cocaine usage  | 5.6  |
| Heroin usage   | .4   |
| Other drug usage   | 3.3  |
| Alcohol/drug treatment program participation                             |      |
| <i>Drug/alcohol treatment not warranted</i>                              | 16.4 |
| <i>Currently attending treatment program</i>                             | 11.6 |
| <i>Successfully completed treatment program</i>                          | 48.4 |
| <i>Not currently attending needed treatment program</i>                  | 23.6 |
| <b>CURRENT MENTAL HEALTH</b>   |      |
| Diagnosed with ADD/ADHD  |      |
| <i>No ADD/ADHD diagnosis or no medication prescribed</i>                 | 92.5 |
| <i>Currently taking ADD/ADHD medication</i>                              | 4.6  |
| <i>ADD/ADHD medication prescribed but not taking</i>                     | 2.9  |
| Mental health treatment prescribed, excluding ADD/ADHD treatment         |      |
| <i>No current mental health problem or no treatment prescribed</i>       | 92.5 |
| <i>Attending mental health treatment</i>                                 | 5.9  |
| <i>Mental health treatment prescribed but not attending</i>              | 1.6  |
| Mental health medication prescribed, excluding ADD/ADHD medication       |      |
| <i>No current mental health problem or no medication prescribed</i>      | 92.4 |
| <i>Currently taking mental health medication</i>                         | 6.7  |
| <i>Mental health medication prescribed but not taking</i>                | .9   |
| Mental health problems interfere with working with the youth             |      |
| <i>No</i>  | 91.0 |
| <i>Yes</i>   | 9.0  |
| <b>ATTITUDES/BEHAVIORS</b>   |      |
| Optimism   |      |
| <i>High aspirations: Sense of purpose, commitment to better life</i>     | 11.9 |
| <i>Normal aspirations: Some sense of purpose</i>                         | 75.1 |
| <i>Low aspirations: Little sense of purpose or plans for better life</i> | 12.5 |
| <i>Believes nothing matters: He or she will be dead before long</i>      | .5   |
| Impulsive, acts before thinking  |      |
| <i>Uses self-control: Usually thinks before acting</i>                   | 10.4 |



|  |      |
|--|------|
| <i>Uses some self-control: Sometimes thinks before acting</i>                            | 61.1 |
| <i>Impulsive: Often acts before thinking</i>   | 19.9 |
| <i>Highly impulsive: Usually acts before thinking</i>                                    | 8.6  |
| Belief in control over anti-social behavior  |      |
| <i>Believes can stop anti-social behavior</i>  | 32.9 |
| <i>Somewhat believes can stop anti-social behavior</i>                                   | 64.6 |
| <i>Believes cannot stop anti-social behavior</i>   | 2.5  |
| Empathy, remorse, sympathy, or feelings for victim(s)                                    |      |
| <i>Has empathy for victim(s)</i>   | 26.6 |
| <i>Has some empathy for victim(s)</i>  | 59.7 |
| <i>Does not have empathy for victim(s)</i>   | 13.7 |
| Respect for property of others   |      |
| <i>Respects property of others</i>   | 67.5 |
| <i>Respects personal property but not publicly accessible property</i>                   | 27.7 |
| <i>No respect for property</i>   | 4.8  |
| Respect for authority figures  |      |
| <i>Respects most authority figures</i>   | 75.9 |
| <i>Resents most authority figures</i>  | 22.0 |
| <i>Defies or is hostile toward most authority figures</i>                                | 2.1  |
| Attitude toward pro-social rules/conventions in society: Believes pro-social rules apply |      |
| <i>Yes</i>   | 93.1 |
| <i>No</i>  | 6.9  |
| Accepts responsibility for anti-social behavior  |      |
| <i>Accepts responsibility for behavior</i>   | 60.9 |
| <i>Minimizes, denies, justifies, excuses, or blames others for behavior</i>              | 32.1 |
| <i>Accepts own anti-social behavior as okay</i>  | 5.6  |
| <i>Proud of own anti-social behavior</i>   | 1.4  |
| Belief in successfully meeting conditions of court supervision                           |      |
| <i>Believes will be successful under supervision</i>                                     | 49.0 |
| <i>Unsure of success under supervision</i>   | 49.8 |
| <i>Does not believe will be successful under supervision</i>                             | 1.2  |
| <b>AGGRESSION</b>  |      |
| Tolerance for frustration  |      |
| <i>Rarely gets upset/temper tantrums</i>   | 56.0 |
| <i>Sometimes gets upset/temper tantrums</i>  | 33.8 |
| <i>Often gets upset/temper tantrums</i>  | 10.2 |
| Hostile interpretation of actions and intentions of others                               |      |

|  |      |
|--|------|
| <i>Primarily positive view of intentions of others</i>   | 76.1 |
| <i>Primarily negative view of intentions of others</i>   | 21.3 |
| <i>Primarily hostile view of intentions of others</i>  | 2.6  |
| Belief in yelling/verbal aggression to resolve disagreement/conflict   |      |
| <i>Believes verbal aggression is rarely appropriate</i>  | 57.3 |
| <i>Believes verbal aggression is sometimes appropriate</i>   | 35.2 |
| <i>Believes verbal aggression is often appropriate</i>   | 7.5  |
| Belief in fighting/physical aggression to resolve disagreement/conflict  |      |
| <i>Believes physical aggression is never appropriate</i>   | 49.4 |
| <i>Believes physical aggression is rarely appropriate</i>  | 24.8 |
| <i>Believes physical aggression is sometimes appropriate</i>   | 22.4 |
| <i>Believes physical aggression is often appropriate</i>   | 3.5  |
| Reports/evidence of violence not in criminal history – outbursts, property damage, fire, animal cruelty, or use of weapon. |      |
| None   | 71.0 |
| 1 report   | 14.1 |
| 2+ reports   | 15.0 |

## SKILLS

|   |      |
|---|------|
| Consequential thinking  |      |
| <i>Good consequential thinking and acting</i>                     | 4.8  |
| <i>Identifies consequences of actions</i>                         | 48.4 |
| <i>Understands about consequences to actions</i>                  | 41.9 |
| <i>Does not understand about consequences of actions</i>          | 4.9  |
| Goal setting  |      |
| <i>Sets realistic goals</i>                                       | 18.9 |
| <i>Sets somewhat realistic goals</i>                              | 64.1 |
| <i>Sets unrealistic goals</i>                                     | 7.1  |
| <i>Does not set any goals</i>                                     | 9.9  |
| Problem-solving   |      |
| <i>Applies appropriate solutions to problem behaviors</i>         | 2.9  |
| <i>Thinks of solutions for problem behaviors</i>                  | 19.8 |
| <i>Identifies problem behaviors</i>                               | 66.0 |
| <i>Cannot identify problem behaviors</i>                          | 11.3 |
| Situational perception  |      |
| <i>Selects the best time and place for best skill</i>             | 7.9  |
| <i>Chooses best skill but not best time and place</i>             | 22.2 |
| <i>Does not choose the best pro-social skill</i>                  | 58.9 |
| <i>Cannot analyze the situation for use of a pro-social skill</i> | 11.0 |



|  |      |
|--|------|
| Dealing with others  |      |
| <i>Often uses advanced social skills in dealing with others</i>              | 4.3  |
| <i>Sometimes uses advanced social skills in dealing with others</i>          | 26.7 |
| <i>Has basic social skills, lacks advanced skills in dealing with others</i> | 61.5 |
| <i>Lacks basic social skills in dealing with others</i>                      | 7.5  |
| Dealing with difficult situations  |      |
| <i>Often uses skills in dealing with difficult situations</i>                | 4.2  |
| <i>Sometimes uses skills in dealing with difficult situations</i>            | 69.6 |
| <i>Rarely uses skills in dealing with difficult situations</i>               | 14.3 |
| <i>Lacks skills in dealing with difficult situations</i>                     | 11.8 |
| Dealing with feelings/emotions   |      |
| <i>Often uses skills in dealing with feelings/emotions</i>                   | 3.7  |
| <i>Sometimes uses skills in dealing with feelings/emotions</i>               | 69.0 |
| <i>Rarely uses skills in dealing with feelings/emotions</i>                  | 15.1 |
| <i>Lacks skills in dealing with feelings/emotions</i>                        | 12.2 |
| Monitoring of internal triggers that can lead to trouble                     |      |
| <i>Actively monitors/controls internal triggers</i>                          | 3.4  |
| <i>Identifies internal triggers</i>  | 76.3 |
| <i>Cannot identify internal triggers</i>                                     | 20.3 |
| Monitoring of external triggers that can lead to trouble                     |      |
| <i>Actively monitors/controls external triggers</i>                          | 4.1  |
| <i>Identifies external triggers</i>  | 77.4 |
| <i>Cannot identify external triggers</i>                                     | 18.5 |
| Control of impulsive behaviors that get youth into trouble                   |      |
| <i>Never a problem with impulsive behavior</i>                               | 4.4  |
| <i>Uses techniques to control impulsive behavior</i>                         | 9.1  |
| <i>Knows techniques to control impulsive behavior</i>                        | 59.0 |
| <i>Lacks techniques to control impulsive behavior</i>                        | 27.5 |
| Control of aggression  |      |
| <i>Never a problem with aggression</i>                                       | 12.9 |
| <i>Often uses alternatives to aggression</i>                                 | 13.0 |
| <i>Sometimes uses alternatives to aggression</i>                             | 56.1 |
| <i>Lacks alternatives to aggression</i>                                      | 12.2 |
| <i>Rarely uses alternatives to aggression</i>                                | 5.9  |

---

**Table 3. MPACT Descriptive Statistics.**

| Item   | Min. | Max. | Mean  | S.D. | $\lambda$ |
|--|------|------|-------|------|-----------|
| <b>1. Education</b>  |      |      |       |      |           |
| Current school enrollment status   | -1   | 2    | -.57  | .85  | .508      |
| Involvement in school activities in most recent term   | 0    | 3    | 1.76  | .92  | .411      |
| Believes there is value in getting an education  | 0    | 2    | .52   | .59  | .869      |
| Believes school provides an encouraging environment  | 0    | 2    | .79   | .64  | .843      |
| Teachers, staff, or coaches' youth likes or feels comfortable talking with   | -1   | 2    | .99   | .93  | .552      |
| Youth's conduct in the most recent term  | -2   | 0    | -.51  | .74  | .648      |
| Number of expulsions & suspensions in the most recent term   | -2   | 2    | .57   | 1.46 | .545      |
| Attendance in most recent term   | 0    | 3    | .86   | 1.16 | .163      |
| Youth's academic performance in the most recent school term  | -2   | 2    | .53   | .99  | .706      |
| Interviewer's assessment of likelihood the youth will stay in & graduate from high school or an equivalent vocational school | 0    | 2    | .73   | .60  | .883      |
| <b>2. Associations</b>   |      |      |       |      |           |
| Interest/involvement pro-social structured activities  | -2   | 0    | -.54  | .75  | .762      |
| Structured activities in which youth participates  | -1   | 1    | .32   | .47  | .610      |
| Unstructured activities  | -2   | 1    | -.24  | .88  | .401      |
| Understanding what is required to maintain a job   | -1   | 0    | -.44  | .50  | .713      |
| Current positive personal relationship(s) with employer(s) or adult coworker(s)  | -2   | 0    | -.22  | .62  | .729      |
| Current interest in employment*  | -4   | 0    | -2.65 | 1.42 | --        |
| Current employment status*   | -2   | 0    | -.10  | .43  | --        |
| Positive adult non-family relationships not connected to school or employment  | -3   | 0    | -.59  | .90  | .804      |
| Pro-social community ties  | -2   | 0    | -.48  | .57  | .788      |
| Friends/companions youth spends time with  | -1   | 2    | -.02  | .58  | .691      |
| In a romantic, intimate, or sexual relationship*   | 0    | 2    | .22   | .51  | --        |
| Admires/emulates anti-social peers   | 0    | 2    | .56   | .70  | .915      |
| Resistance to anti-social peer influence   | 0    | 3    | .88   | .90  | .854      |
| <b>3. Family</b>   |      |      |       |      |           |
| Person youths live with resulting in an increased risk   | 1    | 2    | 1.22  | .41  | .283      |
| Annual combined income of youth & family   | -1   | 1    | -.57  | .54  | .235      |



|   |    |   |      |      |      |
|---|----|---|------|------|------|
| Jail/imprisonment history of persons who are currently involved with the household                          | 0  | 1 | .27  | .44  | .306 |
| Problem history of parents who are currently involved with the household                                    | 0  | 5 | .68  | 1.36 | .416 |
| Problem history of siblings who are currently involved with the household                                   | 0  | 4 | .30  | .96  | .223 |
| Support network for family  | -2 | 0 | -.73 | .75  | .589 |
| Family willingness to help support youth  | 0  | 2 | .30  | .52  | .779 |
| Family provides opportunities for youth to participate in family activities & decisions affecting the youth | -1 | 2 | .70  | .97  | .723 |
| Youth has run away or been kicked out of home   | 0  | 1 | .22  | .41  | .252 |
| Family member(s) youth feels close to/has good relationship with  | 0  | 1 | .44  | .50  | .372 |
| Level of conflict in the family   | 0  | 3 | .41  | .77  | .493 |
| Parental supervision  | 0  | 2 | .74  | .68  | .842 |
| Parental authority & control  | 0  | 2 | .80  | .67  | .561 |
| Consistent appropriate punishment for bad behavior  | 0  | 3 | 1.49 | 1.38 | .797 |
| Consistent appropriate rewards for good behavior  | 0  | 2 | 1.00 | .92  | .853 |
| Parental characterization of youth's anti-social behavior   | 0  | 2 | .11  | .31  | .503 |

#### 4. Alcohol & Drug

|  |    |   |      |     |      |
|--|----|---|------|-----|------|
| Current alcohol/drug treatment program participation   | -2 | 1 | -.21 | .98 | .357 |
| Marijuana use  | 0  | 1 | .40  | .49 | .858 |
| Amphetamine use  | 0  | 1 | .02  | .15 | .519 |
| Cocaine/crack cocaine use  | 0  | 1 | .06  | .23 | .787 |
| Heroin/opiate use  | 0  | 1 | .00  | .06 | .461 |
| Other drug use   | 0  | 1 | .03  | .18 | .475 |
| Alcohol disrupting education   | 0  | 1 | .22  | .41 | .957 |
| Alcohol causing family conflict  | 0  | 1 | .24  | .43 | .938 |
| Alcohol interfering with keeping pro-social friends  | 0  | 1 | .23  | .42 | .960 |
| Alcohol causing health problems  | 0  | 1 | .09  | .29 | .929 |
| Alcohol contributing to criminal behavior  | 0  | 1 | .24  | .43 | .912 |
| Youth needs increasing amounts of alcohol to achieve the same level of intoxication or high* | 0  | 1 | .11  | .31 | --   |
| Youth experiences alcohol withdrawal problems*   | 0  | 1 | .09  | .29 | --   |
| Drugs disrupting education   | 0  | 1 | .27  | .45 | .960 |
| Drugs causing family conflict  | 0  | 1 | .29  | .45 | .957 |
| Drugs interfering with keeping pro-social friends  | 0  | 1 | .26  | .44 | .961 |
| Drugs causing health problems  | 0  | 1 | .10  | .31 | .889 |



|  |   |   |     |     |      |
|--|---|---|-----|-----|------|
| Drugs contributing to criminal behavior  | 0 | 1 | .28 | .45 | .936 |
| Youth needs increasing amounts of drugs to achieve the same level of intoxication or high* | 0 | 1 | .13 | .33 | --   |
| Youth experiences drug withdrawal problems*  | 0 | 1 | .07 | .26 | --   |

## 5. Mental Health

|   |   |   |     |     |      |
|---|---|---|-----|-----|------|
| Current suicidal ideation*  | 0 | 1 | .00 | .06 | --   |
| Currently diagnosed with ADD/ADHD   | 0 | 2 | .10 | .39 | .692 |
| Mental health treatment currently prescribed excluding ADD/ADHD treatment   | 0 | 2 | .09 | .34 | .890 |
| Mental health medication currently prescribed excluding ADD/ADHD medication | 0 | 2 | .09 | .31 | .899 |
| Mental health problems interfere in working with the youth                  | 0 | 1 | .09 | .29 | .800 |

## 6. Cognition & Behaviors

|  |    |   |      |      |      |
|--|----|---|------|------|------|
| Primary emotion when committing crime(s)*                                      | 0  | 3 | .77  | .87  | --   |
| Primary purpose for committing crime(s) within the last 6mos*                  | 0  | 7 | 2.20 | 1.99 | --   |
| Optimism   | -1 | 2 | .015 | .51  | .684 |
| Impulsive, acts before thinking  | -1 | 2 | .27  | .76  | .726 |
| Belief in control over anti-social behavior                                    | -1 | 1 | -.30 | .51  | .672 |
| Empathy, remorse, sympathy, or feelings for the victim(s) of criminal behavior | -1 | 1 | -.13 | .62  | .728 |
| Respect for property of others   | 0  | 2 | .37  | .57  | .761 |
| Respect for authority figures  | 0  | 2 | .26  | .49  | .840 |
| Attitude toward responsible law-abiding behavior                               | 1  | 2 | 1.07 | .25  | .780 |
| Accepts responsibility for anti-social behavior                                | 0  | 3 | .47  | .67  | .784 |
| Belief in successfully meeting conditions of court supervision                 | -1 | 1 | -.48 | .52  | .825 |
| Tolerance for frustration  | 0  | 2 | .54  | .67  | .850 |
| Hostile interpretation of actions & intentions of others                       | 0  | 2 | .26  | .50  | .935 |
| Belief in yelling & verbal aggression to resolve conflict                      | 0  | 2 | .50  | .63  | .852 |
| Belief in fighting & physical aggression to resolve conflict                   | 0  | 3 | .80  | .90  | .833 |
| Reports/evidence of violence not included in criminal history                  | 0  | 2 | .44  | .74  | .476 |
| Reports of sexual aggression not included in criminal history*                 | 0  | 2 | .14  | .49  | --   |
| Consequential thinking   | -1 | 2 | .47  | .67  | .714 |
| Goal setting   | -1 | 2 | .08  | .81  | .776 |
| Problem-solving  | -2 | 1 | -.14 | .64  | .829 |
| Situational perception   | -2 | 1 | -.27 | .76  | .863 |
| Dealing with others  | -2 | 1 | -.28 | .66  | .845 |



|  |    |   |      |     |      |
|--|----|---|------|-----|------|
| Dealing with difficult situations                          | -1 | 2 | .34  | .74 | .888 |
| Dealing with feelings/emotions                             | -1 | 2 | .36  | .74 | .870 |
| Monitoring of internal triggers that can lead to trouble   | -1 | 1 | .17  | .46 | .838 |
| Monitoring of external triggers that can lead to trouble   | -1 | 1 | .14  | .45 | .838 |
| Control of impulsive behaviors that get youth into trouble | -2 | 1 | .10  | .73 | .769 |
| Control of aggression                                      | -2 | 2 | -.15 | .99 | .625 |

\* *Items not retained in the final models.*



**Table 4. Exploratory Factor Analysis Domain Factor Loadings.**

| C.1 Education  |         |       |       |       |
|--|---------|-------|-------|-------|
| Item   | Loading |       |       |       |
| Current school enrollment status   | .496*   |       |       |       |
| Involvement in school activities in most recent term   | .431*   |       |       |       |
| Believes there is value in getting an education  | .854*   |       |       |       |
| Believes school provides an encouraging environment  | .859*   |       |       |       |
| Teachers, staff, or coaches' youth likes or feels comfortable talking with   | .551*   |       |       |       |
| Youth's conduct in the most recent term  | .606*   |       |       |       |
| Number of expulsions & suspensions in the most recent term   | .556*   |       |       |       |
| Attendance in most recent term   | .144*   |       |       |       |
| Youth's academic performance in the most recent school term  | .728*   |       |       |       |
| Interviewer's assessment of likelihood the youth will stay in & graduate from high school or an equivalent vocational school | .877*   |       |       |       |
| C.2 Associations   |         |       |       |       |
| Item   | F1      | F2    | F3    | F4    |
| Interest/involvement pro-social structured activities  | .689*   | -.081 | -.040 | .509* |
| Structured activities in which youth participates  | .818*   | .115  | .213  | -.011 |
| Interest/involvement pro-social unstructured activities  | .132*   | .156  | .077* | .174* |
|  |         |       |       |       |
| Current positive personal relationship(s) with employer(s) or adult coworker(s)  | -.036   | .936* | -.015 | .002  |
| Understanding what is required to maintain a job   | .082    | .543* | .000  | .041  |
|  |         |       |       |       |
| Positive adult non-family relationships not connected to school or employment  | .002    | .160  | .004  | .699* |
| Pro-social community ties  | .010    | .083  | .063  | .748* |
| Friends/companions youth spends time with  | -.083*  | .001  | .646* | .210* |
|  |         |       |       |       |
| Admires/emulates anti-social peers   | .002    | .005  | .882* | .030* |
| Resistance to anti-social peer influence   | .053*   | -.023 | .896* | -.070 |
| C.3 Family   |         |       |       |       |
| Item   | Loading |       |       |       |
| Person youths live with resulting in an increased risk   | .269*   |       |       |       |
| Annual combined income of youth & family   | .190*   |       |       |       |



|   |                |
|---|----------------|
| Jail/imprisonment history of persons who are currently involved with the household                          | .226*          |
| Problem history of parents who are currently involved with the household                                    | .410*          |
| Problem history of siblings who are currently involved with the household                                   | .288*          |
| Support network for family  | .591*          |
| Family willingness to help support youth  | .734*          |
| Family provides opportunities for youth to participate in family activities & decisions affecting the youth | .686*          |
| Youth has run away or been kicked out of home   | .206           |
| Family member(s) youth feels close to/has good relationship with  | .410*          |
| Level of conflict in the family   | .554*          |
| Parental supervision  | .833*          |
| Parental authority & control  | .652*          |
| Consistent appropriate punishment for bad behavior  | .758*          |
| Consistent appropriate rewards for good behavior  | .822*          |
| Parental characterization of youth's anti-social behavior   | .464*          |
| <b>C.4 Alcohol &amp; Drug</b>   |                |
| <b>Item</b>   | <b>Loading</b> |
| Marijuana use   | .706*          |
| Amphetamine use   | .683*          |
| Cocaine/crack cocaine use   | .862*          |
| Heroin/opiate use   | .592*          |
| Other drug use  | .512*          |
| Alcohol disrupting education  | .980*          |
| Alcohol causing family conflict   | .953*          |
| Alcohol interfering with keeping pro-social friends   | .983*          |
| Alcohol causing health problems   | .977*          |
| Alcohol contributing to criminal behavior   | .944*          |
| Drugs disrupting education  | .969*          |
| Drugs causing family conflict   | .964*          |
| Drugs interfering with keeping pro-social friends   | .931*          |
| Drugs causing health problems   | .935*          |
| Drugs contributing to criminal behavior   | .940*          |

|  |                       |            |        |
|--|-----------------------|------------|--------|
| Current alcohol/drug treatment program participation                           |                       | .482*      |        |
| C.5 Mental Health  |                       |            |        |
| Item   |                       | Loading    |        |
| Current suicidal ideation  |                       | .092       |        |
| Currently diagnosed with ADD/ADHD  |                       | .681*      |        |
| Mental health treatment currently prescribed excluding ADD/ADHD treatment      |                       | .883*      |        |
| Mental health medication currently prescribed excluding ADD/ADHD medication    |                       | .890*      |        |
| Mental health problems interfere in working with the youth                     |                       | .779*      |        |
| C.6 Cognitions & Behaviors   |                       |            |        |
| Item   | Attitude/<br>Behavior | Aggression | Skills |
| Optimism   | .565*                 | .017       | .195*  |
| Impulsive, acts before thinking  | -.032                 | .495*      | .405*  |
| Belief in control over anti-social behavior                                    | .573*                 | -.016      | .167*  |
| Empathy, remorse, sympathy, or feelings for the victim(s) of criminal behavior | .578*                 | .180*      | .100*  |
| Respect for property of others   | .487*                 | .352*      | .065*  |
| Respect for authority figures  | .551*                 | .451*      | -.010  |
| Attitude toward responsible law-abiding behavior                               | .653*                 | .280*      | -.026  |
| Accepts responsibility for anti-social behavior                                | .679*                 | .249*      | -.003  |
| Belief in successfully meeting conditions of court supervision                 | 1.009*                | -.231      | -.002  |
|  |                       |            |        |
| Tolerance for frustration  | .106                  | .706*      | .125*  |
| Hostile interpretation of actions & intentions of others                       | .518*                 | .469*      | .035   |
| Belief in yelling & verbal aggression to resolve conflict                      | .230                  | .727*      | .000   |
| Belief in fighting & physical aggression to resolve conflict                   | .202                  | .757*      | -.028  |



|   |       |        |       |
|---|-------|--------|-------|
| Reports/evidence of violence not included in criminal history | -.063 | .657*  | -.037 |
|   |       |        |       |
| Consequential thinking  | .204* | .098   | .517* |
| Goal setting  | .484* | .010   | .395* |
| Problem-solving   | .195* | -.008  | .727* |
| Situational perception  | .243* | -.032* | .729* |
| Dealing with others   | .219* | -.009  | .719* |
| Dealing with difficult situations                             | .027  | .294*  | .727* |
| Dealing with feelings/emotions                                | .012  | .327*  | .690* |
| Monitoring of internal triggers that can lead to trouble      | .008  | .155   | .799* |
| Monitoring of external triggers that can lead to trouble      | -.023 | .138   | .841* |
| Control of impulsive behaviors that get youth into trouble    | -.067 | .374*  | .596* |
| Control of aggression   | .131  | .493*  | .173* |

## Tables 5a-g. Sex/Gender Invariance Tests for MPACT-6 domains.

Table 5a. Education.

| Model | Tests of Invariance & Structure | df  | CFI  | TLI  | RMSEA [90% C.I.]   | $\Delta$ df | $\Delta$ CFI | $\Delta$ TLI |
|-------|---------------------------------|-----|------|------|--------------------|-------------|--------------|--------------|
| A1    | Configural invariance           | 70  | .973 | .965 | .004 [.004 - .005] | --          | --           | --           |
| A2    | Metric invariance               | 79  | .981 | .978 | .003 [.003 - .004] | 9           | +.008        | +.013        |
| A3    | Scalar invariance               | 105 | .985 | .987 | .003 [.002 - .003] | 26          | +.004        | +.009        |
| A4    | Residual invariance - freed     | 95  | .985 | .987 | .003 [.002 - .003] | --          | --           | --           |
| A5    | Residual invariance - fixed     | 105 | .985 | .987 | .003 [.002 - .003] | 10          | .000         | .000         |
| A6    | Factor variance invariance      | 106 | .988 | .990 | .002 [.002 - .003] | 1           | +.003        | +.003        |
| A7    | Factor mean invariance          | 107 | .990 | .991 | .002 [.002 - .003] | 1           | +.002        | +.001        |

Table 5b. Association = Commitment + Employment + Anti-Social Association.

| Model | Tests of Invariance & Structure   | df  | CFI  | TLI  | RMSEA [90% C.I.]   | $\Delta$ df | $\Delta$ CFI | $\Delta$ TLI |
|-------|---|-----|------|------|--------------------|-------------|--------------|--------------|
| B1    | Measurement model   | 58  | .975 | .961 | .002 [.001 - .003] | --          | --           | --           |
| B2*   | 2 <sup>nd</sup> & 3 <sup>rd</sup> order model/configural invariance             | 66  | .980 | .972 | .002 [.000 - .002] | 8           | +.005        | +.011        |
| B3    | 1 <sup>st</sup> , 2 <sup>nd</sup> , and 3 <sup>rd</sup> order metric invariance | 72  | .977 | .971 | .002 [.001 - .002] | 6           | .003         | .001         |
| B4    | 1 <sup>st</sup> , 2 <sup>nd</sup> , and 3 <sup>rd</sup> order scalar invariance | 93  | .987 | .987 | .001 [.000 - .002] | 21          | +.010        | +.016        |
| B5    | Residual invariance - freed   | 83  | .983 | .982 | .001 [.000 - .002] | --          | --           | --           |
| B6    | Residual invariance - fixed   | 93  | .987 | .987 | .001 [.000 - .002] | 10          | +.004        | +.005        |
| B7    | Factor variance invariance  | 99  | .990 | .991 | .001 [.000 - .002] | 6           | +.003        | +.004        |
| B8    | Factor mean invariance  | 100 | .991 | .992 | .001 [.000 - .002] | 1           | +.001        | +.001        |

\*First- and second-order factor loadings were set to be equal within groups to obtain over-identified model.

Table 5c. Family.

| Model | Tests of Invariance & Structure | df  | CFI  | TLI  | RMSEA [90% C.I.]   | $\Delta$ df | $\Delta$ CFI | $\Delta$ TLI |
|-------|---------------------------------|-----|------|------|--------------------|-------------|--------------|--------------|
| C1*   | Configural invariance           | 202 | .946 | .936 | .002 [.001 - .002] | --          | --           | --           |
| C2*   | Metric invariance               | 217 | .956 | .951 | .002 [.001 - .002] | 15          | +.010        | +.015        |
| C3*   | Scalar invariance               | 251 | .959 | .961 | .001 [.001 - .002] | 34          | +.003        | +.010        |
| C4*   | Residual invariance - freed     | 235 | .954 | .953 | .002 [.001 - .002] | --          | --           | --           |
| C5*   | Residual invariance - fixed     | 251 | .959 | .961 | .001 [.001 - .002] | 16          | +.005        | +.008        |
| C6*   | Factor variance invariance      | 252 | .962 | .964 | .001 [.001 - .002] | 1           | +.003        | +.003        |
| C7*   | Factor mean invariance          | 253 | .964 | .966 | .001 [.001 - .002] | 1           | +.002        | +.002        |

\*Correlated residual added between "Level of conflict in the family" and "Parental authority & control"  
Correlated residual added between "Problem history of siblings who are currently involved with the household"  
and" Problem history of parents who are currently involved with the household." Correlated residual added  
between "Problem history of parents who are currently involved with the household" and Annual combined  
income of youth & family."



Table 5d. Alcohol & Drugs.

| Model | Tests of Invariance & Structure | df  | CFI  | TLI  | RMSEA [90% C.I.]   | $\Delta$ df | $\Delta$ CFI | $\Delta$ TLI |
|-------|---------------------------------|-----|------|------|--------------------|-------------|--------------|--------------|
| D1*   | Configural invariance           | 208 | .957 | .951 | .002 [.002 - .003] | --          | --           | --           |
| D2    | Metric invariance               | 223 | .977 | .975 | .002 [.001 - .002] | 15          | +.020        | +.024        |
| D3    | Scalar invariance               | 240 | .979 | .979 | .002 [.001 - .002] | 17          | +.002        | +.004        |
| D4    | Residual invariance - freed     | 224 | .963 | .960 | .002 [.002 - .002] | --          | --           | --           |
| D5    | Residual invariance - fixed     | 240 | .979 | .979 | .002 [.001 - .002] | 16          | +.016        | +.019        |
| D6    | Factor variance invariance      | 241 | .976 | .976 | .002 [.001 - .002] | 1           | .003         | .003         |
| D7    | Factor mean invariance          | 242 | .976 | .976 | .002 [.001 - .002] | 1           | +.000        | +.000        |

\*Correlated residual added between "Alcohol causing health problems" and "Cocaine/crack cocaine use."

Table 5e. Mental Health.

| Model | Tests of Invariance & Structure | df | CFI  | TLI  | RMSEA [90% C.I.]   | $\Delta$ df | $\Delta$ CFI | $\Delta$ TLI |
|-------|---------------------------------|----|------|------|--------------------|-------------|--------------|--------------|
| E1    | Configural invariance           | 4  | .974 | .922 | .005 [.004 - .007] | --          | --           | --           |
| E2    | Metric invariance               | 7  | .986 | .977 | .003 [.002 - .004] | 3           | +.012        | +.055        |
| E3    | Scalar invariance               | 13 | .993 | .994 | .001 [.000 - .003] | 6           | +.007        | +.017        |
| E4    | Residual invariance - freed     | 9  | .979 | .972 | .003 [.002 - .004] | --          | --           | --           |
| E5    | Residual invariance - fixed     | 13 | .993 | .994 | .001 [.000 - .003] | 4           | +.014        | +.022        |
| E6    | Factor variance invariance      | 14 | .990 | .992 | .002 [.000 - .003] | 1           | .003         | .002         |
| E7    | Factor mean invariance          | 15 | .997 | .998 | .001 [.000 - .002] | 1           | +.007        | +.006        |

Table 5f. Cognitions & Behaviors = Attitude/Behavioral + Aggression + Skills.

| Model* | Tests of Invariance & Structure                             | df  | CFI  | TLI  | RMSEA [90% C.I.]   | $\Delta$ df | $\Delta$ CFI | $\Delta$ TLI |
|--------|---|-----|------|------|--------------------|-------------|--------------|--------------|
| F1     | Measurement model   | 546 | .977 | .975 | .003 [.003 - .003] | --          | --           | --           |
| F2     | 2 <sup>nd</sup> model/configural invariance                 | 550 | .976 | .973 | .003 [.003 - .003] | 4           | .001         | .002         |
| F3     | 1 <sup>st</sup> , 2 <sup>nd</sup> , order metric invariance | 571 | .981 | .980 | .003 [.002 - .003] | 21          | +.005        | +.007        |
| F4     | 1 <sup>st</sup> , 2 <sup>nd</sup> order scalar invariance   | 633 | .983 | .984 | .002 [.002 - .003] | 62          | +.002        | +.004        |
| F5     | Residual invariance - freed                                 | 607 | .977 | .978 | .003 [.002 - .003] | --          | --           | --           |
| F6     | Residual invariance - fixed                                 | 633 | .983 | .984 | .002 [.002 - .003] | 26          | +.006        | +.006        |
| F7     | Factor variance invariance                                  | 636 | .985 | .985 | .002 [.002 - .002] | 3           | +.002        | +.001        |
| F8     | Factor mean invariance                                      | 637 | .985 | .986 | .002 [.002 - .002] | 1           | +.000        | +.001        |

\*First-order factor loadings were set to be equal within groups to obtain over-identified model.

Table 5g. Global Youth Needs.

| Model       | Tests of Invariance/Structure | df   | CFI  | TLI  | RMSEA [90% C.I.]   | $\Delta$<br>df | $\Delta$<br>CFI | $\Delta$<br>TLI |
|-------------|-------------------------------|------|------|------|--------------------|----------------|-----------------|-----------------|
| <b>G1*</b>  | Measurement/Baseline Model    | 6529 | .953 | .953 | .001 [.001 - .001] | --             | --              | --              |
| <b>G2**</b> | Factor mean invariance        | 6545 | .951 | .951 | .001 [.001 - .001] | 16             | .002            | .002            |

\*The measurement/baseline model include all the identified six full invariance models, namely, model A7, B8, C7, D7, E7 and F8.

\*\*A correlated residual was added between Mental Health and Cognitions & Behaviors. The final model contains 4<sup>th</sup> -order metric, scalar, variance invariance and mean equal across sex groups.

## Tables 6a-g. Race/Ethnicity Invariance Tests for MPACT-6 domains.

Table 6a. Education.

| Model | Tests of Invariance & Structure | df  | CFI  | TLI  | RMSEA [90% C.I.]   | Δ df | Δ CFI | Δ TLI |
|-------|---------------------------------|-----|------|------|--------------------|------|-------|-------|
| A1    | Configural invariance           | 140 | .977 | .971 | .007 [.007 - .008] | --   | --    | --    |
| A2    | Metric invariance               | 167 | .980 | .978 | .006 [.006 - .007] | 27   | +.003 | +.007 |
| A3    | Scalar invariance               | 245 | .984 | .988 | .005 [.004 - .005] | 78   | +.004 | +.010 |
| A4    | Residual invariance - freed     | 215 | .985 | .987 | .005 [.004 - .005] | --   | --    | --    |
| A5    | Residual invariance - fixed     | 245 | .984 | .988 | .005 [.004 - .005] | 30   | .001  | +.001 |
| A6    | Factor variance invariance      | 248 | .985 | .989 | .005 [.004 - .005] | 3    | +.001 | +.001 |
| A7    | Factor mean invariance          | 251 | .985 | .989 | .005 [.004 - .005] | 3    | +.000 | +.000 |

Table 6b. Association = Commitment + Employment + Anti-Social Association.

| Model* | Tests of Invariance & Structure   | df  | CFI  | TLI  | RMSEA [90% C.I.]   | Δ df | Δ CFI | Δ TLI |
|--------|---|-----|------|------|--------------------|------|-------|-------|
| B1     | Measurement model   | 116 | .975 | .962 | .003 [.002 - .004] | --   | --    | --    |
| B2*    | 2 <sup>nd</sup> & 3 <sup>rd</sup> order model/configural invariance             | 132 | .978 | .970 | .002 [.002 - .003] | 16   | +.003 | +.008 |
| B3     | 1 <sup>st</sup> , 2 <sup>nd</sup> , and 3 <sup>rd</sup> order metric invariance | 150 | .979 | .974 | .002 [.001 - .003] | 18   | +.001 | +.004 |
| B4     | 1 <sup>st</sup> , 2 <sup>nd</sup> , and 3 <sup>rd</sup> order scalar invariance | 213 | .985 | .988 | .002 [.000 - .002] | 63   | +.006 | +.014 |
| B5     | Residual invariance - freed   | 183 | .986 | .986 | .002 [.000 - .003] | --   | --    | --    |
| B6     | Residual invariance - fixed   | 213 | .985 | .988 | .002 [.000 - .002] | 30   | .001  | +.002 |
| B7     | Factor variance invariance  | 231 | .982 | .986 | .002 [.001 - .002] | 18   | .003  | .002  |
| B8     | Factor mean invariance  | 234 | .981 | .985 | .002 [.001 - .002] | 3    | .001  | .001  |

\*First- and second-order factor loadings were set to be equal within groups to obtain over-identified model.

Table 6c. Family.

| Model* | Tests of Invariance & Structure | df  | CFI  | TLI  | RMSEA [90% C.I.]   | Δ df | Δ CFI | Δ TLI |
|--------|---------------------------------|-----|------|------|--------------------|------|-------|-------|
| C1     | Configural invariance           | 404 | .946 | .936 | .004 [.003 - .004] | --   | --    | --    |
| C2     | Metric invariance               | 449 | .953 | .949 | .003 [.003 - .004] | 45   | +.007 | +.013 |
| C3     | Scalar invariance               | 551 | .956 | .962 | .003 [.003 - .003] | 102  | +.003 | +.013 |
| C4     | Residual invariance - freed     | 503 | .953 | .956 | .003 [.003 - .004] | --   | --    | --    |
| C5     | Residual invariance - fixed     | 551 | .956 | .962 | .003 [.003 - .003] | 48   | +.003 | +.006 |
| C6     | Factor variance invariance      | 554 | .954 | .960 | .003 [.003 - .003] | 3    | .002  | .002  |
| C7     | Factor mean invariance          | 557 | .956 | .962 | .003 [.002 - .003] | 3    | +.002 | +.002 |

\*Correlated residual added between "Level of conflict in the family" and "Parental authority & control"  
Correlated residual added between "Problem history of siblings who are currently involved with the household"  
and "Problem history of parents who are currently involved with the household." Correlated residual added  
between "Problem history of parents who are currently involved with the household" and Annual combined  
income of youth & family."

Table 6d. Alcohol & Drugs.

| Model | Tests of Invariance & Structure | df  | CFI  | TLI  | RMSEA [90% C.I.]   | $\Delta$ df | $\Delta$ CFI | $\Delta$ TLI |
|-------|---------------------------------|-----|------|------|--------------------|-------------|--------------|--------------|
| D1*   | Configural invariance           | 416 | .966 | .961 | .004 [.004 - .005] | --          | --           | --           |
| D2    | Metric invariance               | 461 | .978 | .977 | .003 [.003 - .004] | 45          | +.012        | +.016        |
| D3    | Scalar invariance               | 512 | .980 | .981 | .003 [.003 - .003] | 51          | +.002        | +.004        |
| D4    | Residual invariance - freed     | 464 | .972 | .971 | .004 [.003 - .004] | --          | --           | --           |
| D5    | Residual invariance - fixed     | 512 | .980 | .981 | .003 [.003 - .003] | 48          | +.008        | +.010        |
| D6    | Factor variance invariance      | 515 | .978 | .980 | .003 [.003 - .003] | 3           | .002         | .001         |
| D7    | Factor mean invariance          | 518 | .979 | .980 | .003 [.003 - .003] | 3           | +.001        | +.000        |

\*Correlated residual added between "Alcohol causing health problems" and "Cocaine/crack cocaine use."

Table 6e. Mental Health.

| Model | Tests of Invariance & Structure | df | CFI  | TLI  | RMSEA [90% C.I.]   | $\Delta$ df | $\Delta$ CFI | $\Delta$ TLI |
|-------|---------------------------------|----|------|------|--------------------|-------------|--------------|--------------|
| E1    | Configural invariance           | 8  | .968 | .905 | .014 [.012 - .017] | --          | --           | --           |
| E2    | Metric invariance               | 17 | .989 | .985 | .006 [.004 - .007] | 9           | +.021        | +.080        |
| E3    | Scalar invariance               | 35 | .990 | .993 | .004 [.002 - .005] | 18          | +.001        | +.008        |
| E4    | Residual invariance - freed     | 25 | .991 | .991 | .004 [.003 - .006] | --          | --           | --           |
| E5    | Residual invariance - fixed     | 35 | .990 | .993 | .004 [.002 - .005] | 10          | .001         | +.002        |
| E6    | Factor variance invariance      | 38 | .995 | .997 | .003 [.001 - .004] | 3           | +.005        | +.004        |
| E7    | Factor mean invariance          | 41 | .995 | .997 | .002 [.000 - .004] | 3           | +.000        | +.000        |

Table 6f. Cognitions & Behaviors = Attitude/Behavioral + Aggression + Skills.

| Model* | Tests of Invariance & Structure                           | df   | CFI  | TLI  | RMSEA [90% C.I.]   | $\Delta$ df | $\Delta$ CFI | $\Delta$ TLI |
|--------|---|------|------|------|--------------------|-------------|--------------|--------------|
| F1     | Measurement model   | 1094 | .971 | .969 | .004 [.004 - .005] | --          | --           | --           |
| F2     | 2 <sup>nd</sup> model/configural invariance               | 1102 | .969 | .967 | .004 [.004 - .005] | 8           | .002         | .002         |
| F3     | 1 <sup>st</sup> , 2 <sup>nd</sup> order metric invariance | 1168 | .979 | .979 | .004 [.003 - .004] | 66          | +.010        | +.012        |
| F4     | 1 <sup>st</sup> , 2 <sup>nd</sup> order scalar invariance | 1348 | .980 | .982 | .003 [.003 - .003] | 180         | +.001        | +.003        |
| F5     | Residual invariance - freed                               | 1273 | .973 | .975 | .004 [.004 - .004] | --          | --           | --           |
| F6     | Residual invariance - fixed                               | 1348 | .980 | .982 | .003 [.003 - .003] | 75          | +.007        | +.007        |
| F7     | Factor variance invariance                                | 1360 | .984 | .986 | .003 [.003 - .003] | 12          | +.004        | +.004        |
| F8     | Factor mean invariance                                    | 1363 | .985 | .987 | .003 [.003 - .003] | 3           | +.001        | +.001        |

\*First-order factor loadings were set to be equal within groups to obtain over-identified model.



Table 6g. Global Youth Needs.

| Model       | Tests of Invariance/Structure | df    | CFI  | TLI  | RMSEA [90% C.I.]   | $\Delta$ df | $\Delta$ CFI | $\Delta$ TLI |
|-------------|-------------------------------|-------|------|------|--------------------|-------------|--------------|--------------|
| <b>G1*</b>  | Measurement/Baseline Model    | 13313 | .946 | .947 | .002 [.001 - .002] | --          | --           | --           |
| <b>G2**</b> | Factor mean invariance        | 13349 | .940 | .952 | .002 [.002 - .002] | 36          | .006         | +.005        |

\*The measurement/baseline model include all the identified six full invariance models, namely, model A7, B8, C7, D7, E7 and F8.

\*\*A correlated residual was added between Mental Health and Cognitions & Behaviors. The final model contains 4<sup>th</sup> -order metric, scalar, variance invariance and mean equal across four race groups.

Figure 1. Education.

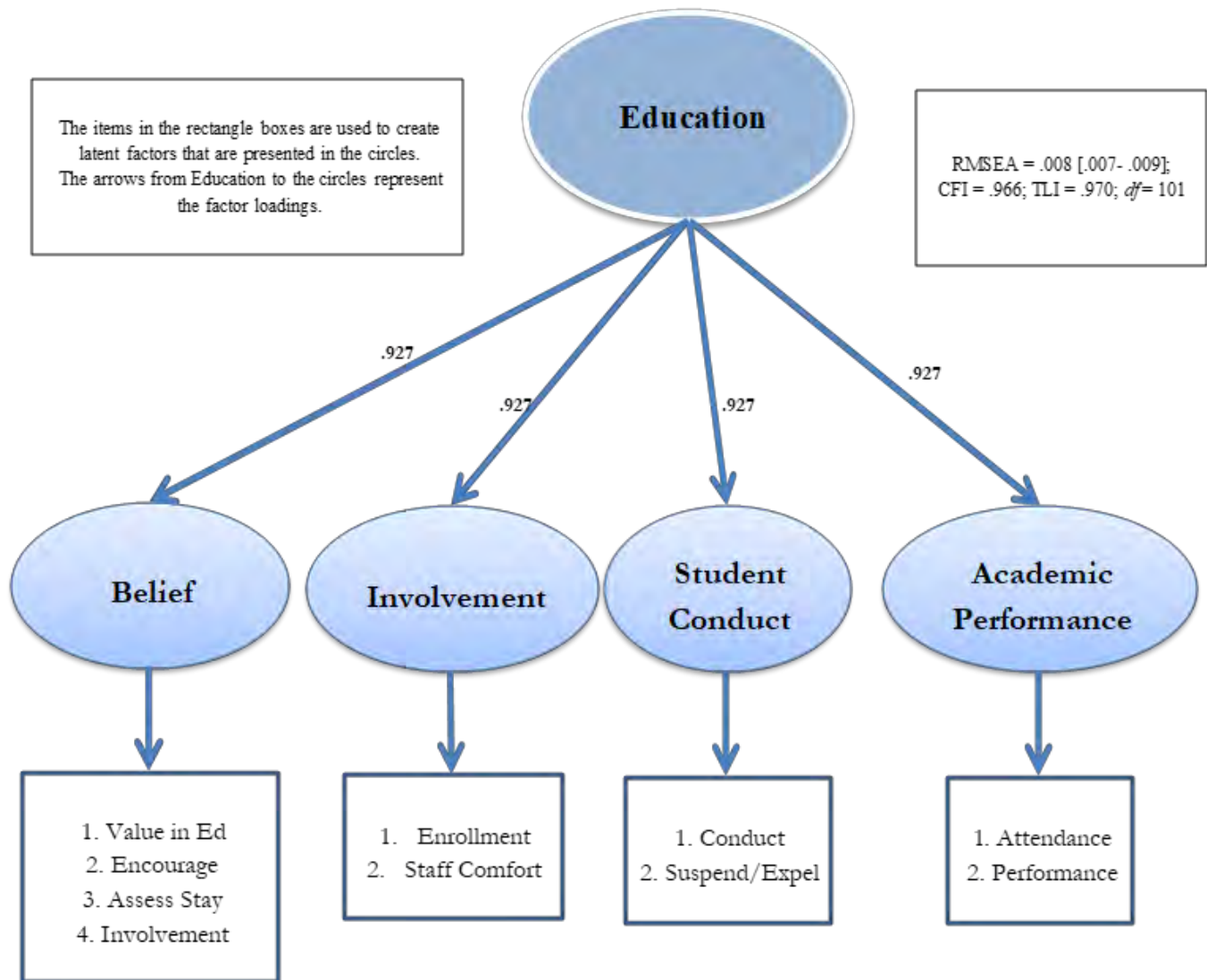


Figure 2. Associations.

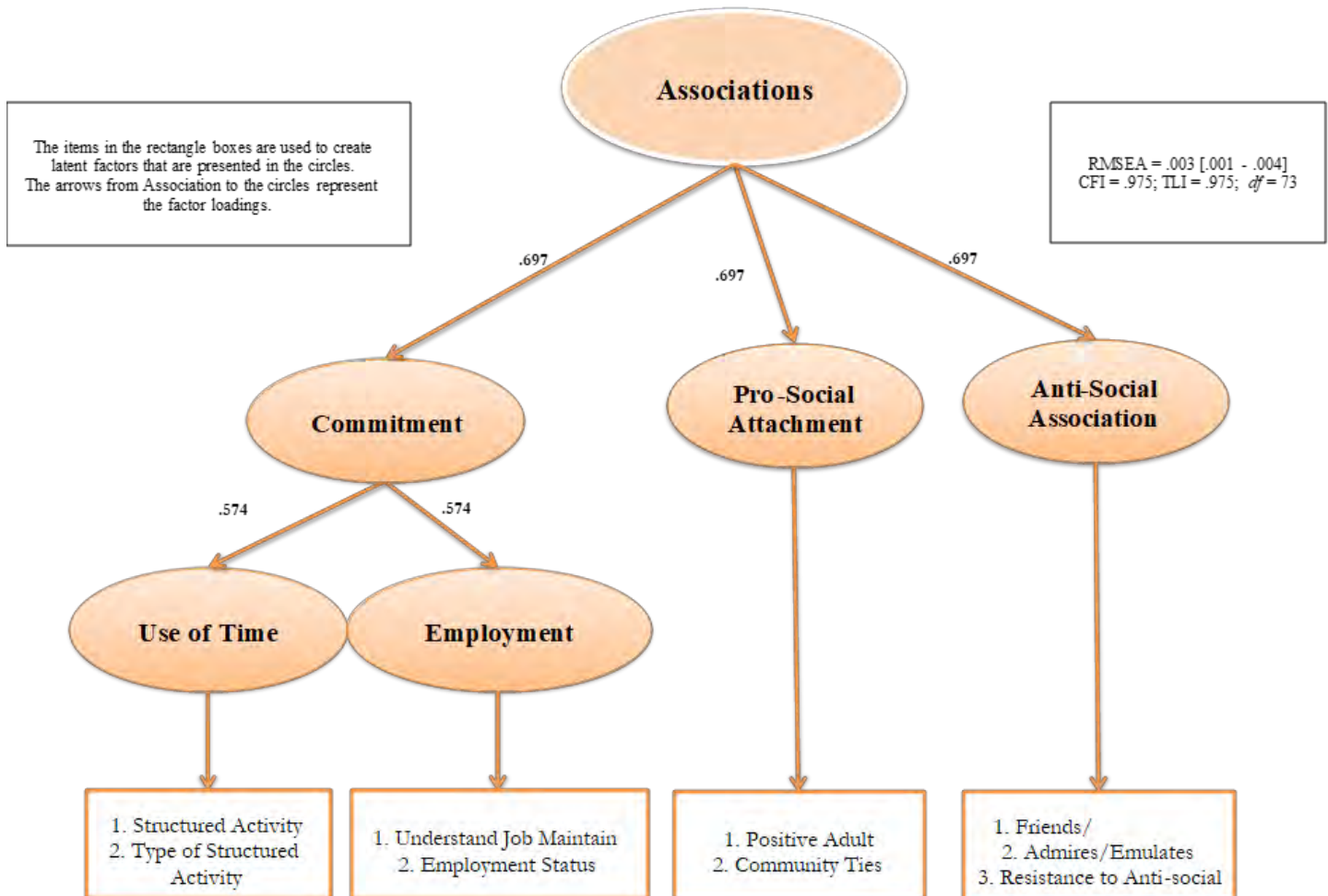


Figure 3. Family.

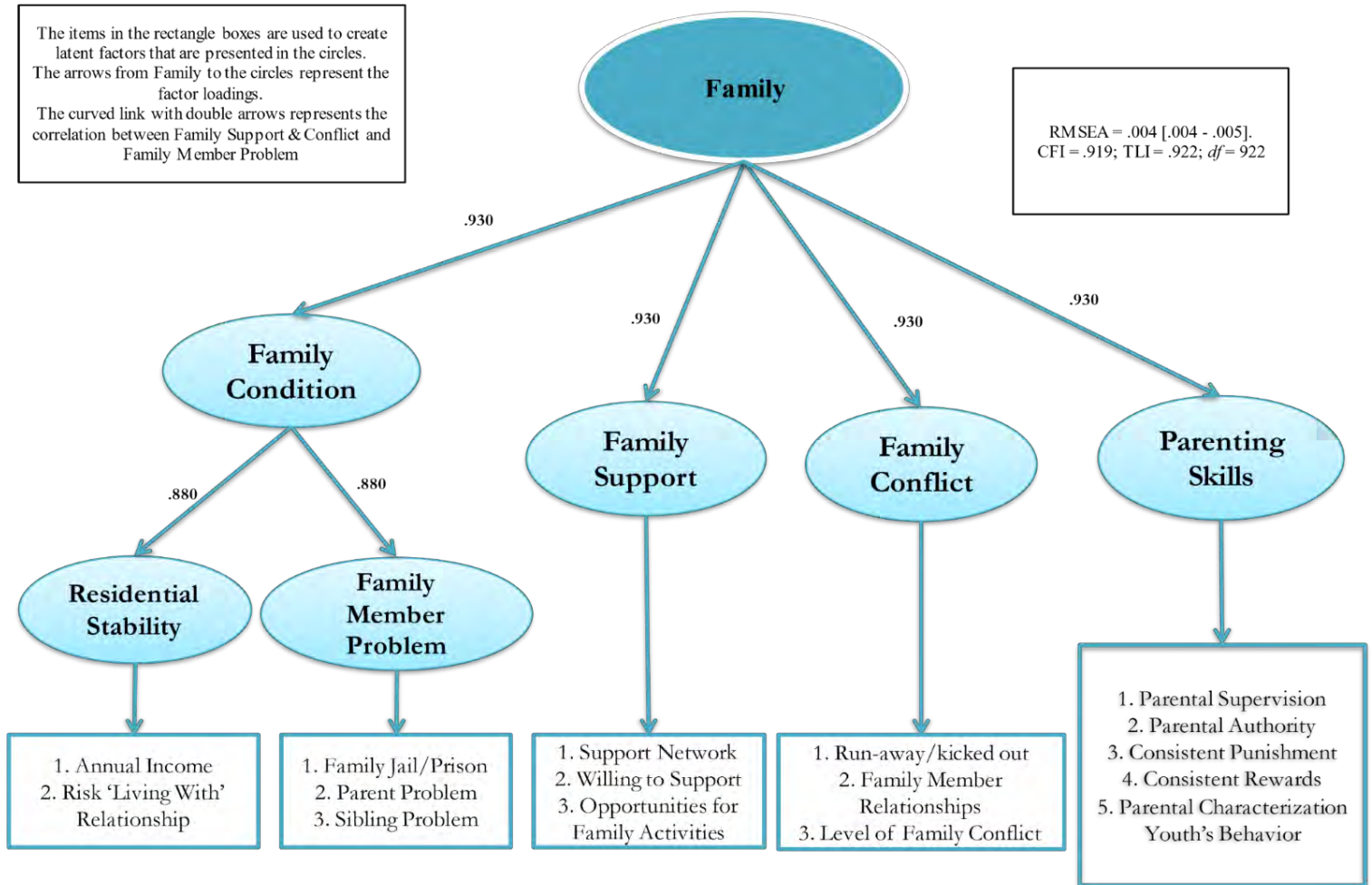




Figure 4. Alcohol & Drug.

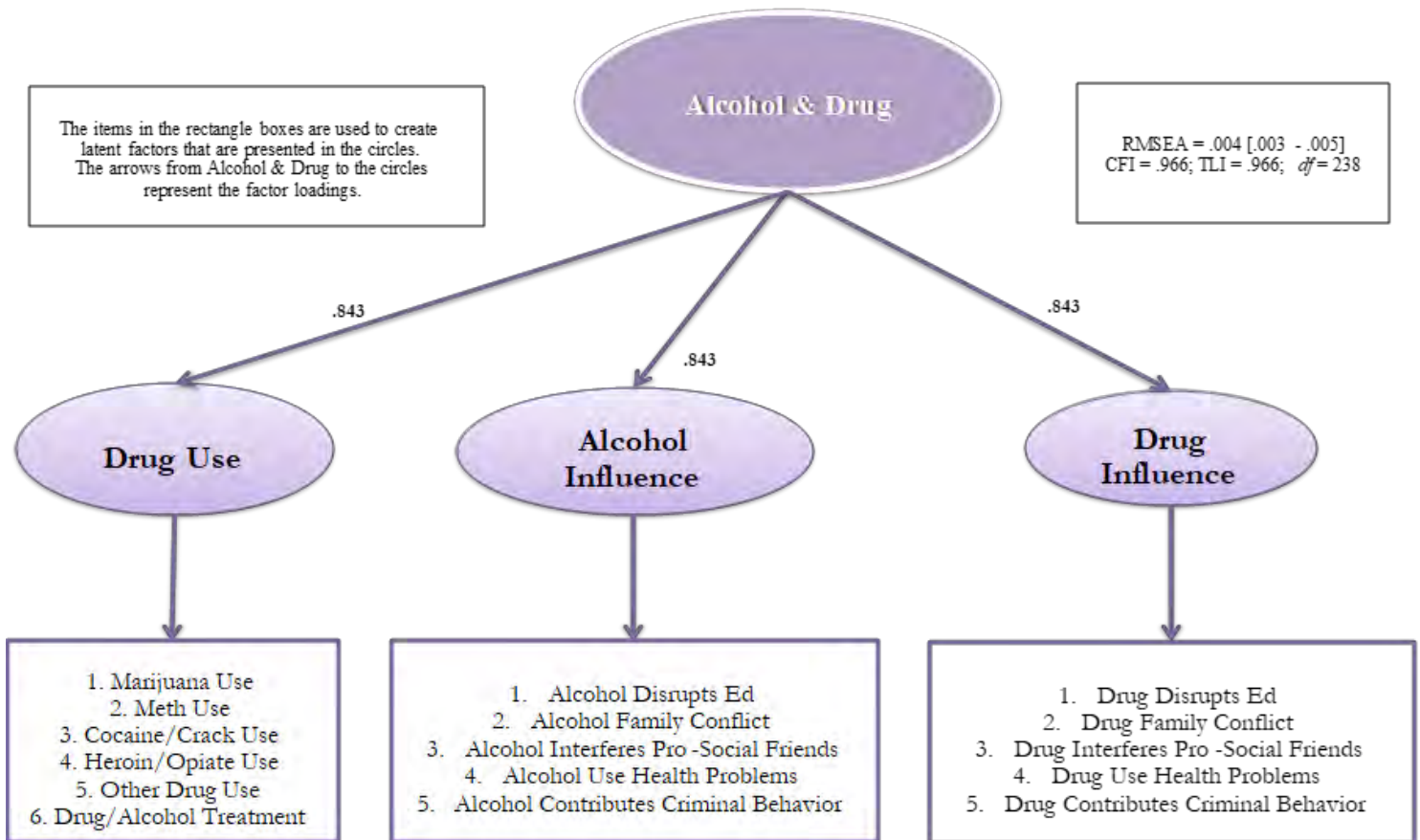


Figure 5. Mental Health.

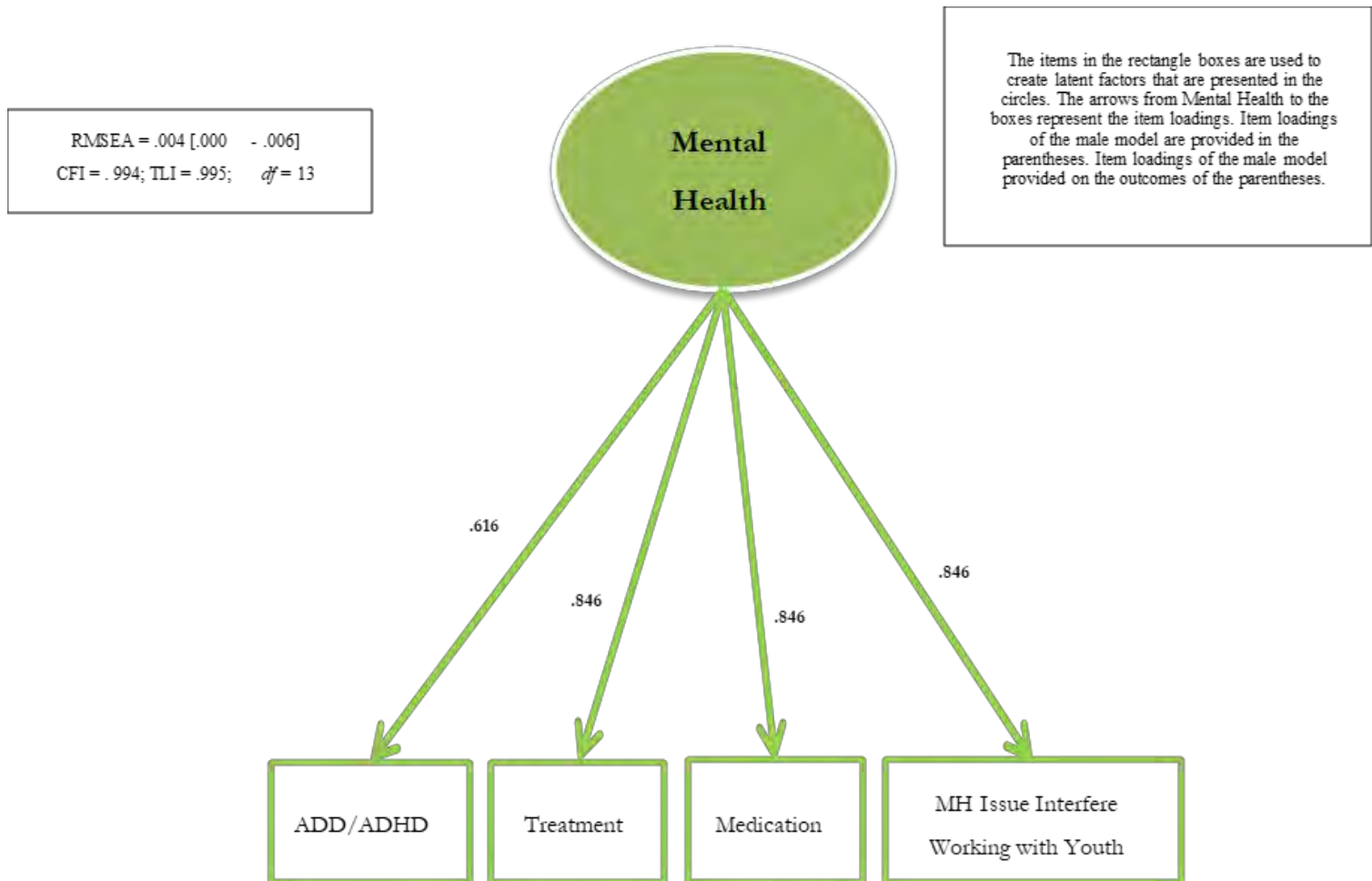


Figure 6. Cognitions & Behaviors.

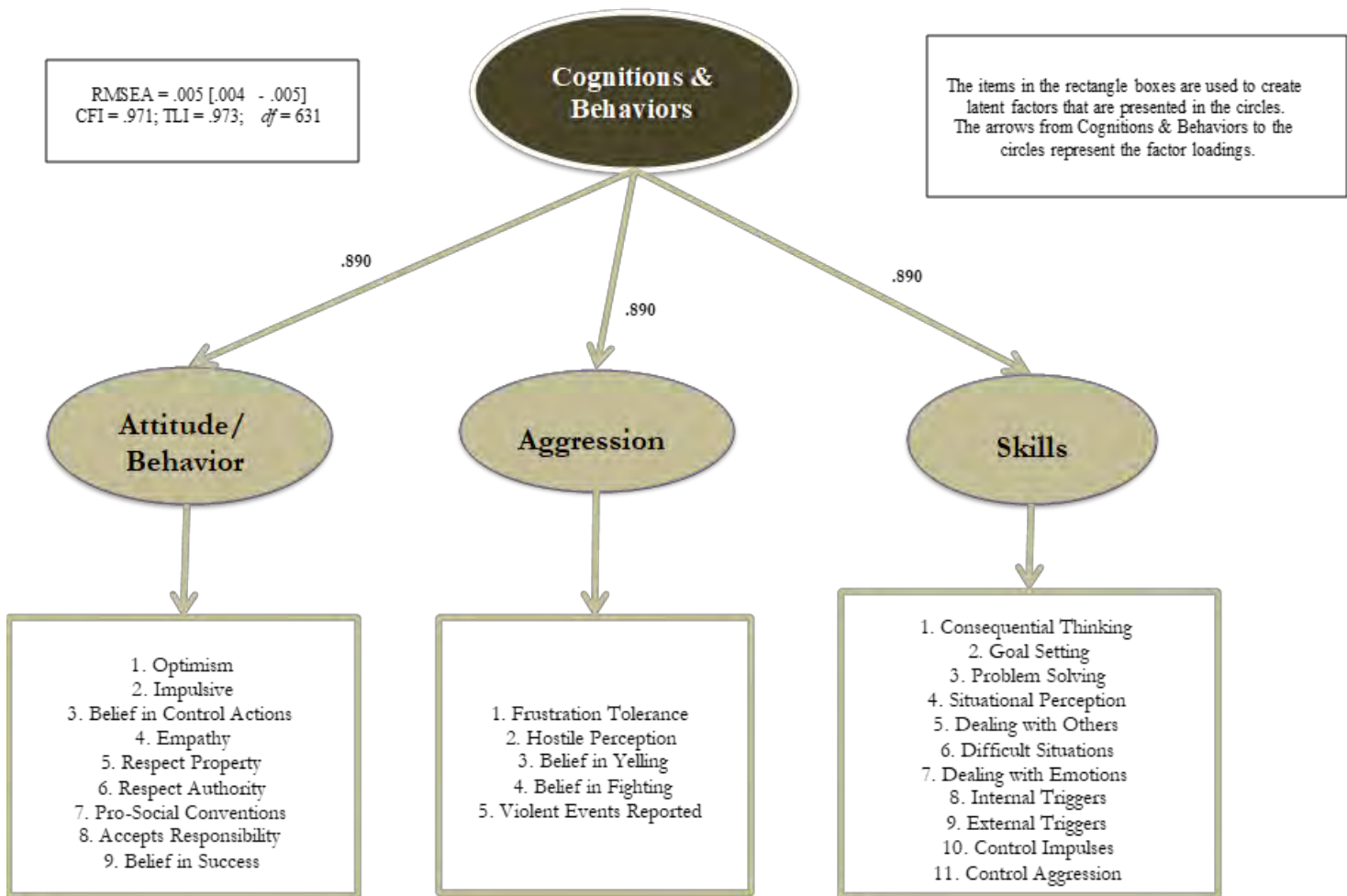


Figure 7. Global Factor (G-factor).

