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EMPIRICAL RESEARCH

Profiles of Problematic Behaviors Across Adolescence: Covariations with Indicators of Positive Youth Development

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Abstract Previous analyses of data from the 4-H Study of Positive Youth Development (PYD) have examined concurrent trajectories of positive development and risk/problem behaviors among adolescents, finding complex and not necessarily inverse relationships among them. In this article, we expand on prior research by employing a person-centered approach to modeling risk behaviors, assessing development from approximately 6th grade through 12th grade among 4,391 adolescents (59.9 % female). Latent profiles involving the problematic behaviors of delinquency, depressive symptoms, substance use, sexual activity, disordered eating behaviors, and bullying were then assessed for concurrent relationships with the Five Cs of PYD: Competence, Confidence, Character, Caring, and Connection. We found six latent profiles, based primarily on mental health, aggression, and alcohol use, with significant differences in Confidence levels among many of the profiles, as well as some differences in the four other Cs. We discuss directions for future research and implications for application to youth policies and programs.

Keywords Positive youth development · Risk behaviors · Profile analysis

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Introduction

The Positive Youth Development (PYD) perspective emphasizes that all young people have strengths (Lerner et al. 2013). However, the presence of strengths (e.g., the relative plasticity of youth development, intentional self-regulation skills, and hopeful future expectations; Lerner 1984; Lerner et al. 2010; Phelps et al. 2007) does not imply an absence of risk or problem behaviors during adolescence (e.g., Benson et al. 2004). In the early years of the development of the PYD perspective, some researchers (e.g., Pittman et al. 2001) made the assumption that there would be a strong negative relationship between positive and problematic behaviors. However, as empirical work began to test this assumption, data indicated that it was incorrect. For instance, findings from the 4-H Study of PYD provided only mixed support for this assumption and, instead, revealed a complex relationship between positive and problematic behaviors (Lewin-Bizan et al. 2010; Phelps et al. 2007). These studies, however, assessed both positive and problematic behaviors as composite measures without decomposing them into distinct constructs. In the present study, we expand on prior research using the 4-H Study sample by disaggregating both positive and problematic behaviors into distinct measures and examining the relationships among these constructs across 7 years of adolescence.

The research to date (e.g., Lewin-Bizan et al. 2010; Phelps et al. 2007; Schwartz et al. 2010; Tucker et al. 2005; Wiesner and Windle 2004) indicates that *different* risk behaviors are demonstrated in *different* ways by *different* youth and are *differentially* related to both positive and negative outcomes. An example of this complex picture comes from research on popularity in high school. Historically, popularity was associated with positive

development (Rubin et al. 1998). However, popular youth were found to be more likely to engage in risk behaviors (Allen et al. 2005; Diego et al. 2003; Mayeux et al. 2008). This evidence suggests that popularity is not clear and definitive evidence of well-being. At the same time, engaging in some levels and kinds of risky behaviors may not mean that a young person is doing poorly. For example, Dworkin (2005) found evidence that experimentation with substance use, alcohol, or sexual activity can often be an opportunity for positive development, as young people try to figure out who they are and where they want to fit. Accordingly, it is important to assess the co-occurrence of risky and positive behaviors and investigate how they are related (Schulenberg 2006).

The 4-H Study of PYD (Lerner 2005; Lerner et al. 2009a, 2010) was designed to test a relational developmental systems model (Overton 2013) of how the strengths of youth and the developmental resources in their contexts (e.g., parents, mentors, or out-of-school-time programs) were linked to indicators of positive or problematic functioning across the adolescent years. PYD was indexed by the Five Cs of Competence, Confidence, Character, Caring, and Connection. Problematic behaviors were indexed by delinquency, depressive symptoms, substance use, sexual activity, disordered eating behaviors, and bullying. The key hypothesis guiding the study was that when the strengths of youth were combined with ecological developmental assets across the adolescent years, then PYD would result and the probability of risk/problem behaviors would be lessened (Lerner et al. 2013). However, as noted earlier, tests of the idea of inverse relationships between positive and problematic attributes of youth functioning found that these attributes were not perfectly inversely related.

Phelps et al. (2007) identified an overall, but far from perfect, inverse relationship between positive and problematic attributes of youth functioning across Waves 1–3 of the 4-H Study (Grades 5–7). Trajectory analysis revealed that this inverse relationship did not hold at the individual or even the sub-group level. The researchers found a nuanced relationship between PYD trajectories and risk trajectories. For example, they identified three trajectories of externalizing risk behaviors (none, low, and increasing moderate-to-high) and four trajectories of internalizing risk behaviors (low stable, decreasing, increasing, and up-and-then-down). Youth in the highest trajectory of PYD were most likely to be in the up-and-then-down risk behavior trajectory. They also found significant gender differences, such that females were more likely to be in the low stable than in the increasing moderate-to-high trajectory of externalizing behaviors, and males were more likely to be in the low stable than in the increasing and up-and-then-down trajectories of internalizing behaviors. Phelps et al. (2007) called for future studies using person-centered approaches to further differentiate interindividual differences in intraindividual characteristics and to articulate the complexity of both positive and problematic development.

Lewin-Bizan et al. (2010) used data from the 4-H Study through Wave 6 (Grade 10) to extend the findings of Phelps et al. (2007). They found mixed trajectories of positive and problematic development from early to middle adolescence (Lewin-Bizan et al. 2010). A dual trajectory analysis was used to assess probabilities for risk trajectory membership based on PYD trajectory membership. An inverse relationship between PYD and problematic behaviors was not found for most youth; for example, whereas youth in the increasing high PYD trajectory were most likely to be in the decreasing risk trajectory, a substantial number of youth did not exhibit the high PYD and low problematic behaviors relationship. Youth who were decreasing in PYD were more likely to be in a low trajectory of risk/problem behaviors than in a trajectory indicating an increase in problem behaviors. In turn, girls were more likely than boys to be in the moderate or high trajectory groups for depressive symptoms, but girls also were more likely than boys to be in the very low trajectory group of externalizing risk behaviors (Lewin-Bizan et al. 2010).

These two studies illustrate the potential of using the 4-H Study to illuminate the constellation of positive and problematic behaviors of adolescence and how these characteristics may interrelate for different youth. However, these studies had two primary limitations. First, as noted, PYD was indexed as a single, second-order latent construct, thus ignoring the possibility that the first-order latent constructs comprising PYD (the Five Cs) could bear differential relationships to problematic behaviors. In the present study, we assessed separately each of the Cs in relationship to problematic behaviors. Although considerable research has established the utility of examining the overall construct of PYD, recent work by Geldhof et al. (2014) has suggested that the individual Cs may provide a more nuanced picture than a global measure. Geldhof et al. (2014) have investigated a bifactor model, in which all indicators load on two constructs: a global factor of PYD and one of five specific factors that represent the variance in each C after controlling for global PYD. In this bifactor model, the Cs related independently (and sometimes differentially) to outcome variables such as Contribution and depressive symptoms (Geldhof et al. 2014)

A second limitation of the previous studies (Lewin-Bizan et al. 2010; Phelps et al. 2007) is that they analyzed problematic behaviors by forming an index through a composite of items relating to the components of substance use and delinquency. Composite scores imply that the components are interchangeable and have equivalent developmental significance (Lanza et al. 2010). Such

scores do not allow assessment of the possibility that different problematic behaviors may have different connections to positive functioning when embodied within a relational developmental system (Overton 2013). Accordingly, in the current study, we allowed each indicator of problematic behavior to be distinct by using latent class analysis (LCA; Collins and Lanza 2010), a cross-sectional, person-centered analytical technique used to identify unobserved subgroups of individuals who are similar to each other and different from individuals in other subgroups on their responses to groups of variables (Jung and Wickrama 2008). This technique allowed us to investigate the ways in which problematic behaviors might co-occur.

Although we considered extending these analyses longitudinally, we were not able to do so. The longitudinal extension of LCA is latent transition analysis (LTA). LTA may be used to determine the prevalence of latent profiles across time and the incidence of transitions among profiles. Use of this technique, however, requires high rates of participant overlap at adjacent waves of the study, and rates of overlap in the 4-H Study dataset are small (they range from 28 to 64 %, with an average of 41 %). Thus, we were not able to conduct these longitudinal analyses using LTA and we proceeded with cross-sectional LCA.

The set of problematic behaviors used in the present study extended beyond the indexing of depressive symptoms, substance use, and delinquency included by Phelps et al. (2007) and Lewin-Bizan et al. (2010); we also included disordered eating behavior, sexual behavior, and bullying. Classification of sexual behavior as a problem will be addressed in the discussion section of this paper. Sexual behavior during adolescence can be normative and healthy and does not always constitute a problem (Diamond and Savin-Williams 2009).

The Present Study

As previously stated, the research to date (e.g., Lewin-Bizan et al. 2010; Phelps et al. 2007; Schwartz et al. 2010; Tucker et al. 2005; Wiesner and Windle 2004) demonstrates that *different* problematic behaviors are demonstrated in *different* ways by *different* youth and are potentially related to *different* positive and negative outcomes. Prior research suggests a complex relationship between problematic behaviors and positive development, but there is relatively little information about this relationship throughout early, middle, and late adolescence. As such, our investigation of profiles of problematic behaviors in young people has both practical and theoretical significance. Accordingly, using data from the 4-H Study, we addressed the following questions: First, can profiles of problematic behaviors be identified in Waves 2 through 8 (Grades 6 through 12) of the 4-H Study of PYD? If yes, then what is the relationship between various profiles of risk behaviors and the 5 Cs of PYD? These questions are designed to further assess the components of the complex relationships between problematic behaviors and positive development. Furthermore, as was done with previous studies assessing problematic behaviors in this dataset, we will assess whether there are patterns of gender difference relating to profile membership.

Method

The 4-H Study of PYD is a longitudinal investigation of adolescents that focuses on defining and measuring key features of PYD. Full details of the 4-H Study of PYD have been presented elsewhere (Lerner 2005, 2011; Lerner et al. 2009a, b, 2010). Therefore, we present here only the features of the methods relevant to the present research, which includes data from Waves 2 through 8 (Grades 6 through 12). Because many of the measures included in the present analyses were not included in Wave 1 (Grade 5), we began our analyses at Wave 2.

Participants

The sample for the present analyses is comprised of 4,391 adolescents (38.8 % male, 59.9 % female, 0.4 % indicated different answers across waves). In terms of ethnicity across all seven waves, 65.8 % identified as European American, 9.4 % identified as Latino/a, 7.3 % identified as African, 2.3 % identified as Multiracial, 1.8 % identified as Asian or Pacific Islander, 1.5 % identified as Native American, 1.8 % identified as other, and 7.0 % indicated different answers across waves.

Because this study was longitudinal in design, participants' mean age varied across year. In Wave 2, the mean age was 12.10 years (SD = 0.61) and was 13.41 years (SD = 0.84) in Wave 3, 14.4 years (SD = 1.38) in Wave 4, 14.93 years (SD = 1.10) in Wave 5, 15.73 years (SD = 1.31) in Wave 6, 16.50 years (SD = 1.39) in Wave 7, and 17.61 years (SD = 1.46) in Wave 8.

Procedure

In Waves 1 through 3 of the 4-H Study, data collection from youth was conducted by trained study staff or, at more distant locations, hired assistants. A detailed protocol was used to ensure that data collection was administered uniformly and to ensure the return of all study materials. After Wave 1, youth who were absent on the day of the survey or who were from schools or programs that did not allow on-site testing were contacted by e-mail, mail, or phone, and were asked to complete and return the survey to us.

Beginning in Wave 5, youth completed the survey online unless they requested a paper survey. Parents completed online or paper surveys. Paper surveys were delivered to their homes by their children or through the mail (in the latter case, return postage was provided).

Attrition

Attrition in the 4-H Study is not randomly distributed across schools or youth program sites. For example, in Waves 2 and 3, some school principals withdrew consent for their school to participate and, thus, these students "dropped out" without having had the opportunity to remain in the study. The withdrawal of principal or superintendent permission to continue testing resulted in the loss of 561 participants in Wave 2. Of the 1,954 participants tested in Wave 2, 21.5 % individually withdrew their participation from Wave 3, whereas 337 (17.5 %) dropped out because of school/site attrition. In subsequent Waves (4, 5, 6, 7, and 8), many of the same schools did not allow us to conduct on-site data collection. Youth in these schools were contacted through mail or phone and were asked to complete the survey and mail it back to us or to complete it online. Since we consistently contacted all youth who ever participated in the study, many youth who were not surveyed in earlier waves came back into the study in later waves. During Waves 4, 5, 6, 7, and 8, we continued to contact all youth who were part of the first three waves and, in addition, we increased the sample by expanding our recruitment of youth in 4-H clubs around the country. For new youth participants, their parents were also asked to give consent and to complete the parent questionnaire.

Investigating the central research questions of this paper requires addressing item- and wave non-response. When examining problematic behaviors, characteristics of the individual may be related to differential attrition, as noted in previous longitudinal research (e.g., Schaie and Strother 1968). To account for attrition in relationship to participants' profiles of problematic behaviors, we created a binary variable at each wave to indicate whether youth participated in subsequent waves. We present the findings from this analysis after we present the profile analysis.

Measures

Positive Youth Development

Although there are several models of PYD (e.g., Hamilton 1999; Lerner et al. 2009), the 4-H Study uses measures derived from the Five Cs model of PYD. Scores on each of the Cs range from 0 to 100, with higher scores representing higher levels of the Five Cs and, therefore, higher levels of PYD. Each C is constructed from a subscale measured by a set of questions; in order to calculate the C, a certain number of the questions must be answered. Youth who do not answer enough of the questions to measure the construct have their information dropped for that C. For this reason, there is variation in the number of participants with scores per C (e.g., 1,279 participants with Caring scores in Wave 2 and 1,679 participants with Connection scores in Wave 2). The Five Cs comprising the PYD construct are operationalized as follows.

Confidence

Confidence is an internal sense of overall positive self-worth (e.g., "I am happy with myself most of the time"), positive identity (e.g., "All in all, I am glad I am me"), and feelings about one's physical appearance (e.g., "I think I am good looking"). This scale is a mean of 16 items. The Cronbach's alpha ranged from 0.86 to 0.92 across Waves 2 through 8.

Competence

Competence is a positive view of one's actions in domain-specific areas, including academic competence (e.g., "I am just as smart as others my age"), social competence (e.g., "I have a lot of friends"), and physical competence (e.g., "I could do well at just about any new athletic activity"). This scale is a mean of 11 items. The Cronbach's alpha ranged from 0.82 to 0.86 across Waves 2 through 8.

Character

Character involves social conscience (e.g., "Helping to make the world a better place to live in"), valuing diversity (e.g., "Knowing a lot about people of other races"), possession of standards for correct behaviors (e.g., "I usually act the way I know I am supposed to"), and a sense of personal values and integrity (e.g., "Accepting responsibility for my actions when I make a mistake or get in trouble"). This scale is a mean of 20 items. The Cronbach's alpha ranged from 0.88 to 0.93 across Waves 2 through 8.

Caring

Caring reflects sympathy and empathy toward others. An example item for Caring is "When I see another person who is hurt or upset, I feel sorry for them." This scale is comprised of nine items. The Cronbach's alpha ranged from 0.81 to 0.85 across Waves 2 through 8.

Connection

Connection involves a positive bond with people and institutions that are reflected in healthy, bidirectional exchanges between the individual and peers (e.g., "My

friends care about me"), family (e.g., "I have lots of good conversations with my parents"), school (e.g., "I get a lot of encouragement at my school"), and community (e.g., "Adults in my town or city listen to what I have to say") in which both parties contribute to the relationship. This scale is comprised of 22 items. The Cronbach's alpha ranged from 0.89 to 0.91 across Waves 2 through 8.

Measures of Problematic Behaviors

In selecting measures of problematic behaviors to include in our profile analysis, we considered both behaviors assessed in previous studies of risk behavior and other behaviors that might be related to each other. As in the previous studies discussed above (Lewin-Bizan et al. 2010; Phelps et al. 2007), we used measures of depressive symptoms, delinquency behaviors, and substance use. In addition, we included measures of disordered eating behaviors, sexual activity, and bullying.

Depressive Symptoms

The Center for Epidemiological Studies Depression (CES-D) scale is a widely used 20-item self-report measure of depressive symptomatology, conceptualized as feelings of frustration, sadness, demoralization, loneliness, and pessimism about the future (Radloff 1977). Example items include "During the past week I was bothered by things that usually don't bother me" and "During the past week I felt sad." The response format is on a four-point scale, ranging from 0 = *rarely or none of the time* (less than one day) to 3 = *most or all of the time* (5–7 days) to indicate how frequently the respondent experienced symptoms during the past week (although the original scale asks about the experience of symptoms over the past 2 weeks). Items are summed for a total score (with a maximum score of 60), and higher scores indicate higher depressive symptomatology (i.e., greater frequency and number of symptoms of depression). Because the entire scale is designed to assess the same underlying experience of depressive symptoms, and because scores on each item have been shown to correlate highly with the other items, we used a composite score from this measure. The measure has been used extensively with adolescents and such studies have established this scale's validity and reliability with populations in high school and junior high school (Radloff 1977). In the 4-H Study, scores showed excellent reliability at all waves, with Cronbach's alphas ranging from 0.81 to 0.89.

Bullying

The 4-H study included nine questions adapted from the Revised Olweus Bully/Victim Questionnaire (Olweus 1996), including two general questions and seven specific questions about how often participants experienced being bullied in the past couple of months. We used only the item: "How often have you taken part in bullying another child or other children?" Response options ranged from 0 = *never* to 4 = *several times a week*. Because most participants reported never engaging in bullying, we recoded the answer options into a binary format of 0 = never and 1 = one or more times. Although Solberg and Olweus (2003) use "2–3 times a week" or more as a cutoff for identifying who is coded as a bully, in the current analyses we decided to assess not only those who might be characteristically bullies but those who engaged in any sort of bullying behavior, including "only once or twice."

Delinquency

We measured delinquency with items derived from the Search Institute's Profiles of Student Life-Attitudes and Behaviors (PSL-AB) scale (Leffert et al. 1998) and the Monitoring the Future questionnaire (Johnston et al. 2001). Wave 2 included four items assessing the frequency of the following behaviors: stolen something, gotten in trouble with the police, hit or beat up someone, and damaged property just for fun. The response options ranged from 1 = *never* to 5 = *five or more times*. At Waves 3 through 8, the additional item of "carried a weapon" was added to the original four items. As with the bullying item, relatively few participants reported engaging in these behaviors frequently, so we recoded the answer options into a binary format of 0 = *never* and 1 = *one or more times* and included each item separately.

Substance Use

At Wave 2, five items assessed how often participants had done the following within the last year: used cigarettes, alcohol, marijuana or hashish, or other drugs such as LSD or cocaine, and sniffed glue. At Wave 3, an additional item was added for taking steroid pills or shots without a doctor's prescription. The response options ranged from 1 = *never* to 4 = *regularly*. For Waves 2 through 4, items were recoded into binary format in the same manner as the delinquency and bullying items. Beginning in Wave 5, however, the distribution of the alcohol variables changed, such that a substantial portion of youth reported using alcohol "sometimes." For Waves 5 through 8, alcohol use was recoded into a trichotomous variable, with the categories of 0 = *never*, 1 = *occasionally*, and 2 = *frequently or regularly*. As with delinquency, we kept the items separate and did not create a composite.

Disordered Eating Behavior

The Eating Disorder Inventory (EDI) is a 64-item, self-report assessment of common psychological and behavioral

characteristics of anorexia nervosa and bulimia (Garner et al. 1983). We used three of the eight EDI subscales that deal with attitudes and behaviors concerning eating, weight, and body shape: Drive for Thinness, Bulimic Symptoms, and Body Dissatisfaction. The seven-item Drive for Thinness subscale assesses whether or not the participant has excessive concern with dieting, a preoccupation with weight, and an extreme pursuit of thinness and fear of weight gain. Example items from this subscale include: "I am terrified of gaining weight" and "I am preoccupied with a desire to be thinner." The Bulimic Symptoms subscale consists of seven items that assess whether or not the respondent has a tendency toward episodes of uncontrollable overeating (bingeing) that may be followed by the impulse to engage in self-induced vomiting. Sample items include: "I eat when I am upset" and "I have the thought of trying to vomit in order to lose weight." To avoid item duplication, the original nine-item Body Dissatisfaction subscale was modified to include five items that reflect whether or not respondents believe certain parts and features of their bodies (e.g., thighs, buttocks, hips, stomach, and body shape) are appropriately sized or too large. An example item is "I think my stomach is too big." All items are scored on a six-point Likert-type scale, with responses ranging from 1 = *never* to 6 = *always*, with higher scores reflecting greater weight and body shape concern. Linear transformations were performed on individual items so that each subscale would have a range beginning with zero. Possible scores for Drive for Thinness and Bulimia subscales ranged from 0 to 35 and for the Body Dissatisfaction subscale from 0 to 25. Because each scale is designed to point at underlying emotional experiences and patterns of behavior, and because scores on each item have been shown to correlate highly with the other items in that scale, we used a composite score from each scale. Cronbach's alphas across Waves 5 through 8 were acceptable for the Drive for Thinness (0.88–0.90), Bulimic Symptoms (0.79–0.83), and Body Dissatisfaction (0.77–0.85) subscales.

Sexual Behavior

Waves 5 through 8 included two questions to assess participants' sexual behavior. First, participants indicated whether they had ever had sexual intercourse. Those who responded that they had engaged in sexual intercourse then indicated whether, when they had sex, they used protection or contraception always, sometimes, or never. We combined the sexual behavior variables into a single item with three possible outcomes: 0 = *has not had sex*, 1 = *has had sex with the consistent use of protection or contraception*, and 3 = *has had sex without consistent protection or contraception (using protection or contraception either sometimes or never)*.

Identifying Profiles of Problematic Behaviors

We first sought to identify profiles of problematic behaviors (e.g., depression, substance use, eating disorders) at each wave of the 4-H study of PYD. To do this, we used latent class analysis (LCA; Collins and Lanza 2010), which is a type of mixture modeling. LCA is a latent variable technique that specifies how indicators (e.g., responses to questionnaire items) relate to a categorical latent variable that represents the unobserved subgroups. Indicators may be categorical, continuous, or some combination thereof (as in the current study). The aim of LCA is to identify subgroups of individuals who are similar to each other and different from individuals in other subgroups with regard to a specific group of variables (i.e., the problematic behaviors; Muthén and Muthén 2000). These subgroups are not directly observable but must be inferred from relationships among the observed variables (i.e., participants' responses to questionnaire items about specific behaviors).

The procedure for conducting LCA involves testing models with varying numbers of profiles and comparing fit indices, as well as theoretical interpretability, to decide on the number of profiles that provides the best fit to the data. In terms of statistical model fit indices, a variety of tools can help the researcher determine the appropriate number. The most commonly used tools include information criteria (e.g., the Bayesian Information Criterion [BIC]; Schwarz 1978), the bootstrap likelihood ratio test (BLRT; McLachlan and Peel 2000), and the Lo-Mendell-Rubin likelihood test (LMR; Lo et al. 2001). We examined all of these indices but gave special weight to the BIC and BLRT because, in prior simulation work (Nylund et al. 2007), these two tests were the most accurate in suggesting the appropriate number of classes. We also examined the interpretability of each model, including the prevalence of the profiles, their specific response patterns, and their correspondence with theoretical expectations. We evaluated each wave separately and independently chose the most appropriate number of profiles.

Relating the Profiles of Problematic Behaviors to the Five Cs of Positive Youth Development

We then investigated whether, at each wave, profile membership was associated with gender differences in the Five Cs. We also examined differences between profiles for the likelihood of participants being retained in further waves of the study. We conducted these analyses using the three-step process available in MPlus (Asparouhov and Muthén 2013). This procedure, newly available in Version 7, operates as follows. First, the latent class

model is estimated. Second, the most likely latent class membership is found for each individual (based on the class to which the participant has the highest probability of belonging). Using these probabilities, a classification uncertainty rate is computed. In the third step (which includes the auxiliary variable), most likely class membership is treated as an indicator of latent class membership, with uncertainty rates (i.e., measurement error) prefixed at the probabilities obtained in step two. We controlled alpha in our multiple comparisons (within each wave) using a Bonferroni correction starting with a nominal alpha of 0.10; the nominal alpha of 0.10 was chosen to counteract the overly conservative nature of the Bonferroni correction.

Results

Using a person-centered approach in the assessment of the relationships among problematic behaviors across the adolescent years, we conducted a series of latent profile analyses on a sample of 4,391 adolescents in Waves 2 through 8 (Grades 6 through 12) of the 4-H Study of PYD, including problematic behaviors such as bullying, delinquency, substance use, sexual activity, depressive symptoms, and eating disordered behaviors. After identifying distinct profiles of problematic behaviors at each wave, we tested for differences between the profiles in the Five Cs of PYD and gender. We then investigated possible differential patterns of attrition by profile.

Preliminary Analyses

Descriptive statistics for focal variables at each wave are available in Tables 1 and 2. Table 1 shows means and standard deviations for the continuous variables. The means of each of the Cs of PYD were consistently high, ranging from 66 to 77 on a 100-point scale. The mean of depressive symptoms was steadily low, ranging from 12 to 14 on a 60-point scale. Means of drive for thinness were moderate, in the 17–19 range on a 35-point scale, means for bulimic symptoms were in the 12–14 range on a 35-point scale, and means for body dissatisfaction were in the 12–-14 range on a 25-point scale. Table 2 shows the proportions of youth who reported engaging in specific problematic behaviors. Proportions were generally low, under 28 % (e.g., beating up others, Wave 2) except for using alcohol (19–64 %) and sexual activity (29–51 %). Beginning in Wave 5, similar proportions of youth reported occasional (17–21 %) or frequent (17–23 %) alcohol use, whereas sexual activity was more frequently always protected (13–31 %) than unprotected (7–11 %).

Primary Analyses

The primary goal of this study was to determine whether profiles of problematic behaviors could be identified in Waves 2 through 8 of the 4-H Study of PYD and, if so, to assess the relationship between various profiles of risk behaviors and the Five Cs of PYD as well as to determine whether there are patterns of gender difference relating to profile membership. As noted, we addressed the first question using LCA. We first present the results of the LCA, including the descriptions of each profile identified, and then proceed to the secondary questions pertinent to the Five Cs of PYD and gender differences in profile membership.

Profiles of Problematic Behaviors

Full information about fit indices and model choice is available upon request from the first author. We chose a four-profile solution at Wave 2, five-profile solutions at Waves 3 and 4, six-profile solutions at Waves 5 through 7, and a five-profile solution again at Wave 8. Using the final number of profiles at each wave (e.g., four profiles for Wave 2), we then looked at the pattern of profiles across waves to determine potential similarities and differences (e.g., whether any profiles at Wave 2 were similar to profiles at Wave 3). The model fit suggested which number of profiles would fit best. It is important to note that the profiles may not all differ from each other with statistical significance in terms of the item response probabilities and means of each of the included variables. We holistically evaluated the profiles to look for patterns of responses rather than specific areas of difference. Where we perceived similarities across profiles in different waves, we chose names for the profiles that would hold across waves. The percentage of youth in each profile is reported in Table 3. Figures 1, 2, 3, 4, 5, 6 display the patterns of problematic behaviors within each profile across waves so that the reader can visually compare the relative consistency of each profile across waves. Each figure contains a line graph that indicates the probability of engaging in the behaviors coded with binary variables and a bar graph that indicates the mean estimated scores for the continuous variables. The profiles are also described below.

Low Risk

One of the most prevalent profiles, this group was characterized by a generally low probability of engaging in any of the problematic behaviors. This profile also displayed one of the most consistent patterns across waves. The probability of members of this group engaging in almost all of the risk behaviors was below 0.1, except for beating

Table 1 Means and standard deviations for continuous variables

	Wave (Grade)						
	2 (6)	3 (7)	4 (8)	5 (9)	6 (10)	7 (11)	8 (12)
Confidence	71.58 (17.57)	72.31 (17.27)	68.07 (19.85)	69.08 (19.59)	66.90 (18.84)	68.14 (18.80)	69.33 (17.85)
Competence	68.60 (15.04)	69.02 (15.11)	75.27 (17.04)	74.64 (17.34)	72.77 (16.91)	75.93 (15.61)	76.96 (14.54)
Character	71.02 (17.86)	72.58 (15.57)	69.73 (15.33)	71.40 (16.60)	72.22 (15.27)	74.45 (14.14)	76.26 (14.08)
Connection	73.74 (14.32)	68.81 (15.00)	67.81 (16.18)	66.74 (16.03)	69.20 (15.43)	70.21 (14.82)	70.39 (14.79)
Caring	70.02 (18.25)	72.98 (19.32)	71.43 (19.22)	71.15 (19.04)	74.50 (18.44)	77.10 (16.00)	77.99 (15.76)
Depressive symptoms	12.92 (9.25)	13.16 (9.52)	13.93 (9.69)	14.73 (10.31)	13.62 (9.83)	12.50 (9.17)	12.43 (9.23)
Drive for thinness				17.91 (8.60)	17.89 (8.70)	18.02 (8.63)	18.33 (8.89)
Bulimic symptoms				13.07 (5.99)	13.14 (5.79)	12.96 (5.70)	13.12 (5.87)
Body dissatisfaction				13.29 (5.74)	13.45 (5.98)	13.66 (6.02)	13.84 (6.29)

Table 2 Percentage of participants answering "yes" on categorical variables

	Wave (Grade)						
	2 (6)	3 (7)	4 (8)	5 (9)	6 (10)	7 (11)	8 (12)
Bullying	26.23	21.42	25.18	26.64	20.29	15.47	12.56
Cigarettes	5.88	9.28	12.97	18.37	16.67	13.39	17.35
Smokeless tobacco	1.85	4.21	5.63	7.88	8.69	7.25	9.30
Sniffing glue	13.25	11.17	9.39	8.04	6.22	2.78	3.53
Marijuana	2.31	4.40	8.01	15.23	12.43	12.37	15.68
Hard drugs	1.07	2.59	3.67	5.16	4.10	3.21	4.73
Stealing	10.00	11.55	13.53	15.24	13.07	8.92	8.17
Police involvement	8.31	9.47	12.63	14.68	12.33	8.93	8.14
Beating someone up	27.74	23.22	24.82	24.94	20.66	10.04	8.47
Damage property	7.92	9.01	11.55	12.01	11.14	5.44	4.24
Steroids		2.27	2.66	3.81	2.71	2.03	3.06
Weapon		12.93	18.50	15.45	19.05	11.76	12.40
Alcohol (yes)	18.94	21.01	30.43				
Alcohol (sometimes)				21.06	19.55	18.90	17.76
Alcohol (often)				19.21	17.56	18.80	23.28
Sex (protected)				30.69	13.54	18.10	24.04
Sex (unprotected)				9.92	7.49	8.42	10.62

someone up and bullying in the earlier waves, which were below 0.2. In the later waves, the probability of drinking alcohol *sometimes* or engaging in *protected* sex rose slightly.

Mental Health Struggles

This profile was characterized by high levels of depressive symptoms, although the levels were lower in later waves. In Waves 2 through 4, depressive symptom scores were in the 30–35 range. In Waves 5 through 7, scores were 25–30, and around 22 in Wave 8. Evidence of disordered eating attitudes and behaviors was also strong, with drive for thinness in the 30–35 range, body dissatisfaction in the 20–25 range, and bulimic symptoms in the 25–30 range. This profile, however, showed low levels of the binary-coded problematic behaviors, with all probabilities below 0.4, except for using tobacco and alcohol in Wave 8. Levels of problematic behaviors were also slightly elevated in Wave 2, in particular bullying and beating people up. Because Waves 2 and 8 both had fewer profiles overall, these slight shifts might be due to the presence in the profile of a small number of individuals who would have been in the Mental Health and Other Risks profile (discussed below); that additional profile, however, was not justified in those waves in terms of model fit.

Table 3 Percentage of participants in each latent profile of problematic behaviors by wave

Profile	Wave (Grade)						
	2 (6)	3 (7)	4 (8)	5 (9)	6 (10)	7 (11)	8 (12)
Low risk	67	67	63	37	46	49	41
Mental health struggles	10	9	7	4	6	4	6
High "drive for thinness"				24	21	27	26
Alcohol and aggression	20	16	21	21	15	9	21
Mental health and other risks		6	5	6	8	9	
High risk	3	2	4	8	4	2	6

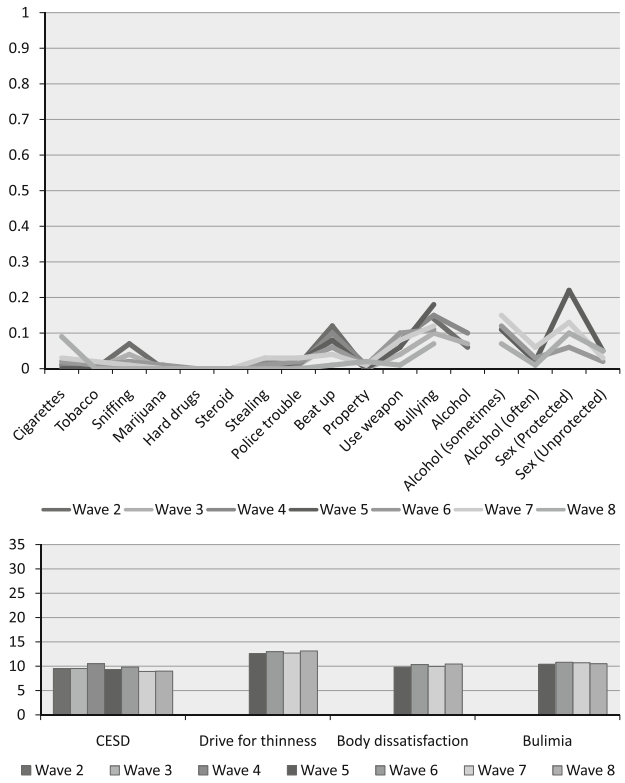

Fig. 1 Low risk profile across Waves 2–8

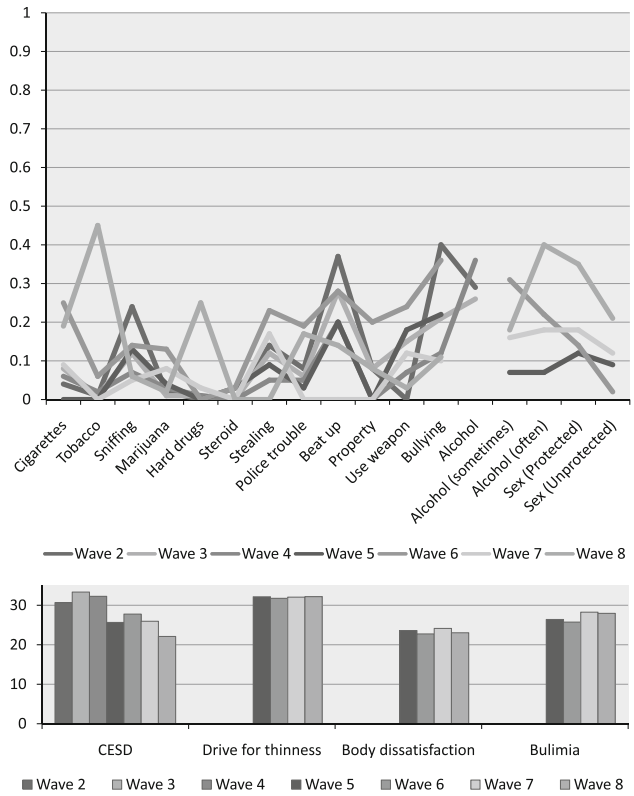

Fig. 2 Mental health struggles profile across Waves 2–8

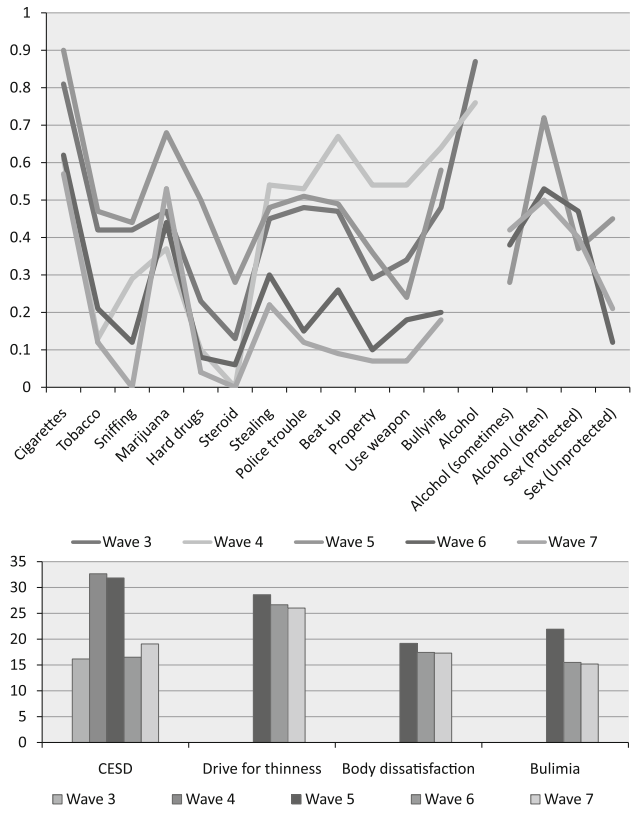

Fig. 3 Mental health and other risks profile across Waves 3–7

Mental Health and Other Risks

This profile was characterized by a consistent theme of mental health struggles combined with a mix of problematic behaviors, although the specific pattern of behaviors varied from wave to wave. This group was not identified at Waves 2 or 8. Depressive symptoms were highest in Waves 4 and 5, with scores ranging from 30 to 35. Scores were lower in Waves 3, 6, and 7, ranging from 15 to 20. In

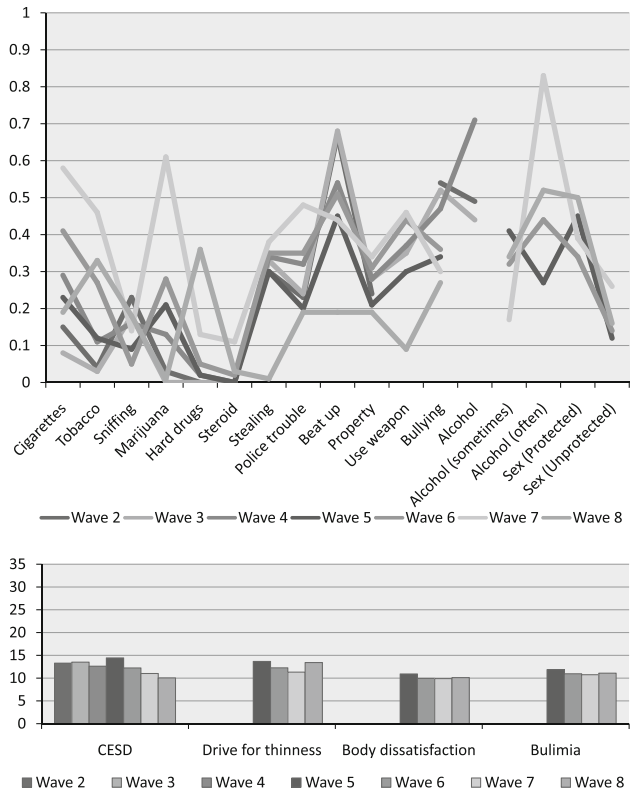

Fig. 4 Alcohol and aggression profile across Waves 2–8

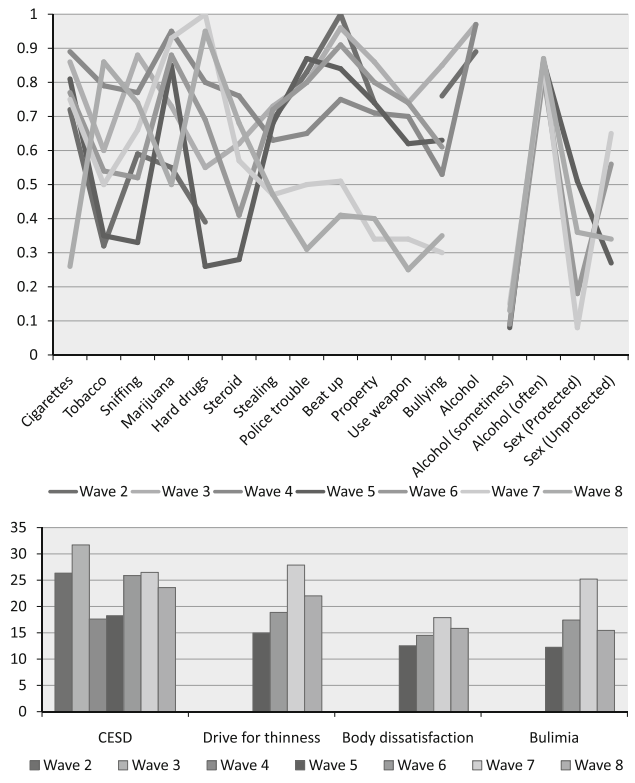

Fig. 5 High risk profile across Waves 2-8

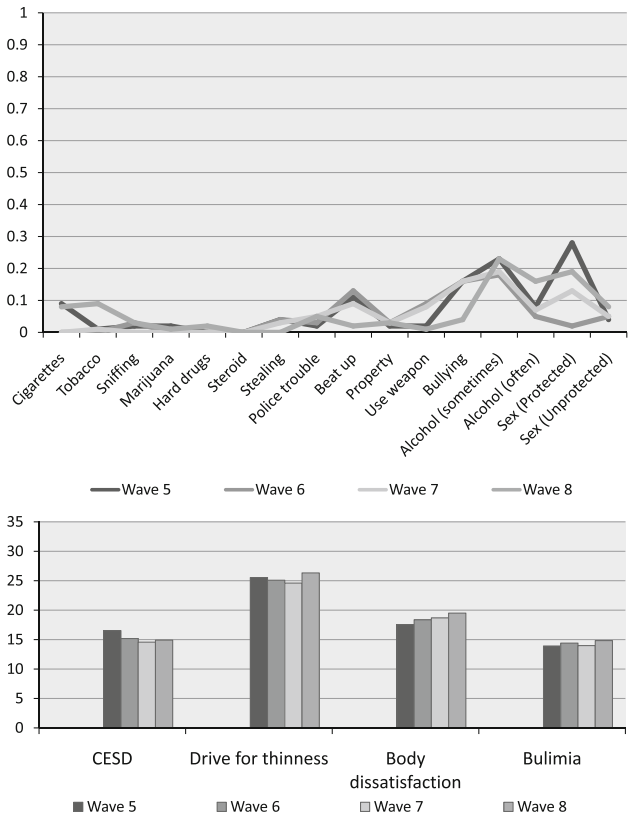

Fig. 6 High "drive for thinness" profile across Waves 5–8

Waves 5 through 7, the drive for thinness was high, with scores ranging from 25 to 30, and body dissatisfaction was also high, with scores ranging from 15 to 20. Bulimic symptoms started higher in Wave 5 with a score of about 22, and dropped to about 15 in Waves 6 and 7. Cigarette and alcohol use were the most striking high probability behaviors, with probabilities ranging from 0.5 to 0.9. In Waves 5 through 7, the probabilities of using alcohol *often* ranged from 0.5 to just over 0.7. Marijuana use was also prevalent, with probabilities between 0.3 and 0.7. Probabilities of engaging in delinquent behaviors ranged from 0.2 to 0.7 in Waves 2 through 5, and then in Waves 6 and 7 dropped to 0–0.3.

Alcohol and Aggression

This profile was characterized by engagement in some kind of problematic behavior, with mid-range probabilities of engaging in aggressive behaviors such as beating people up and also using alcohol and marijuana. Youth in Wave 7 displayed the highest probabilities of engaging in these behaviors. In Waves 5 through 8, youth in this group had a 0.3–0.5 probability of engaging in *protected* sex, and a 0.1–0.3 probability of engaging in *unprotected* sex. Furthermore, this group of youth showed consistently low

levels of symptoms of mental health struggles, with low scores for depressive symptoms and eating disordered feelings and behaviors, which ranged consistently between 10 and 15.

High Risk

This profile was characterized by the highest probabilities of engaging in problematic behaviors. Youth in this profile at Wave 2 were not quite as engaged with problematic behaviors across the board, except for smoking cigarettes (0.7), beating people up (1.0), and drinking alcohol (0.9). Youth in Waves 7 and 8 also had much lower probabilities for engaging in delinquent behaviors, with probabilities ranging from 0.2 to just over 0.5, as compared to 0.5–1.0 in the other waves. Furthermore, in Waves 5 through 8, these youth had a 0.8–0.9 probability of drinking alcohol *often* and a 0.2–0.7 probability of engaging in sex *without protection*. Symptoms of mental health struggles were moderate yet varied, with a dip in Waves 4 and 5 and a spike in Waves 3 and 7.

High "Drive for Thinness"

This group emerged in Wave 5 when the 4-H study began including measures of disordered eating feelings and behavior in the survey. The group was defined by an elevated Drive for Thinness, with scores around 25, accompanied by depressive symptoms and bulimic symptoms scores around 15 and body dissatisfaction scores increasing from 15 to 20. These youth had very low probabilities (under 0.1) for engaging in almost all problematic behaviors, except for drinking alcohol *sometimes*, which ranged from 0.1 to 0.3, and having *protected* sex, which ranged from 0 to 0.3. Overall, scores on the Drive for Thinness scale were the strongest differentiator between this group and the Mental Health Struggles profile.

Profile Differences in Five Cs and Gender

Differences among the profiles in scores on the Five Cs are shown in the second set of figures (Figs. 7, 8, 9, 10). We identified several significant differences. The Low Risk youth had consistently high levels of each of the Five Cs, ranging from 70 to over 80. In contrast, the High Risk youth had low levels of each of the Cs, ranging from 40 to 60, with a few exceptions in some waves in which their Confidence and Competence scores were a bit higher. In comparison to the other groups, the Mental Health Struggles group and the Mental Health and Other Risks group had low Confidence and low-to-mid range Competence and Connection, but mid-to-high range Character and Caring. The Alcohol and Aggression group, in contrast, had mid-to-high range Confidence and Competence, mid-range Character and Caring, and Connection scores that varied considerably. The High "Drive for Thinness" group had low Confidence, low-to-mid range Competence, and high Character and Caring, with mid-to-high range Connection. Of all the Cs, differences in Confidence levels among the groups were most striking. Table 4 lists the means of the 5Cs of PYD across profiles by wave, with significance tests.

We present gender differences here, rather than in conjunction with profiles, because they were neither consistent nor defining features of the profiles. Members of the Alcohol and Aggression group were more likely to be male than members of the other groups. In some waves, members of the High Risk group were also slightly more likely to be male. Members of the Mental Health Struggles groups, members of the Mental Health and Other Risks groups in later waves, and members of the High "Drive for Thinness" groups were more likely to be female.

Accounting for Attrition

Attrition analyses revealed a consistent pattern of significant differences, as displayed in Table 3. Although there were no significant differences in the dropout pattern at Waves 3 and 4, members of the Low Risk profile were more likely to stay in the study in each of the other waves, as compared to members of the Alcohol and Aggression, Mental Health and Other Risks, or High Risk groups, depending on the wave.

Discussion

The aim of this study was to determine whether profiles of problematic behaviors could be identified in Waves 2 through 8 of the 4-H Study of PYD and, if so, whether youth in these profiles differed in their levels of the Five Cs of PYD and if there were patterns of gender difference in profile membership. This study was conducted in order to address a gap in the research on understanding interindividual differences in risk during adolescence. Using a person-centered approach, we found distinct profiles based on measures of mental health, disordered eating behaviors, aggression, and alcohol use. We named the profiles as follows: Low Risk, Mental Health Struggles, Mental Health and Other Risks, Alcohol and Aggression, High Risk, and High "Drive for Thinness." This research demonstrates the benefits of person-centered analyses and the importance of understanding problematic behaviors in relation to both other problematic behaviors and indicators of positive development.

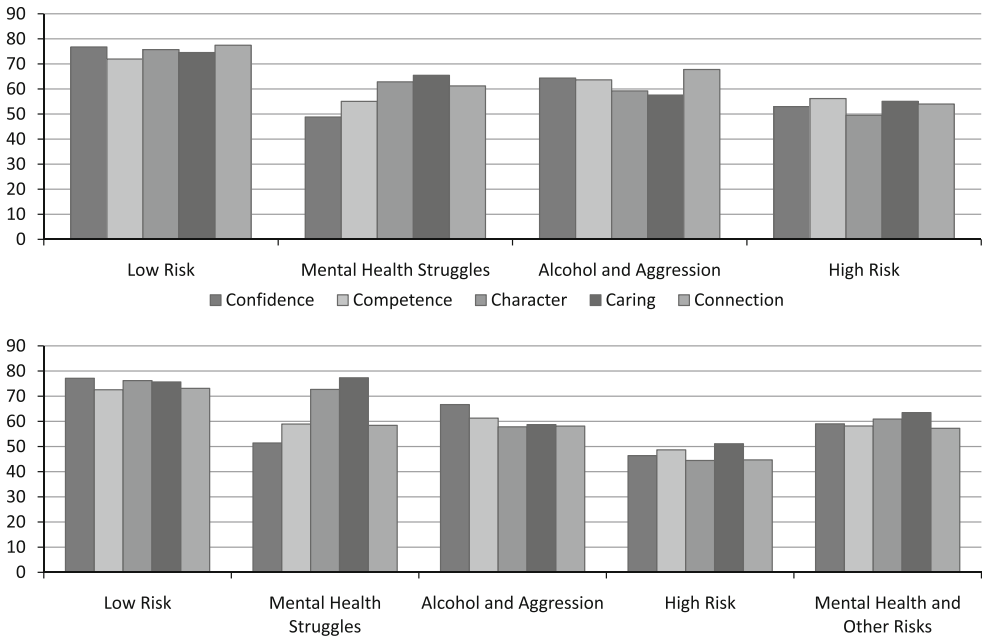

Fig. 7 Waves 2 and 3 comparison of 5 Cs of PYD

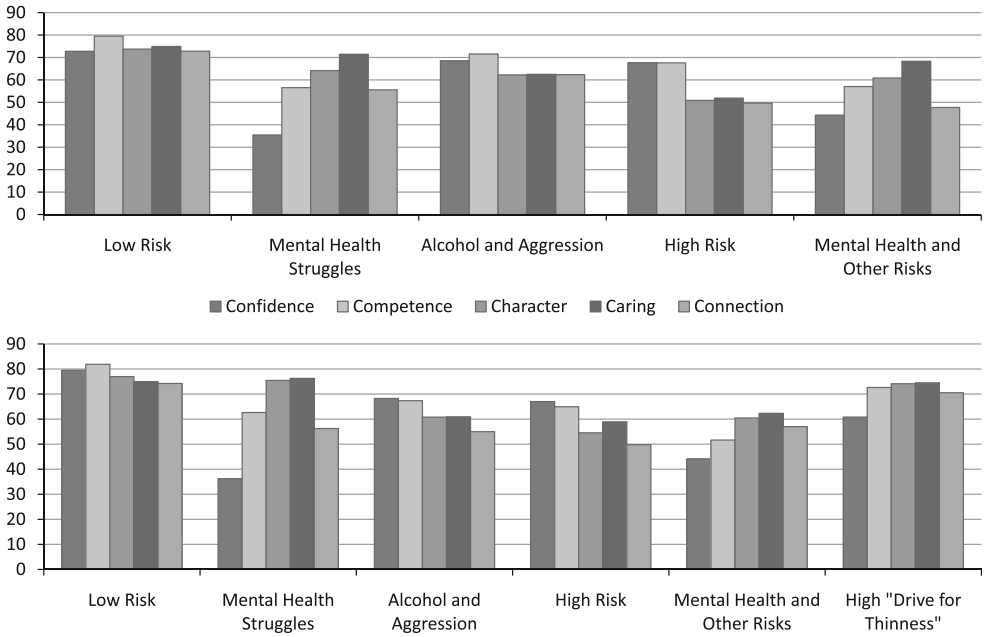

Fig. 8 Waves 4 and 5 comparison of 5 Cs of PYD

Profile analysis allowed us to identify general typologies of problematic behaviors of youth and to investigate specific patterns of deviation from those trends. Our research expanded on previous work (Lewin-Bizan et al. 2010; Phelps et al. 2007) by using profile analysis to assess how different risk behaviors fit together in different ways and by delineating how these behaviors were related to each of the Five Cs of PYD. The findings were consistent with past research identifying a complex relationship among positive and problematic behaviors (Lewin-Bizan et al. 2010; Phelps et al. 2007; Tucker et al. 2005; Wiesner and Windle 2004).

We identified several interesting findings. Three profiles of youth did not engage in much externalizing behavior but, rather, were differentiated based on internalizing behaviors, including: low internalizing behaviors (Low Risk), high depressive symptoms and high scores on all the disordered eating behavior measures (Mental Health Struggles), and high scores specifically on the Drive for Thinness scale (High "Drive for Thinness"). Three profiles included evidence of both internalizing and externalizing behaviors: moderate-to-high levels of alcohol use, bullying, and beating people up (Alcohol and Aggression), high

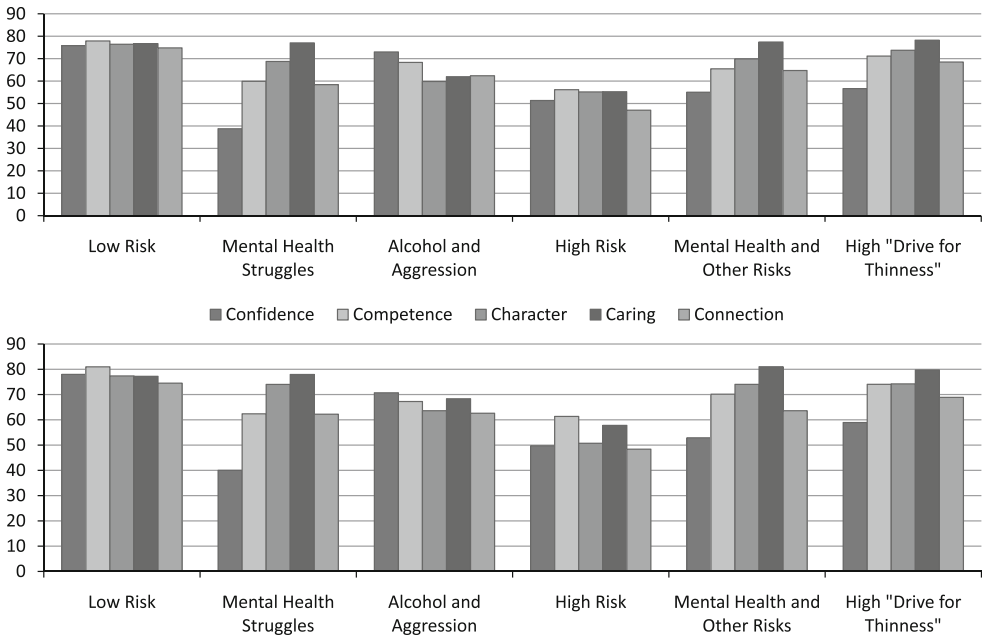

Fig. 9 Waves 6 and 7 comparison of 5 Cs of PYD

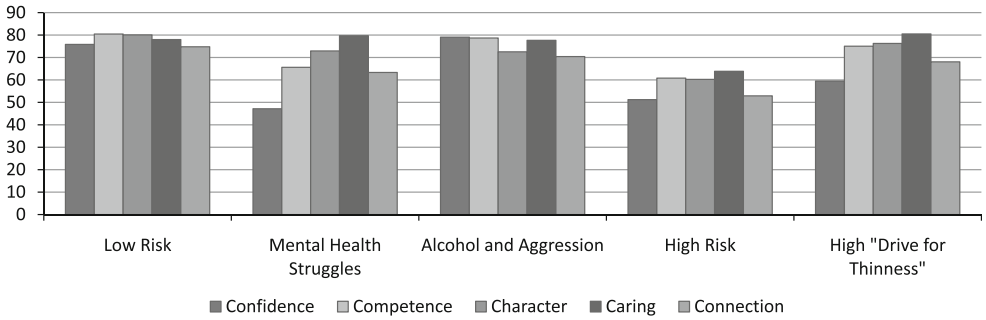

Fig. 10 Wave 8 comparison of 5 Cs of PYD

levels of depressive symptoms with a broader variety of substances and delinquent behaviors (Mental Health and Other Risks), and lastly a group of problematic behaviors across the range of behaviors studied (High Risk).

We found higher levels of Confidence and Competence associated with not only the Low Risk profile but also with the Alcohol and Aggression profile. In contrast, low levels of Confidence and Competence were consistently found in the Mental Health Struggles and the Mental Health and Other Risks profiles, and low levels of Confidence were found in the High "Drive for Thinness" profile. This pattern suggests a possible association between high levels of Confidence and Competence and externalizing behaviors, in the absence of other indicators of positive development and, in contrast, an association between low levels of Confidence and internalizing symptoms, even in the presence of other indicators of positive development. These findings make sense in the context of research on the role of sports in youth development. Sports participation has been linked to the Five Cs of PYD (Zarrett et al. 2009) and, at the same time, links have been found between sports participation and alcohol consumption (Mays et al. 2010; Schulenberg and Maggs 2002). Youth who participate in sports appear similar to the popular youth discussed in the controversial peer status literature (Allen et al. 2005; Diego et al. 2003; Mayeux et al. 2008). In contrast, for the profiles of youth with low Confidence, this low Confidence may be a part of the low self-esteem characteristically associated with depressive symptoms and other internalizing symptoms (Orth et al. 2008).

Members of the Alcohol and Aggression group and, to a lesser extent, members of the High Risk group were slightly more likely to be male. Members of the Mental Health Struggles, Mental Health and Other Risks, and High "Drive for Thinness" groups were more likely to be female. These findings are consistent with past studies indicating that males are more likely to engage in delinquency and substance use, and females are more likely to exhibit signs of depression and eating disorders (Fay and Lerner 2013; Lewin-Bizan et al. 2010; Phelps et al. 2007; Zimmerman et al. 2008). Our analysis of attrition patterns found that youth in the Low Risk group were more likely to

Table 4 Means of the 5Cs of positive youth development across profiles by wave

Wave	Profile	Confidence	Competence	Character	Caring	Connection
2	LR	76.76	71.94	75.69	74.54	77.45
	MHS	48.81	55.05	62.84	65.46	61.22
	A & A	64.34	63.63	59.23	57.56	67.77
	HR	52.96	56.18	49.52	55.07	53.98
	Overall test	397.63***	143.75***	175.60***	79.83***	222.79***
	All pairwise comparisons significant except	MHS versus HR	A & A versus HR MHS versus HR	MHS versus A & A	MHS versus A & A A & A versus HR	MHS versus A & A MHS versus HR A & A versus HR
3	LR	77.13	72.55	76.19	75.65	73.11
	MHS	51.41	58.93	72.70	77.32	58.40
	A & A	66.66	61.28	57.83	58.70	58.12
	HR	46.36	48.67	44.46	51.09	44.68
	MHOR	59.01	58.16	60.91	63.46	57.23
	Overall test	349.20***	216.90***	256.93***	73.23***	300.71***
	All pairwise comparisons significant except	MHS versus HR MHS versus MHOR A & A versus MHOR	MHS versus MHOR MHS versus A & A A & A versus MHOR	LR versus MHS A & A versus MHOR	LR versus MHS A & A versus HR A & A versus MHOR HR versus MHOR	MHS versus A & A MHS versus MHOR A & A versus MHOR
4	LR	72.76	79.50	73.75	74.92	72.79
	MHS	35.46	56.56	64.14	71.44	55.59
	A & A	68.56	71.56	62.26	62.48	62.33
	HR	67.69	67.60	50.87	51.89	49.68
	MHOR	44.30	57.04	60.86	68.32	47.72
	Overall test	304.12***	135.82***	154.99***	88.41***	255.63***
	All pairwise comparisons significant except	LR versus HR MHS versus MHOR A & A versus HR	MHS versus MHOR MHS versus HR A & A versus HR HR versus MHOR	MHS versus A & A MHS versus MHOR A & A versus MHOR HR versus MHOR	LR versus MHS MHS versus MHOR A & A versus MHS A & A versus MHOR	MHS versus HR MHS versus A & A MHS versus MHOR HR versus MHOR

Table 4 continued

Wave	Profile	Confidence	Competence	Character	Caring	Connection
5	LR	79.51	81.87	76.97	74.98	74.23
	MHS	36.24	62.63	75.45	76.25	56.25
	A & A	68.24	67.36	60.79	60.93	54.98
	HR	67.02	64.94	54.55	58.93	49.78
	MHOR	44.16	51.64	60.46	62.31	57.01
	HDFT	60.80	72.61	74.13	74.49	70.54
	Overall test	270.62***	78.95***	132.29***	62.78***	203.23***
	All pairwise comparisons significant except	MHS versus MHOR A & A versus HR HR versus HDFT	MHS vs A & A MHS versus HR MHS versus HDFT A & A versus HR A & A versus HDFT HR versus HDFT	LR versus MHS LR versus MHOR MHS versus HR MHS versus HDFT A & A versus HR A & A versus MHOR	LR versus MHS LR versus MHOR MHS versus HDFT A & A versus HR A & A versus MHOR HR versus MHOR	LR versus HDFT MHS versus A & A MHS versus MHOR A & A versus HR A & A versus MHOR
6	LR	75.79	77.89	76.42	76.68	74.79
	MHS	38.76	59.89	68.76	77.02	58.41
	A & A	72.99	68.33	59.82	61.96	62.38
	HR	51.35	56.16	55.16	55.25	47.04
	MHOR	55.03	65.46	69.89	77.41	64.72
	HDFT	56.63	71.16	73.74	78.24	68.49
	Overall test	672.37***	201.26***	202.01***	102.33***	272.25***
	All pairwise comparisons significant except	LR versus A & A HR versus MHOR MHOR versus HDFT	MHS versus HR MHS versus MHOR A & A versus MHOR A & A versus HDFT	MHS versus MHOR A & A versus HR	LR versus MHS LR versus MHOR LR versus HDFT MHS versus MHOR MHS versus HDFT A & A versus HR MHOR versus HDFT	MHS versus A & A A & A versus MHOR MHOR versus HDFT

Table 4 continued

Wave	Profile	Confidence	Competence	Character	Caring	Connection
7	LR	77.98	80.97	77.37	77.22	74.52
	MHS	40.01	62.37	74.01	77.95	62.23
	A & A	70.70	67.25	63.60	68.34	62.61
	HR	49.72	61.35	50.72	57.79	48.39
	MHOR	52.89	70.14	74.03	81.00	63.60
	HDFT	58.93	74.06	74.22	79.72	68.89
	Overall test	400.39***	99.13***	57.19***	34.35***	91.78***
	All pairwise comparisons significant except	HR versus MHOR	MHS versus A & A MHS versus HR A & A versus HR A & A versus MHOR HR versus MHOR MHOR versus HDFT	LR versus MHS LR versus MHOR MHS versus MHOR MHS versus HDFT MHOR versus HDFT	LR versus MHS LR versus MHOR LR versus HDFT MHS versus MHOR MHS versus HDFT A & A versus HR MHOR versus HDFT	MHS versus A & A A & A versus MHOR MHS versus HR MHS versus MHOR MHS versus HDFT MHOR versus HDFT
8	LR	75.84	80.45	80.07	77.99	74.78
	MHS	47.15	65.63	72.91	79.70	63.33
	A & A	79.07	78.69	72.54	77.64	70.41
	HR	51.22	60.81	60.24	63.84	52.91
	HDFT	59.52	75.04	76.27	80.49	68.06
	Overall test	256.99***	98.88***	44.21***	16.11**	74.20***
	All pairwise comparisons significant except	LR versus A & A MHS versus HR	LR versus A & A MHS versus HR A & A versus HDF	MHS versus A & A MHS versus HDFT	LR versus A & A LR versus MHS LR versus HDFT MHS versus A & A MHS versus HDFT A & A versus HDFT	

* $p < .05$; ** $p < .01$; *** $p < .001$

stay in the study, as compared to youth in the three groups that included the highest levels of problematic behaviors. Past studies have also found that higher attrition is related to higher levels of risky behaviors (McCoy et al. 2009; Post et al. 2012; Zand et al. 2006). Although the profiles themselves are a model to help understand youth and are not specific evidence of distinct "types" of young people, these characterizations are useful in understanding the complexity of the covariance of behaviors and characteristics within different individuals.

This complexity leads us to propose the term "potentially problematic behaviors" in order to communicate the contextually and developmentally embedded perspective that is needed when investigating these behaviors. For example, smoking cigarettes (a risk behavior) is considered less desirable than feeling connected to one's community (an indicator of positive development). However, each attribute is part of a more complex developmental system in which particular behaviors are not necessarily linked only to positive or negative developmental outcomes. When these behaviors are interpreted in context, there is evidence that experimentation may be normative and can have both positive and negative outcomes (Dworkin 2005; Tucker et al. 2005).

For example, in this study we found a distinction between youth who had sex with protection and youth who had unprotected sex: members of the Low Risk group were increasingly likely to engage in protected sex as they got older, but had a very low probability of engaging in unprotected sex; in contrast, members of the High Risk group were likely to engage in unprotected sex but not protected sex. Other research has shown that two-thirds of adolescents will have sex before they are 18 years old, making sexual activity a normative behavior during adolescence (Crockett et al. 2006). Unprotected and/or unwanted sex is problematic, but sexual activity *per se* is not always linked to negative outcomes. A specific behavior is an instance of individual contributions to individual ↔ context relations within a relational developmental system and, as such, behaviors may be more likely to link to negative outcomes if they are persistent, excessive, or done in certain combinations.

One example of this embodied system can be seen by comparing the Alcohol and Aggression group with the Mental Health and Other Risks group; youth in both groups were using alcohol, but youth in one group (Alcohol and Aggression) were using alcohol while sometimes having unprotected sex and beating people up, and youth in the other group (Mental Health and Other Risks) were using alcohol and maybe a few other substances and experiencing symptoms of depression and eating disorders. The meaning and consequences of the alcohol use are likely to be different in each of these embodied contexts. Indeed, youth in the Alcohol and Aggression group showed higher scores on Confidence and Competence in comparison to youth in the Mental Health and Other Risks group, who were more likely to display higher Character and Caring. Understood within such an embodied system (Overton 2013), it becomes increasingly clear how interrelations of potentially problematic behaviors may be connected in different ways to indicators of more positive development. This observation, however, merits further investigation into the developmental processes before a shift in terminology is called for.

We recognize several limitations in the present study. First, our measures for problematic behaviors were quite basic. For example, bullying behaviors were assessed using only one item, although there are likely several different kinds of bullying behaviors that different youth might be more or less likely to exhibit. More information about bullying behaviors might have also provided us with enough detail for differentiating between youth who report bullying "only once or twice" and youth who bully more frequently. In addition, the measure of sexual activity did not differentiate between contraceptive behavior that prevents pregnancy and the use of condoms or other latex barriers to prevent sexually transmitted infections. Furthermore, the measure did not differentiate between types of sexual activities, which may have different levels of risk. Because the strength of the 4-H Study is in the measures of positive behaviors, further profile analysis could be conducted on datasets with more detailed measures of problematic behaviors.

Another limitation is that a few of the profiles seemed to change somewhat from wave to wave, and it is unclear which of these changes might be indicative of qualitative differences in young people's experiences of the problematic behaviors. For this reason, we chose to design our figures to show each profile across waves, so that the reader can visually compare the profiles across waves in interpreting our findings. Due to low rates of many of the problematic behaviors, and higher attrition among members of the high risk profile, caution must be used in interpreting the results.

Our study is also limited by the fact that we did not have enough participant consistency across waves in our sample to do longitudinal analyses. The next logical step would be to conduct a latent transition analysis to assess the extent to which youth transition from one profile category to another over time. Who transitions and who remains in one category consistently throughout adolescence? In other words, do these profiles represent roughly the same group of youth over time, or do they represent different youth? Future research with datasets that have lower attrition rates and, thus, more consistent participation in each wave will be needed.

This study also has several strengths. Using latent profile analysis allowed us to conduct a person-centered analysis assessing latent patterns in a large dataset. The results showed us a specific model, which constitutes an approximation of average tendencies and deviations from the average patterns for young people in the study. The results should not be interpreted as determining that there are specific youth who fit into these specifically delineated groups. Rather, the purpose of latent class analysis is to model youth behaviors in order to estimate interindividual differences in intraindividual attributes of functioning.

Looking across waves in this way provides a comprehensive picture of problematic behaviors among youth in the 4-H Study of PYD, a national longitudinal study of diverse youth. This picture included many *different* problematic behaviors at once, making distinctions between *different* types of delinquency, *different* types of substance use, and *different* levels of alcohol use. Furthermore, we recognized the difference between safe and unsafe sex and between depression, generalized eating disordered behaviors, and drive for thinness specifically. With this plethora of variables, we had clear findings that provided a sense of the complex relationships among problematic behaviors and indicators of positive development.

The findings of this research are preliminary, but nonetheless could alert schools and families to the need to look for multiple indicators of both positive and problematic occurrences in young people. Even when youth demonstrate positive development and follow the rules, they may be suffering in terms of mental health. Inversely, even when young people are getting in trouble in some areas, they may have strengths upon which we can capitalize in order to promote more positive development and address risks. As discussed above in terms of alcohol use, a single behavior may require different intervention or treatment approaches depending upon the other interrelated behaviors. Different treatment approaches may be warranted for youth who exhibit alcohol use with mental health challenges versus alcohol use with delinquency, as the etiology behind alcohol use may be entirely different for these groups. Such implications for intervention and treatment merit further exploration.

The present study points to several next steps for research. There is a clear need for longitudinal analysis. Latent profile analysis followed by latent transition analysis would help us better understand how specific youth move through (or remain in) these profiles of problematic behaviors across time. Qualitative longitudinal analysis could be used to hear from youth at multiple points during adolescence to better understand the meaning of different patterns of risk behaviors and how youth experience these behaviors within their embodied lives. Another direction to explore might be ecological analysis, assessing whether and how these profiles vary depending upon the ecological context in which youth are embedded. For example, some profiles of problematic behavior might be more likely for particular youth in particular contexts.

Another important direction for future research is the continued use of person-centered analysis. For example, P-technique (Molenaar and Nesselroade 2009; Nesselroade and Ford 1985) could be used to assess the behaviors of a small group of youth by focusing in detail on different behaviors across much smaller periods of time. A theoretically-driven division of the x-axis (time) could help us to understand the dynamic of problematic behaviors throughout, for example, a school year, the course of a week, or even a single day.

Conclusion

The present study has both theoretical and applied implications. Profile analysis demonstrated that adolescents' problematic behaviors combine in distinct profiles based on measures of mental health, disordered eating behaviors, aggression, and alcohol use. Membership in different profiles also corresponded to differing strengths in indicators of PYD. For those in daily contact with young people, it is important to keep in mind that youth who appear to be doing well in one area may not be doing well in different areas of their lives, and youth who appear to be struggling in one area may be not be struggling in every area. For researchers, it is important to understand that some so-called "risk" behaviors are, in fact, qualitatively riskier than others. All problematic behaviors cannot be grouped together into a single category. Some risk behaviors are more likely to co-occur with positive development, whereas other risk behaviors are more likely to co-occur with even increased risk. In addition, for both practitioners and researchers, we have illustrated that promotion is not prevention, and that risk is not deficit. All youth have strengths, and many youth take risks. An integrated and individualized promotion and prevention approach may be called for in order to put all youth on a thriving path.

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provided feedback on the manuscript drafts; RL is the Principal Investigator on the project, and provided feedback on the manuscript drafts. All authors read and approved the final manuscript.

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