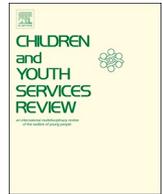




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Using latent class analysis to identify the complex needs of youth on probation

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ABSTRACT

Youth involved with the juvenile justice system have higher rates of unmet social and psychological service needs than the general population. Yet, scant research has addressed the potentially complex needs of youth on probation. This study is thus a first step in improving our ability to promote positive youth development and improved outcomes from youth on probation. It uses administrative data on probation youth from FY2011-2013 in a mid-Atlantic state. We estimated latent class models based on the ordinal scoring (high, moderate, none/low) of the 25 subscales from a standardized assessment administered at intake. In order to test whether groups were distinct, we examined a range of variables, including the official risk classification and recidivism rates measured by official rearrests and reconvictions. We report the demographic differences between the estimated groups, as well as adverse childhood experiences, school and employment status, previous legal history, and substance use history. Ultimately, the seven-class model produced four groups that others have noted: a relatively low needs (lowest need), relatively high needs (complex needs), substance use service needs, and mental health service needs. The other three groups that emerged include two gender specific groups (one for male and one for female high-need groups) and a group with skills needs that lacks supportive and protective skills. The analyses will facilitate a better appreciation for the service needs of moderate risk youth. Youth on probation are not a uniform population; they reflect tremendous heterogeneity, and probation systems should embrace systemic responsiveness to provide appropriate services to improve youth outcomes. Advancing efforts to provide a broader spectrum of services that address multi-morbid conditions can ensure that youth have opportunities to improve their quality of life during the period of supervision.

1. Introduction

The juvenile justice system involves the over 1.4 million youth who are arrested annually (Sickmund & Puzanzhera, 2014). These youth have higher rates of unmet social and psychological service needs than the general population (Maschi, Hatcher, Schwalbe, & Rosato, 2008). This may be, in part, due to their complicated array of service needs, as indicated by higher risk of these factors: adverse childhood experiences including chronic stress in their family and neighborhood environments (Baglivio et al., 2014; Clements-Nolle & Waddington, 2019; Fagan & Novak, 2017), mental health disorders (Abram, Teplin, McClelland, & Dulcan, 2003; Teplin, Abram, McClelland, Dulcan, & Mericle, 2002), learning disabilities and elevated high school noncompletion rates (Hjalmarsen, 2008; Kirk & Sampson, 2013), employment and stable employment as adults (Apel & Sweeten, 2010; Sampson & Laub, 1997), and higher risk for diseases and negative adult health outcomes

(Barnert et al., 2019). Collectively youth involved in the juvenile justice system are more likely to have negative lifelong experiences and only a small fraction report achieving a limited number of positive long-term outcomes after their involvement (Mendel, 2007).

The probation system provides a prime opportunity for intervention, since youth on probation have come to the attention of the juvenile justice system for behavioral issues but authorities have not considered them to be “dangerous” or requiring secure detention. Youth on probation have high recidivism rates, and we lack a systematic understanding of how sanctions and interventions can facilitate a process of desistance (Mulvey et al., 2004; Mulvey & Schubert, 2012). We also lack information on how to build systems of care that promote positive youth development and address the unmet needs of the youth through evidence-based programming. For example, many interventions focus on a single need area (e.g. education, substance abuse, mental illness, etc.). They therefore cannot address the myriad of needs that youth

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present. Few programs deal with multi-need issues, youth case workers tend to lack the skills to address multi-needs, and the system lacks the resources to handle complex issues like suicide, HIV risk behaviors, or even the COVID-19 pandemic. We could vastly improve our interventions to support youth involved in the juvenile justice system to promote successful transitions to adulthood and maximize their future contributions. This study contributes to our systematic knowledge base through an examination of the complex needs of these youth, with the goal of informing intervention design, services, and policies. The study calls for a systemic responsiveness system for youth in the justice system.

1.1. Risk assessments in the juvenile justice system

Many juvenile justice systems have started using standardized risk and/or needs assessment tools in an attempt to predict recidivism. Risk and need assessments in criminal and juvenile justice refer to actuarial assessments that identify various factors that promote or inhibit involvement in crime (Slobogin, 2013). Dynamic risk and protective factors may change due to maturation and learned skills while static factors do not (Slobogin, 2013). Typical static factors include age of first arrest, number of arrests, number of detentions, and other characteristics of justice involvement. Dynamic factors include community/family support, substance use behaviors, values, attitudes, and educational achievements. Risk and need assessments identify services and interventions that can minimize the static risk factors and bolster the dynamic protective factors (Jones, Brown, Robinson, & Frey, 2016).

Historically, four generations of design have shaped criminal risk and assessment tools. The first generation of risk assessments relied on the subjective judgments of professionals who would gauge the safety risks a person poses to others (Bonta, Harman, Hann, & Cormier, 1996). Second generation risk assessments relied heavily on criminal history to determine risk of recidivism (Baird et al., 2013). These assessments used around a dozen different mostly static empirical attributes (Andrews, Bonta, & Wormith, 2006) to predict recidivism and classify by severity of risk (Schwalbe, 2008). These assessments aimed to identify restriction and supervision levels for each category of risk (Schwalbe, 2008). Third generation risk assessments survey both static and dynamic risk factors and use them to predict recidivism (Andrews et al., 2006). Fourth generation risk assessments include additional protective factors and reference responsiveness, differentiate static and dynamic factors, and give recommendations for case management (Baird et al., 2013). The fourth generation assessment tool the Youth Assessment Screening Instrument (YASI) originated in Washington State (Baglivio, 2009). The Washington State Institute of Public Policy and the Washington State Association of Juvenile Court Administrators designed YASI with the goal of both enhancing the effectiveness of treatment systems by targeting youth to services based on their area of need and to protect the public from future crimes through appropriate clinical supervision (Jones et al., 2016).

Most evaluations of risk assessment tools evaluate their predictive validity (Schwalbe, 2007; Skeem, Kennealy, Tatar, Hernandez, & Keith, 2017). For the most part findings indicate a higher likelihood of recidivism among youth with higher scores on validated risk assessment tools such as the YASI than those with lower scores (Baglivio, 2009; Schwalbe, 2007; Skeem, Scott, & Mulvey, 2014). Local juvenile justice agencies use third and fourth generation tools to identify service needs, and these tools could support the development of interventions to address specific (multi)needs of individuals (Taxman & Caudy, 2015).

While attention has focused on honing risk assessments' accuracy in predicting recidivism outcomes, research has scarcely addressed using this wealth of data to examine the broad service needs of these youths and developing appropriate services that meet these needs. Many risk assessment tools provide overall scores and categories (e.g., high, medium, low), but do not differentiate between domains. However, some domains predict recidivism more strongly than others. For example, one study found stronger associations between environmental

and personal characteristics and outcomes than legal history (Baglivio, 2009). Another found that substance dependence and criminal cognitions predict outcomes better than family support, peer associations, or other factors (Taxman & Caudy, 2015). Also, individual level risk factors may cluster, such as in environmental situations in more disordered neighborhoods. Thus exclusionary discipline incidents may seem like individual factors but be far more common in under-resourced schools (Rodriguez, 2013). Few studies have systematically examined multi-needs to determine which single factor or patterns of clusters predict different outcomes, and thus agencies often lack the capacity to offer services to facilitate more positive youth development especially among youth with complex needs.

1.2. Identifying patterns of risk and protective factors

Agencies tend to use risk profiles to identify a primary need for an individual, although two studies illustrate that various types of risks may cluster in patterns (Onifade et al., 2008; Schwalbe, Macy, Day, & Fraser, 2008). In light of such clustering researchers can use the statistical procedure latent class analysis (LCA) to identify patterns of risk profiles based on a person-centered approach using a "holistic-interactionistic framework" (Bergman & Magnusson, 1997, p. 293). Such an approach views "individual development as a process characterized by states that change in continuous time," which "is partly specific to individuals" (Bergman & Magnusson, 1997, p. 293). Although a vast number of possibilities may exist, common patterns will likely emerge (Bergman & Magnusson, 1997), distinguishing subgroups. LCA is well-suited to test, for example, an interactional theory of delinquency. Such an approach is consistent with the concept of equifinality – delinquency has multiple possible causes and combinations of causes rather than a single cause (Thornberry & Krohn, 2005). Identifying the state of pattern of youth risk and need factors as they enter probation can provide insight into possible categories of youth needs that could drive service "packages" to address the unmet youth needs. That is, the system can use this information to ensure that youth have opportunities to participate in programs that are likely to yield more positive outcomes.

Using a sample of 372 youth on probation in a Midwestern county, Onifade et al. (2008) found five risk profiles using cluster analyses: a low risk group, a non-constructive free time group, a family conflict group, a high risk with history group, and a high risk new comer group. Cluster analysis is a descriptive approach to identifying patterns (Bergman & Magnusson, 1997). Schwalbe et al. (2008) used LCA to analyze a sample of 542 court-involved youth from North Carolina. They also identified five risk profiles: a low-need group, serious school problems, hostility-inattention, high risk and family history, and substance abuse and peer delinquency. Schwalbe et al. used a relatively small sample size that could not support models with more than five classes. The lack of convergence in their models with more than five classes suggests their sample may have had insufficient power to detect additional classes due to low prevalence of some of the need factors (Nylund-Gibson & Choi, 2018).

More studies must use larger samples in other locales to establish generalizable profiles. Identifying common patterns of risk may enable the juvenile justice system to provide better targeted services, especially when young people have complex needs reflecting both static and dynamic factors in varying combinations. Improving our knowledge about young people's service needs will advance youth justice by improving service delivery, including how interventions address the disproportionality of youth of color and from disadvantaged backgrounds among those at highest risk.

1.3. The current study

In this study, we seek to test whether there are distinct subgroups of youth on probation, and if so, explore the demographic factors, juvenile justice history and involvement, and recidivism of those subgroups.

This study uses a larger sample than past studies and includes youth in a wider variety of geographical areas compared to previous studies (N = 16,402), thus allowing us to identify smaller subgroups of youth, including unexpected subgroups. This study may contribute to juvenile justice research by providing a broad understanding of the complex service needs of youth involved in the juvenile justice system – knowledge that can inform state policies and programs for probation youth to reduce the likelihood of further system involvement and help program providers to understand the multi-morbid needs of youth.

2. Methods

The study uses an administrative data set from one state to conduct LCAs to identify common patterns of risk and protective factors among youth on probation, examines differences among the subgroups, and tests associations with recidivism. Distinct groups will yield the ability to characterize more nuanced information about the needs of the youth that move beyond a single risk score. Additionally, it provides a roadmap for the agency to identify needed services to be responsive to the needs of the youth in the system.

2.1. Data

The administrative data includes youth who began probation during FY2011–2013 from one mid-Atlantic state. Over those three fiscal years, the state had 17,962 unique youth on probation, with 16,402 having a complete standardized risk assessment at intake. This data includes demographic data, dates on probation, intake offense, and subscale scores from the standardized risk and needs assessment tool.

2.2. Measures

The YASI is a standardized and validated risk assessment with acceptable gender responsiveness (Jones et al., 2016). It consists of 90 items from 10 domains: legal history, family, school, community and peers, alcohol and drugs, mental health, attitudes, aggression, skills, and employment and leisure time. As a fourth generation assessment tool, the YASI differentiates between dynamic and static factors, as well as risk and protective factors. The YASI includes eight static risk, two static protective, eight dynamic risk, and seven dynamic protective scores. Youth are classified as having none/low, moderate, or high levels of risk or protective factors on each of the subscales. Table 2 presents the 25 subscales and the prevalence of youth in each category.

In order to test whether groups were distinct, we examined demographic characteristics, offense information, days on probation, the official YASI risk score, as well as specific items from the YASI including those that approximate items from the Adverse Childhood Experiences (ACE) survey. Demographic characteristics consisted of age (7.8–20.6 years), gender (male or female), and race/ethnicity. Race/ethnicity was constructed from two separate variables, race and ethnicity. The constructed race/ethnicity variable consisted of White, Black, Hispanic, and Other.

Offense information included a measure of offense severity and classification of the offense type. Offense severity is measured on a scale from 1 to 9, where higher scores indicate a milder offense – 1 is a felony against a person, 4 is a class one misdemeanor against person, and 8 is a status offense. Offenses are also classified as a drug, property, person, or other. Number of days on probation was calculated based on the youth's start and end date.

Probation youth are classified according to their overall score on the YASI prescreening instrument, which is an abbreviated version of the YASI. Youth can be classified as having none/low, moderate, and high risk, and these risk scores are publicly reported and used to inform sanctions.

To develop a better understanding of each class and how they compared to each other, we examined specific items from the YASI. We

reconstructed nine of the 10 ACEs, following Baglivio et al. (2014). Our measure of ACEs likely includes an undercount of household substance abuse, mental illness, and criminal record given that the data includes current circumstances, not historic problems, and does not include a measure of parental separation or divorce. Additionally, the study examined specific items to understand previous legal history, school enrollment, employment status, and history of substance use.

Recidivism was measured using official rearrests and reconvicitions through 2015.

2.3. Analytic approach

We used Mplus version 7.11 (Muthén & Muthén, 1998) to estimate latent class models based on ordinal scoring (high, moderate, none/low) of each subscale from the YASI administered at intake. LCA identifies groupings of individuals based on a set of indicators. Cluster analysis is a descriptive approach to identifying patterns while LCA is model-based approach that generates fit statistics that allow for comparisons between models (Bergman & Magnusson, 1997). Thus, researchers estimate models iteratively, with each subsequent model specifying one additional class. No clear agreement as to which statistics researchers should use to identify the preferred model has emerged in the literature (Nylund-Gibson & Choi, 2018). In this study we used LCA's information criteria to identify the most desirable fit: the Bayesian Information Criterion, sample-size adjusted Bayesian Information Criterion, Akaike Information Criterion, where the lowest value indicates the preferred model. However, these information criteria often continue to decrease without reaching a minimum (Nylund-Gibson & Choi, 2018). In these cases, researchers can plot the values to identify the point of diminishing return (Nylund-Gibson & Choi, 2018). Another type of statistic researchers use to identify the preferred model are the likelihood-based tests, and we used the Vuong-Lo-Mendell-Rubin test, which compares nested models and uses a significance test to determine whether the additional class provides improved model fit (Nylund-Gibson & Choi, 2018). We used a random sample of half the cases (n = 8201) to assess whether the results are robust and produce comparable results, and they were.

Finally, we examined the classes with respect to the original YASI scales we had used to construct the model and specific items on the YASI. We used variables not included in the model to test whether the classes are distinct. To do so we tested whether the classes differed on demographic characteristics, offense characteristics, days on probation, overall YASI risk score, and recidivism. For the continuous variables, we used analysis of variance and ran post-hoc tests (sidak, Bonferroni, and scheffs for robustness) to identify pairwise differences. For the categorical variables, we used the adjusted residuals to identify which cells differed significantly from expectation at the alpha = 0.01 level, and this indicates differences from the mean.

3. Results

Table 1 presents the model fit indices. With this data set, the model fit statistics did not completely align. The information criteria indicators continued to decline with the estimation of up to 12 classes.

Table 1
Model fit statistics.

	N	AIC	BIC	Adj BIC	Entropy	VLMR	p
3 classes	16,402	613,788	614,890	614,435	0.856		0.000
4 classes	16,402	605,430	606,902	606,295	0.861	8454	0.000
5 classes	16,402	600,717	602,559	601,799	0.867	4809	0.000
6 classes	16,402	596,765	598,977	598,062	0.845	4048	0.000
7 classes	16,402	593,332	595,913	594,849	0.842	3529	0.000
8 classes	16,402	591,154	594,106	592,888	0.841	2273	0.109

Bold indicates the preferred solution for that statistic.

Table 2
Demographic and juvenile justice system involvement, overall and by class.

	Overall	Class 1 (17.8%) LOWEST NEED	Class 2 (16.3%) SKILLS NEED	Class 3 (9.1%) MENTAL HEALTH NEED	Class 4 (12.6%) SUBSTANCE USE NEEDS	Class 5 (8.8%) FEMALE HIGH-NEED	Class 6 (20.4%) MALE HIGH-NEED	Class 7 (15.2%) COMPLEX NEEDS
Age	15.94	16.25	15.76	15.26	16.33	15.98	16.01	15.70
Male	0.746	0.661*	0.760	0.803*	0.854*	0.039*	0.949*	0.843*
Race/Ethnicity								
White	0.431	0.546*	0.438	0.446	0.466*	0.430	0.370*	0.334*
Black	0.420	0.320*	0.429	0.428	0.376*	0.388*	0.473*	0.509*
Hispanic	0.102	0.078*	0.086*	0.079*	0.107	0.132*	0.116*	0.120*
Other	0.047	0.057*	0.047	0.047	0.051	0.051	0.041	0.037
Offense Severity	4.70	4.92	4.51	4.53	4.83	5.23	4.52	4.58
Offense Type								
Drug	0.087	0.123*	0.052*	0.030*	0.139*	0.072	0.097	0.067*
Property	0.314	0.276*	0.257*	0.226*	0.379*	0.269*	0.397*	0.330
Person	0.334	0.288*	0.430*	0.509*	0.224*	0.284*	0.287*	0.364*
Other	0.266	0.313*	0.262	0.235*	0.258	0.376*	0.219*	0.241*
Risk Score								
None/Low	0.319	0.805*	0.526*	0.155*	0.300	0.228*	0.087*	0.011*
Moderate	0.504	0.191*	0.450*	0.702*	0.621*	0.667*	0.675*	0.389*
High	0.177	0.004*	0.024*	0.143*	0.079*	0.106*	0.238*	0.600*
Length of Stay	357.81 (2 3 5)	277.71 (1 7 3)	339.63 (2 2 1)	397.97 (2 7 0)	340.99 (2 1 7)	358.38 (2 2 3)	386.73 (2 3 3)	425.74 (2 7 8)
Rearrested	0.301	0.138*	0.201*	0.300	0.295	0.297	0.393*	0.479*
Reconvicted	0.176	0.064*	0.110*	0.174	0.171	0.151*	0.248*	0.299*

* Indicates statistically significant difference from the expected value at $p < .01$.

However, diminishing returns of the information criteria indicate the four-class solution is superior. The VLMR was significant until the estimation of the model with 8 classes, suggesting that the seven-class model was better. Thus, we explored the four-, five-, six-, and seven-class models. All of the models consistently produced similar groups (e.g., one with low-risk with high-protective factors, one with high-risk with low-protective factors group). The five-, six-, and seven-class solutions included gender-specific groups of a high-risk group that was predominately female and one that was predominately male. Ultimately, the seven-class model produced distinct groups of youth and

remained relatively well distributed (in that the largest group consisted of 20.4% of the sample and the smallest group consisted of 8.8% of the sample). This justifies the selection of the 7-class model we will present. The fact that the entropy value for the seven-class model was closer to 1 (0.842) also supports our selection.

Figs. 1–4 show the mean-centered percentage (the zero line represents the mean) of the indicators for each group that was classified as moderate- or high-risk on each of the YASI subscales based on type of factor (i.e., static risk, static protective, dynamic risk, and dynamic protective). Figs. 1 and 2 show the static and dynamic risk indicators,

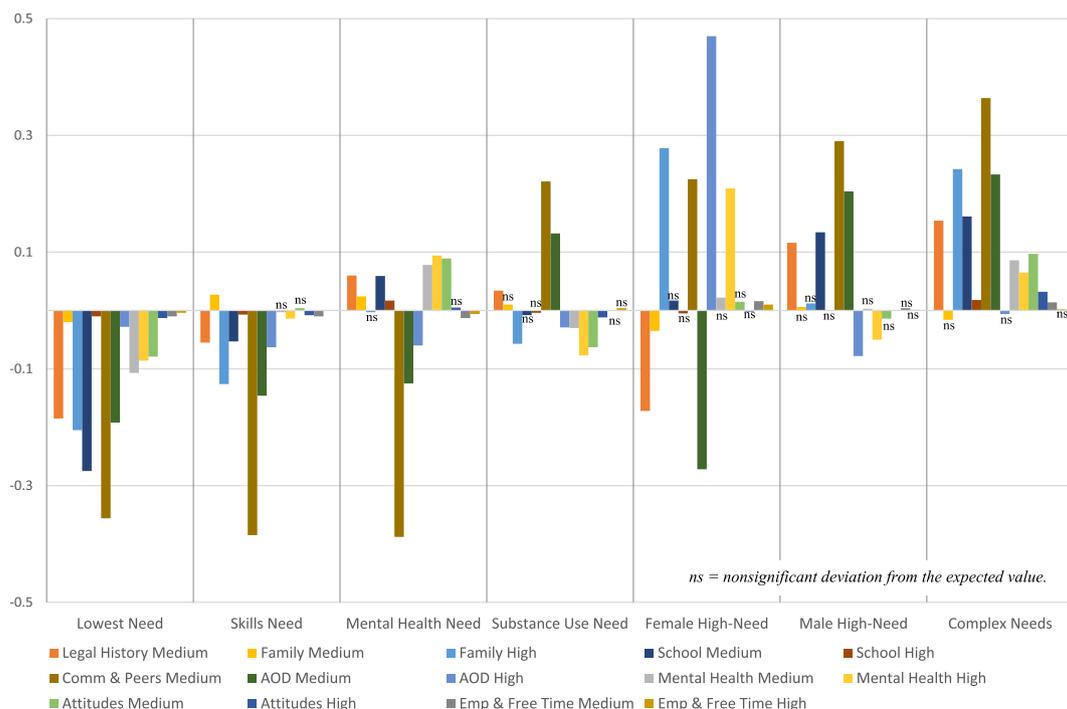


Fig. 1. Mean-centered percentages of the YASI static risk subscales.

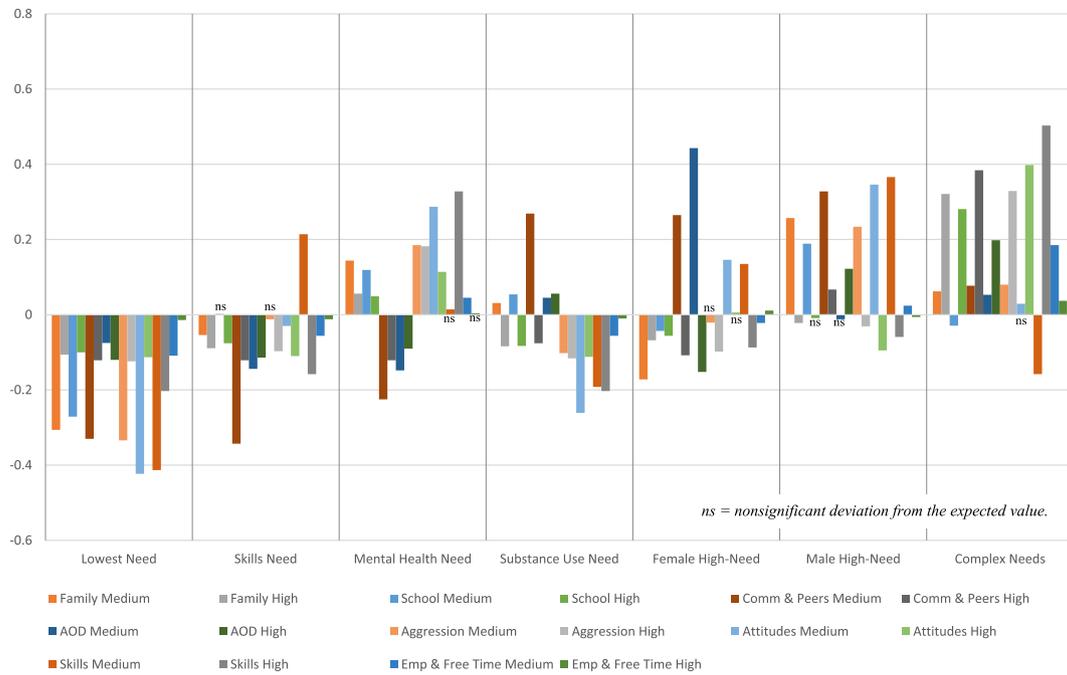


Fig. 2. Mean-centered percentages of the YASI dynamic risk subscales.

respectively. Moving from Class 1 (lowest need) on the left to Class 7 (complex need) on the right, it is clear that the groups on the left (1 and 2) have lower than average risk factors, the groups in the middle (3–6) have a mix of risk factors, and the group on the right (7) are high in risk factors. Figs. 3 and 4 show the static and dynamic protective indicators, respectively. The pattern for protective factors reverses the pattern in the risk factors – the groups on the left (1 and 2) had the highest levels of protective factors, those in the middle (3–6) had a mix, and those on the right (7) had the lowest levels of protective factors. Thus, we see increasing risk and decreasing protective factors as we move from the

groups on the left to the groups on the right. These graphs illustrate the heterogeneity of the population regarding static and dynamic risk and protective factors.

The first column of Table 2 describes the characteristics of the overall sample and subsequent columns illustrate the differences across the LCA classes. The average age is 15.94 and almost three-quarters (74.6%) are male. Overall, 43.6% were White, 41.5% were Black, 10.2% were Hispanic, and 4.8% reported another race/ethnicity. The average offense severity was 4.7, with 33.4% committing a person of-fense, 31.4% committing a property offense, 8.7% committing a drug

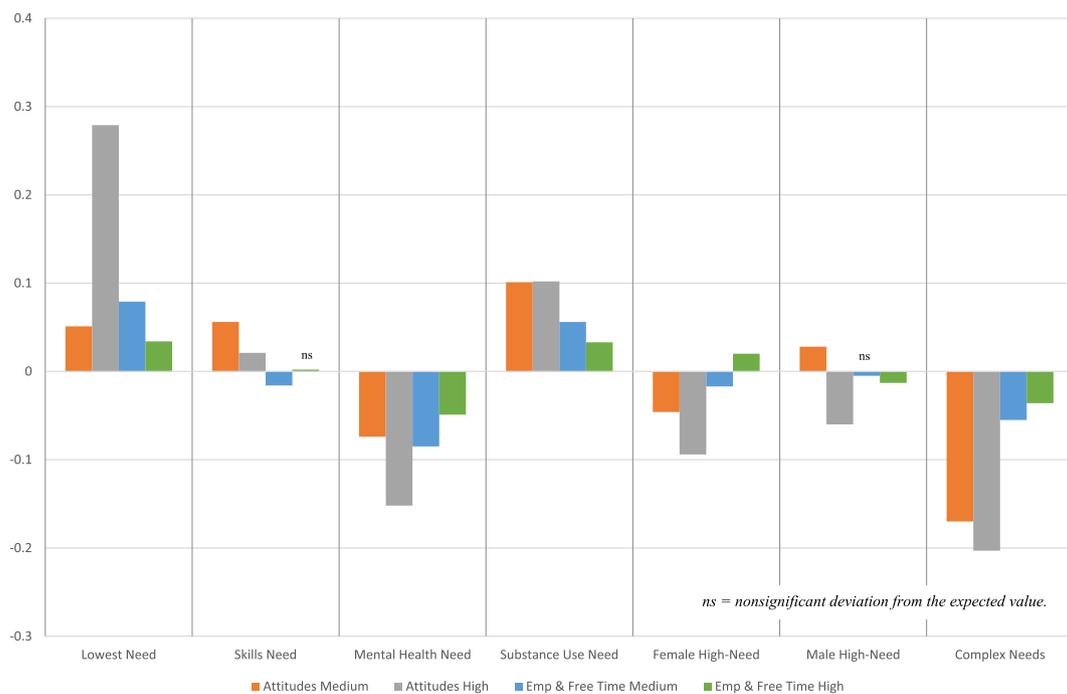


Fig. 3. Mean-centered percentages of the YASI static protective subscales.

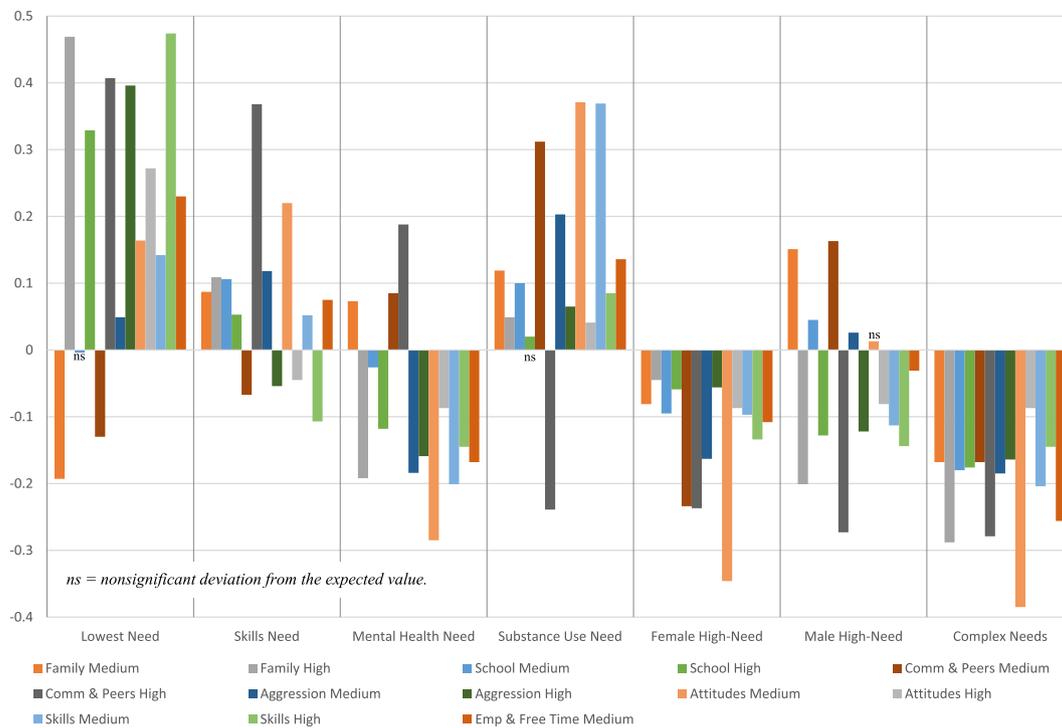


Fig. 4. Mean-centered percentages of the YASI dynamic protective subscales.

offense, and 26.5% committing another type of offense. Almost one-third, 31.9%, were classified as none/low risk, 50.4% as moderate risk and 17.7% as high-risk. On average, youth remained on probation for almost one year (357.81 days). As to recidivism, 30.1% were rearrested and 17.6% were reconvicted.

Table 3 presents the details of the groups the seven-class model

identifies. Overall, the rate of reported ACEs varied from about 5% of the sample reporting sexual abuse to 29% of the sample reporting incarceration of someone in their household. A majority (88%) were currently enrolled in school and 12% reported that they were currently employed. Almost half (49%) reported a previous arrest, 44% reported they'd ever used alcohol (including 9% who reported alcohol use that

Table 3
Adverse Childhood Experiences, School, Employment, and Substance Use, overall and by class.

	Overall	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7
		LOWEST NEED	SKILLS NEED	MENTAL HEALTH NEED	SUBSTANCE USE NEEDS	FEMALE HIGH-NEED	MALE HIGH-NEED	COMPLEX NEEDS
Adverse Childhood Experiences								
emotional abuse	.097	.015*	.047*	.196*	.034*	.132*	.072*	.250*
physical abuse	.155	.065*	.124*	.259*	.093*	.250*	.125*	.267*
sexual abuse	.054	.029*	.058	.082*	.041*	.103*	.034*	.073*
family violence	.175	.046*	.105*	.338*	.075*	.261*	.144*	.380*
household substance abuse	.160	.091*	.110*	.144	.158	.231*	.177*	.240*
household mental illness	.172	.103*	.157	.222*	.143*	.221*	.172	.236*
criminal household	.291	.194*	.250*	.302	.284	.320	.326*	.385*
emotional neglect	.094	.035*	.072*	.127*	.064*	.124*	.092	.177*
physical neglect	.107	.058*	.098	.156*	.077*	.159*	.096	.155*
NONE	.417	.623*	.481*	.274*	.494*	.276*	.413	.218*
currently enrolled in school	.877	.891*	.902*	.892	.871	.882	.865	.841*
currently employed	.124	.224*	.120	.055*	.186*	.107	.094*	.051*
previously employed	.117	.153*	.112	.047*	.172*	.113	.119	.073*
previous history	.492	.307*	.389*	.512	.510	.510	.578*	.663*
ever used alcohol	.442	.343*	.257*	.235*	.576*	.646*	.518*	.549*
ever used marijuana	.593	.407*	.341*	.329*	.739*	.778*	.751*	.795*
alcohol disrupts function	.090	.045*	.028*	.038*	.107*	.165*	.112*	.154*
marijuana disrupts function	.164	.064*	.050*	.066*	.200*	.223*	.226*	.315*

*Indicates statistically significant difference from the expected value at $p < .01$. Green font indicates lower than the overall average, and red font indicates higher than the overall average.

disrupted functioning), and 59% reported that they'd ever used marijuana (and 16% reported that marijuana use disrupted their functioning). Again, variation exists across the different class models.

3.1. Description of the seven groups

Each class description will begin with a description of the YASI indicators, as depicted in Figs. 1–4, and a comparison to the actual risk classification, offense history, probation history and recidivism rates as Table 2 depicts. Then, we will characterize the demographic characteristics of each group (Table 2), and examine the youth's ACE, school, employment, and substance use history (Table 3).

Class 1: Lowest need group. Figs. 1–4 show that this group reports lower than average risk and higher than average protective factors. Thus, the risk assessment would probably categorize this group in the none/low risk group – and as Table 2 shows, it classified 80.5% none/low risk, and almost all of the rest (19.1%) as moderate risk and very few as high risk (0.4%). This group reported a higher than average offense severity score (4.92) than most groups, indicating milder offense severity. Arrests for a drug offense (12.3%) and other offense (31.3%) were relatively common in comparison to the overall group, although substantial numbers had committed property (27.6%) or person (28.8%) offenses. These youth spent less time on probation than any of the other groups, with an average 277.7 days on probation, and they had a lower than average rearrest rate (13.8%), and conviction rate (6.4%). The rearrest and conviction rate for the YASI overall none/low risk group only slightly exceed these rates (15.6% and 7.5%, respectively).

As Table 2 shows, Class 1 constitutes 17.8% of the sample. On average, youth in this class were older than most of the other groups (16.25 years old), and more likely to be female (33.9%). This group included higher than average White youth (55%), and lower than average youth of color (31.5% Black, 7.7% Hispanic, and 5.8% reported another racial/ethnic group).

As shown in Table 3, this lowest need group reported the lowest percentage of ACEs, previous legal history, rates of alcohol and marijuana use, and disruptions. Among all the groups, this one had highest percentage of enrolled in school and currently and previously employed.

Class 2: Skills-need group. Figs. 1–4 indicate Class 2 has fairly low risk overall, with mostly lower-to-average risk and higher-to-average protective factors. Fig. 2 shows a striking difference between the skills-need group and the lowest need group: the skills-need group reported a higher than average score on the skills indicator. In Fig. 4, we find that this group has a few lower-than average dynamic protective factors, indicating room for development in the areas of aggression, attitudes, and skills indicators. In fact, as Table 2 shows, the YASI classified a higher than average percent of this group as none/low-risk (52.6%) and nearly half as moderate-risk (45.0%). Compared to the lowest need group, a lower percent of this group was arrested for drug (5.2%) and property offenses (25.7%), and a higher percent were arrested for a person offense (43.0%). This group reported the lowest average offense severity scores indicating severe offenses. These youth spent a comparable amount of time on probation to the female high-need (Class 5) and the substance use need (Class 4) groups, with an average of 339.6 days. This group had lower than average rearrest (20.1%) and conviction (11.0%) rates.

As Table 2 shows, the skills-need group consists of 16.3% of the sample. The mean age of youth in this class, 15.8 years old, was similar to the complex needs group. Fewer in this group were Hispanic (8.6%) than any of the other groups.

As shown in Table 3, the skills-need group was more likely than average to report none of the ACEs we measured for this study, had the highest percentage enrolled in school (90.2%), and were the least likely to report a previous legal history and less likely to report substance use than most other classes.

Class 3: Mental health need group. As Figs. 1–4 show, this group appears overall to have a more moderate level of risk than the lowest need and skills-need groups, with a mix of risk and protective factors. Closer inspection of Figs. 1 and 2 reveals that low community and peers and substance use risk factors, and low protective factors except for community and peers. As Table 2 shows, the YASI classified most youth in this group as moderate-risk (70.2%) and the rest almost evenly as none/low-risk (15.5%) and high-risk (14.3%) groups.

Table 2 shows that this group consists of 9.1% of the sample. As Table 2 shows, youth in this class were the youngest on average (15.3 years old), and tend to be male (80.3%). This group included fewer than average Hispanic youth (7.9%). This group reported comparably low offense severity scores compared to the skills need, the complex needs (Class 7), and the male high-need (Class 6) groups (4.53). This group reported lower than average drug offenses (3.0%) property offenses (22.6%) and other offenses (23.5%), and higher than average person (50.9%) offenses. These youth spent a comparable average number of days on probation to the male high-need (Class 6) group. In this group, the average rearrest rate was 30.0%, and average conviction rate was 17.4%.

Table 3 shows that the mental health need group reported higher than average ACEs in terms of abuse, neglect, family violence, and a history of family mental illness. These traumatic experiences likely put these youth at risk for mental illness. They also reported lower rates of substance use and consequences and lower rates of employment histories.

Class 4: Substance use need. Figs. 1–4 illustrate that this group, like the mental health need group, appears to have a more moderate level of risk than the lowest need and skills-need groups. Figs. 1 and 2 show that this group has average to low levels of risk except in for the community and peers and alcohol and drug indicators. This group also has higher than average protective scores, except in the community and peers scales. As Table 2 shows, the YASI classified a higher than average percent of this class as moderate risk (62.1%), and a lower than average percent as high-risk (7.9%). This group reported higher offense severity scores (indicating low severity) than all the groups except the low-need group (4.83). A higher than average percent of this group were arrested for drug (13.9%) and property (37.9%) offenses, and a lower than average percent were arrested for person offenses (22.4%). The average time on probation was 340.99 days. This group had average rearrest (29.5%) and conviction (17.1%) rates.

As Table 2 shows, this group consists of 12.6% of the sample. On average, youth in this group were older than any group except the lowest-need group (16.33 years old). A higher than average percent of this group were male (85.4%) and were White (46.6%). A lower than average percent of this group were Black (37.6%).

Table 3 shows that the substance use need group reports lower than average abuse, neglect, family violence, and family history of mental illness. This group reports higher rates of employment history, and as expected, higher rates of substance use and consequences.

Class 5: Female specific. Figs. 1 and 2 show that this group reported a mix of risk factors and lower than average protective factors. This suggest that overall this group is a moderate risk group. As Table 2 shows, YASI classified a higher than average percent as moderate risk (66.7%). This group had higher offense severity scores than the other groups except the lowest need group (5.23). A lower than average percent of this group was arrested for a property offense (26.9%) and person offense (28.4%), but a higher than average percent were arrested for other offenses, including status and misdemeanor offenses (37.6%). The girls in this group spent an average amount of time on probation (358.38). This group also had an average rearrest rate (29.7%) but a lower than average conviction rate (15.1%). These rearrest and conviction rates are slightly lower than the rates for the moderate-risk YASI group (32.61% and 18.94%, respectively).

As Table 2 shows, the female specific gender group consists of 8.8% of the sample. On average, youth in this class were slightly older than

almost all the other groups, except the substance use needs and male high-need (Class 6) group (15.98 years old). Almost all of these youth were female, while only 3.9% of the group were males. This group consisted of a higher than average percentage of Black (38.2%) and Hispanic (13.2%) youth.

Digging deeper into trauma-related items as displayed in Table 3, this female high-need group reported higher than average rates of ACEs except for the criminal household, and higher than average rates of substance use and disruptions from substance use. Collectively, these girls appear to have histories of traumatic experiences, and may be self-medicating with substance use.

Class 6: Male high-needs group. Figs. 1 and 2 show that this group reported average or higher than average risk scores, and Figs. 3 and 4 show that this group reported average or lower than average protective scores. Thus, we would expect that this group would be categorized as moderate or high risk. In fact, as Table 2 shows, a higher than average percentage were classified as moderate risk (67.5%) and high-risk (23.8%). This group reported lower average offense severity scores than the lowest need, female high-need, and substance use need groups (4.52), indicating more severe offenses. A higher than average percent were arrested for property offenses (39.7%), and a lower than average percent were arrested for person (28.7%) and other (21.9%) offenses. These youth spent more days on probation, on average, than the other groups, with an average of 386.73 days, except that their time on probation was not statistically different from the mental health need group, and they spent less time on average than the complex needs (Class 7) group. This group reported higher than average rearrest (39.3%) and reconviction (24.8%) rates.

As Table 2 shows, this group consisted of 20.4% of the sample. Almost all (94.9%) were male. On average, these young men were younger than the lowest need and substance use need groups, and older than the complex need (Class 7) and mental health need and skills need groups (16.01 years old). This group consisted of a lower percentage of White youth (37.1%), and higher than average Black (47.1%) and Hispanic (11.6%) youth.

These high-need males report a mix of ACEs (Table 3), indicating lower than average abuse and family violence, but higher than average histories of household criminal and substance abuse. This group reported lower than average current employment, and higher than average previous history of legal involvement as well as substance use and consequences of substance use.

Class 7: Complex needs group. Figs. 1 and 2 show that this group reported higher than average risk and lower than average protective factors across domains. As shown in Table 2, YASI classified a higher than average as high risk (60.0%). This group reported a lower offense severity score than three other classes (i.e. low need, female high-need, and substance use need groups) and lower percentage arrested for drug (6.7%) and other (24.1%) offenses. At the same time, they had above average arrests for a person offense (36.4%). These youth spent the longest average amount of time on probation, with an average of 425.7 days. This group had a rearrest rate of 47.9%, and a reconviction rate of 29.9%, which is second highest among the overall group, and slightly lower than the rearrest and reconviction rate for the YASI high-risk group (49.0% and 31.9%, respectively).

As shown in Table 2, 15.2% of the sample fell into this category. On average, youth in this class were the second youngest group (15.7 years old) and typically were male (84.3%). This group consisted of the fewest White youth (33.1%), with higher than average percentage youth of color (51.2% were Black and 12.1% were Hispanic).

Not surprisingly, as shown in Table 3, the complex needs group reported higher than average percentages of ACEs, lower than average rates of being currently enrolled in school, lower rates of currently and previously employed, the highest percent of a previous legal history, and higher than average rates of alcohol and marijuana use and disruptions.

4. Discussion

Juvenile justice systems have made large strides toward administering standardized risk and assessment tools, a well-recognized evidence-based practice. Yet, beyond administering assessment tools, justice agencies have difficulties in using the risk-need assessment information to inform key decisions, including linking assessment information to treatment and programmatic decisions (Thurman, Chowdhury, & Taxman, 2019). Researchers should attend more to the decision-making processes that determine how authorities use information from the risk and need assessment tools in case management decisions or individualizing treatment (Viglione, Rudes, & Taxman, 2015). For example, the agency that provided the data for this study illustrates that tension regarding collecting and using the data. As the developers of the YASI have recommended, the juvenile justice agency classified youth as none/low, moderate, or high risk based on the abbreviated YASI Pre-Screen, which consists of 34 items across nine domains (Jones et al., 2016). The agency also administers the full YASI, as Jones et al. (2016) recommend for case planning purposes. Yet, the risk category is driving the programming assignment due to limited programs and interventions in the system; needs do not play an instrumental role in identifying the nature and type of services the youth receive.

Reducing recidivism among young people will require the juvenile justice system to provide a fuller array of interventions. Taxman (Taxman, 2014) discusses that the systems generally lack systemic responsibility and thus fail to provide a full array of services, which limits case management. Taxman also indicates that the nature of the services does not meet the needs of individual youth. Sankofa et al. (Sankofa et al., 2018) reviewed juvenile justice treatment services and noted that youth make it clear they know that the treatment programming is designed to “rehabilitate” through an emphasis on cognitive-behavioral skills. But the youth also noted that the programming uses a middle class framework that does not acknowledge the structural racism, limited opportunities, or skills they need to survive in their neighborhoods. The youth understand that programming does not reflect their cultural or ethnic backgrounds or their own communities. They perceived interventions as meaningless and punishments as not therapeutic. Such findings may reflect the use of generic interventions that do not reflect individual needs of youth and the clustering of risk-need factors that authorities should be using to define the interventions (Taxman & Caudy, 2015).

Practitioners and researchers should use the current study’s findings to refine our approach to thinking about youth involved in the juvenile justice system. Beyond seeking to reduce recidivism, we should use information from risk and need assessment tools to identify the types of services that helping these youth make a successful transition into adulthood may require. This study provides insight into how to translate risk and need assessment information into meaningful data on the range of service needs that emerge among youth in various situations. If we can identify a system for prioritizing services based on these complex needs, the arrest and entry in the juvenile justice system may become an opportunity to shift a youth’s trajectories for the better.

This study clarifies that the juvenile justice population is not a singular population; it reflects tremendous heterogeneity. The racial and ethnic composition of the juvenile justice population increases the need to be responsive to this heterogeneity by recognizing how structural racism and blocked opportunities affect young people’s behaviors and decisions. This study identified seven distinct groups of youth on probation, providing insight into a myriad of complex needs of youth on probation. In particular, this study helps disentangle the risk categories, especially the moderate risk category, which we separated into four groups with distinct needs: mental health need, substance use need, female specific, and male high need. Additionally, we disentangled the none/low risk category into a lowest need and skills-need in this study. The LCA analyses make it possible to define youth in terms of need(s),

not just their risk for future delinquent behavior, to emphasize the opportunity to offer multidimensional services to be offered to these youth to promote positive development and lifetime quality of life.

Consistent with prior literature, we found four groups (Onifade et al., 2008; Schwalbe et al., 2008) that others have noted: groups with relatively low needs (lowest need), relatively high needs (complex needs), substance use service needs, and mental health service needs. These four groups mirror the literature on needs and the research suggests they are consistent across multiple samples. At the same time, the results from this study yield some important distinctions, especially in light of the two new gender-specific groups that emerged in this study. The mental health needs group reported higher than average ACEs and lower than average substance use, suggesting a subgroup of youth have experienced childhood stressors and trauma and are not self-medicating through illicit substance use. At the same time, the substance use need, female specific, and male specific groups report higher than average rates of substance use. These three moderate risk groups differ in ways that have treatment implications. First, the substance use group reported lower than average ACEs and high risk and low protective factors in the community and peers domain, suggesting that peers and/or situational factors may play a role in their substance use. The female specific group reported higher levels of ACEs, which suggests this group may be self-medicating with substances. Finally, the male specific group reported lower rates of childhood maltreatment but higher rates of a family history of substance use and criminality, suggesting that family may have important influence on their behaviors. These distinctions illustrate why a single treatment approach to address their substance use may not serve the needs of these three types of moderate-risk youth.

Based on the findings in this study, there are service interventions that juvenile justice agencies should consider adding to be responsive to their populations:

- For the *lowest need youth*, diversion or lesson-learning opportunities should be sufficient to ensure that the youth does not penetrate further into the system. This includes community services, restorative justice practices to allow the youth to see how their behavior has affected others, and other efforts to help the youth develop positive relationships; develop self-efficacy through creativity, educational attainment, and employment opportunities; and develop an understanding of the consequences of their behaviors.
- The *skills need group* would likely benefit from skills to learn to navigate difficult times, and in making decisions that advance their engagement in positive behaviors such as work, school, healthy living, creativity, and relationships (Butts, Bazemore, & Meroe, 2010). This group should receive low-intensive control strategies that leverage existing protective factors to prevent future justice involvement.
- The *mental health need group* would likely benefit from mental health services that focus on learning to manage emotions and moods, and regulate behavior, while the *substance use need group* would likely benefit from substance use services to reduce self-medication and destructive behaviors. Such services might lead these groups to involvement in prosocial activities and further efforts to promote development that do not rely upon medications and encourage youth to learn to express themselves positively.
- The *female high-need group* would benefit from services that focus on identity and self-efficacy. Genderized services can help girls in this group to address the non-offending behaviors that result in low functionality such as trauma, mental health, and peers. To facilitate change in girls, interventions should emphasize helping them develop an attainable identity to overcome the disregarded self that many girls experience (Goodson & Morash, 2017). Interventions that emphasize a positive and productive identity can help girls in this group to overcome identities of condemnation and self-harm. Identity-based motivation theory recognizes individuals' perceptions of attainable possible selves as the future-oriented component of self-concept, a first step in an adolescent's goal-setting and

motivation for action. Current interventions do not focus on developing a prosocial identity; rather they emphasize the importance of taking on mainstream values, opinions, and identity, as Sankofa et al. (Sankofa et al., 2018) note. Girls require specific interventions that will address their particular pathways to delinquent or status behaviors.

- The *male high-need group* requires an emphasis on multisystem approaches that address substance use treatment, family therapy, and/or mentoring in the environments in which they reside (Liddle, Dakof, Turner, Henderson, & Greenbaum, 2008). Sankofa et al. (Sankofa et al., 2018) identified that male youth noted that the programs in which they participate call on them to become "ideal" or reformed citizens. Such programs emphasize individual responsibility and accountability in decisions. This suggests the need to shape interventions based on an understanding of how the social structures or environments in which the youth reside affect their decisions. Boys expressed the desire to learn more practical skills that will serve their survival so they can support themselves in highly disenfranchised, fragmented communities.
- The *complex needs group* would benefit from more structure to build their protective factors. This group would benefit from an emphasis on multisystem approaches, such as functional family or multi-dimensional therapies that focus on building positive behaviors as well as a positive identity as a member of the community.

Building systems of programming within juvenile justice systems will provide the resources that juvenile justice workers need to individualize supervision plans and case management for youth. While many jurisdictions are using risk and need assessment tools, few workers use these tools to inform case management functions and those who do might face constraints due to limited resources and limited programming in the communities they serve. Taxman (Taxman, 2014; Thurman, Chowdhury, & Taxman, 2019) has identified the problem of systemic responsiveness as a barrier to implementation of evidence-based practices. Systemic responsiveness calls for increasing the capacity of programming such that it responds to the findings from risk-need assessment information. A systemic responsiveness approach should include multidimensional services that address a configuration of needs.

Further, third and fourth generation risk assessment tools include domains to identify needs that predict negative outcomes, particularly recidivism. The design of these instruments assumes that needs are mutually exclusive, and such tools reflected little overlap or convergence among various needs making it difficult to create a taxonomy for services that could ameliorate negative outcomes. This study identified seven distinct groups of youth on probation, providing insight into a myriad of complex needs of youth on probation and disentangling the risk categories into specific needs. We discuss these youth in terms of need rather than risk, to emphasize the opportunity for intervention to offer multidimensional services to these youth to promote positive development and lifetime quality of life.

4.1. Limitations

Researchers and practitioners should interpret these results with the limitations of the study in mind. These include the fact that all participants came from a single U.S. state, and similar analyses with data from other locations may reveal different groups. For example, in comparison to previous studies, these findings revealed three new groups including two gender-specific groups. Specific artifacts in the data, as well as the indicators researchers use to create the groups, may affect LCA analyses. Moreover, LCA is a descriptive technique, and thus, multiple studies should be considered in tandem with this one. Thus, future research should undertake the same and similar analyses as those we conducted. Still, these findings provide useful insight and have implications for practitioners.

5. Conclusion

This study extends current knowledge by identifying seven distinct groups of youth on probation, highlighting the need for systemic responsiveness and specific service needs. It showed that youth on probation differ from one another in significant ways, and tailoring of services to their needs will make them more effective. Juvenile justice system intervention should move away from singular interventions focused on a single need and toward multidimensional interventions that recognize the unique needs of individuals. Expanding services offered to youth in this manner may foster positive development among youth preparing to transition to adulthood. Maschi et al. (2008) refer to the juvenile justice system as a “system of last resort,” which, to some, may justify emphasizing punishment and narrowly defined opportunities for reform. However, given the size of the juvenile justice system and the overuse of the system for minority youth, it must support positive growth and provide opportunities that will benefit young people. The current research bolsters the claim that using the concepts of systemic responsiveness can facilitate changes in the juvenile justice system.

CRedit authorship contribution statement

JoAnn Lee: Conceptualization, Methodology, Formal analysis, Writing - original draft, Visualization. **Faye Taxman:** Conceptualization, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.childyouth.2020.105087>.

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