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Capturing Complete Mental Health Among Adolescents: Investigation of Covitality Latent Class Typologies

A dissertation submitted in partial satisfaction of the requirements for the degree of Doctor of Philosophy in Counseling, Clinical, and School Psychology

by

Jennica Lee Rebelez Ernst

Committee in charge:

Professor Michael J. Furlong, Chair

Professor Erin Dowdy

Professor Karen Nylund-Gibson

September 2015

The dissertation of Jennica Lee Rebelez Ernst is approved.

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Erin Dowdy Quirk

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Karen Nylund-Gibson

_____

Michael J Furlong, Committee Chair

April 2015

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VITA OF JENNICA LEE REBELEZ-ERNST
April 2015

EDUCATION
University of California, Santa Barbara, Santa Barbara ,California

Department of Counseling, Clinical, and School Psychology
Ph. D. in Counseling, Clinical and School Psychology (emphasis) June 2015
Advisor: Dr. Michael Furlong

PPS and NCSP in School Psychology June 2015

Master of Education (M.Ed.) June 2012

Department of Psychology
Bachelor of Arts in Psychology June 2010
Minor in Education and Applied Psychology; Honors Graduate

PROFESSIONAL EMPLOYMENT

University of California, Santa Barbara, Santa Barbara, CA

Graduate Student Researcher- First 5/THRIVE Santa Barbara 2011-2013

Teaching Assistant- CNCSP 102, Introduction to Applied Psychology Research 2011-2012

Research Assistant- Safe School Healthy Students 2010- 2011

Assistant to the Editor of the Journal of School Violence June-September 2011

Story Teller Children's Project Assessor 2009-2012

Graduate Student Clinician at the Psychological Assessment Center at UCSB Summer 2013

Behavioral Collaboration Team (BCT), grad student clinician at IV Elementary 2012-2013

School Psychology Practicum Student at Goleta Valley Junior High School 2011-2012

Teaching Assistant at Franklin Elementary School, grades 3 and 5 2010-2011

Teaching Assistant at Orfalea Children's Center, UCSB 2006-2010

Children's Hospital Los Angeles (CHLA) / University of Southern California (USC) Keck School of Medicine, University Center of Excellence in Developmental Disabilities (UCEDD), Los Angeles, CA

Predoctoral Psychology Intern, Project Heal Trauma Speciality Track 2014-2015

PUBLICATIONS AND PRESENTATIONS

Publications:

- Mayworm, A. M., Dowdy, E., Knights, K., & **Rebelez, J**. (2014). Assessment and treatment of selective mutism with English language learners. *Contemporary School Psychology*. Advanced online Publication. doi: 10.1007/s40688-014-0035-5

- Quirk, M., Mayworm, A., **Rebelez, J**., & Furlong, M.J. (2014). Examining the dimensionality and measurement invariance of a school readiness screener by gender and parent education levels. *Manuscript submitted to International Journal of School & Educational Psychology*.

- **Rebelez, J**.**L** (2013) Serving foster youth in the school setting: Ethical considerations. *School Psychology: From Science to Practice, 6,* 19-26.

- Renshaw, T.L., Furlong, M.J., Dowdy, E., O'Malley, M.D., Smith, D.C., **Rebelez, J**., Lee, S.Y., & Strøm, I.F. (2014). Covitality: A synergistic conception of adolescents' mental health. In M. J. Furlong, R. Gilman, & E. S. Huebner (Eds.), *Handbook of positive psychology in the schools* (2nd ed.) New York, NY: Routledge

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- **Rebelez, J.L**., & Furlong, M.J. (2013). Psychometric support for an abbreviated version of the California School Climate and Safety Survey. *International Journal of School and Educational Psychology,* 1, 154-165. doi: 10.1080/21683603.2013.819306

- Felix, E. D., Terzieva, A., M. J., Quirk, M., & **Rebelez, J**. (2012). First 5 Santa Barbara County Evaluation Report 2011-2012. Technical report submitted to First 5 Santa Barbara County.

- Felix, E. D., Terzieva, A., Furlong, M. J., Quirk, M., **Rebelez, J**., & Schell, J. (2011). First 5 Santa Barbara County Evaluation Report 2010-2011. Technical report submitted to First 5 Santa Barbara County.

- Felix, E. D., Terzieva, A., Furlong, M. J., Quirk, M., Schell, J., & **Rebelez, J**. (2011). Thriving Children Reports. Reports for 5 communities based on their results – accountability efforts. Reports submitted to THRIVE and First 5 Santa Barbara County.

- Furlong, M.J., & **Rebelez, J**. (2011). *School Violence*. Encyclopedia of Primary Prevention and Health Promotion. Kluwer Academic/ Plenum Publishers.

Posters and Presentations:

- **Rebelez, J. L**. (2015, March). Trauma treatment and educational considerations among homeless children and families. Presented in Project HEAL didactic seminar at the UCEDD at Children's Hospital, Los Angeles
- **Rebelez, J. L**. (2014, December). Dual diagnoses: Developmental delay and exposure to domestic violence. Presented in Project HEAL didactic seminar at the UCEDD at Children's Hospital, Los Angeles.

- **Rebelez, J.L**., & Furlong, M.J. (2014, February). Assessing complete mental health using the Social Emotional Health Survey. Poster accepted for presentation at the National Association of School Psychologists Annual Convention. Washington, D.C.

- Mayworm, A.M., Knight, K., & **Rebelez, J.L** (February 2014). *Assessment and treatment of selective mutism in English Language Learners.* Paper to be presented at the National Association of School Psychologists Annual Convention. Washington, D.C.

- Rebelez, J. (2013, November). Psychometrics: Illustration through positive mental health assessment. Presented to the CNCSP 102-Introduction to Applied Psychology research undergraduate class at the University of California, Santa Barbara.

- **Rebelez, J. L**., & Furlong, M. J. (2013, February). Predictive validity of the California School Climate and Safety Survey. Poster presented at the meeting of the National Association of School Psychologists, Seattle, WA

- **Rebelez, J. L**., & Furlong, M. J. (2012, October). Danger, Climate, and Safety at School: Psychometric support for a progress monitoring instrument. Paper presented at the meeting of the California Association of School Psychologists, Costa Mesa, CA

- **Rebelez, J. L.,** & Furlong, M. J. (2012, March). A longitudinal look at the well-being of youth transitioning into middle school. Paper presented at the meeting of the California Association of School Psychologists, Costa Mesa, CA

- **Rebelez, J. L**. (Spring & Fall, 2011, Winter & Spring, 2012). Homelessness and at-risk students: Implications and importance of early learning. Presented to the CNCSP 102-Introduction to Applied Psychology research undergraduate class at the University of California, Santa Barbara.

AWARDS

- Graduate Dean's Advancement Fellowship **June 2013**
- Michael Goodman Research Award (California Association of School Psychologists) **2012-2013**
- Dean of Education Fellowship, UCSB **2010-2011**
- Department of Clinical, Counseling, and School Psychology Block Grant Recipient **2010 &2013**
- Promises 2 Kids Guardian Scholars Recipient **2006-Present**
  (*For former foster youth of San Diego, CA)*

FIELDS OF STUDY

Major Field: Psychology
Minor studies: Education and Applied Psychology
Doctoral Emphases: School psychology and Clinical Psychology
Studies in School Psychology with Professors Jill Sharkey, Erin Dowdy, Michael Furlong, Matthew Quirk
Studies in Psychometrics, Applied Statistics, and Structural Equation Modeling: with Professors Karen Nylund-Gibson, Michael Furlong, and Matthew Quirk
Studies in School Based Mental Health with Professors Erin Dowdy and Michael Furlong
Studies in Trauma Psychology with Doctors Veronica Chavez and Karen Rogers

ABSTRACT

Capturing Complete Mental Health Among Adolescents:

Investigation of Covitality Latent Class Typologies

by:

Jennica Lee Rebelez-Ernst

Utilizing a strengths-based framework, the proposed study sought to build upon and respond to recommendations in the literature regarding conducting more holistic assessments of adolescent mental health. First, an overview of various models of positive based mental health and adolescent development frameworks, including the newly developed model of *covitality*—a combination of 12 core positive psychological schemas that are associated with student's positive mental health—is provided. Using a diverse sample of 12,279 adolescents from 17 high schools in California, this study implemented a three-part mixture model (latent profile and class analysis) to investigate underlying mental health profiles among adolescents. Specifically, profiles underlying student covitality were first explored in detail. Subsequently, a latent class investigation of adolescent psychosocial distress was conducted using ratings of externalization and internalization symptoms. Next, a *dual-component* measurement model was implemented to provide an example of a potential application of the covitality construct as part of a dual-factor method for screening for complete mental health among adolescents. A three-step model for inclusion of covariates was also implemented to

better understand how students from different sociocultural backgrounds and schools might uniquely experience mental health. Post-hoc investigations of adolescent risk behavior, quality of school life, and academic achievement are also reported for each covitality profile. Implications for researchers and practitioners interested in conducting strengths-based investigations of complete mental health among adolescents from a dual-component framework are provided.

Keywords: covitality, latent profile analysis (LPA), latent class analysis (LCA), adolescents, strengths-based assessment, dual-factor, mental health

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Capturing Complete Mental Health Among Adolescents:

Investigation of Latent Class Typologies of Covitality

In light of recent devastations, such as the tragic Sandy Hook Elementary School shooting, as well as numerous other unfortunate crises that have taken place on school campuses in the past few decades, the necessity to attend to mental health needs of youth in the schools is even more salient and warranted. National policy statements have emerged calling for systematic mental health and behavioral screening of school-aged youth in order to identify students who are at risk of experiencing a negative life trajectory (American Academy of Pediatrics, 2013; Children's National, 2013). Until recently, the state of California did not have an exemplary method of measuring or monitoring student well-being among youth, and existing approaches for assessing student experiences at school overwhelmingly focused on the negative aspects of student functioning (e.g., engagement in substance abuse, presence of negative mental health symptoms, etc.).

Historically, conceptualizations of psychological health have been rooted in a unidimensional understanding, as evidenced by the term "mental illness" that is most often used to describe an individual's psychological functioning. Until relatively recently, mental health was almost exclusively defined as the absence of psychopathology (Greenspoon & Saklofske, 2001). Researchers have begun to respond to this paradigm shift by highlighting the need for mental health classification systems to integrate both adaptive and maladaptive factors. For example, DiStefano and Kamphaus (2006) noted the importance of integrating both spectrums to assist with early identification of psychological and behavioral difficulties, and inform intervention and treatment programs to identify risks to development and promote healthy, resilient behavior and mental health.

Positive Approaches to Assessing Mental Health Among Adolescents

The following sections provide overviews of some frameworks that have been proposed to attend to positive aspects of youth well-being. Then, a description of existing approaches to assessing mental health among adolescents and the associated recommendations and limitations as described by the respective researchers will be provided.

Positive Psychology— Contemporary Humanists?

Commonly referred to as the "third force" in psychology, the humanistic tradition first received attention in the 1950s as a counter approach to the popular traditions of psychoanalysis and behaviorism (Bugental, 1964). Studying an individual as an integrated whole drives this approach (Buhler, 1971). Humanistic psychologists focused on ways humans could achieve and flourish in life, rather than concentrating on the origins of mental illness, as was the norm in psychology prior to their seminal ideas. Humanists (along with existentialists) were among the first to emphasize the importance of personal experience and a person's perceived meaning in this world, as opposed to solely examining unconscious drives and behaviors (Rowan, 2005). This approach to psychology highlights the idea that people should not be studied as products of the material world, but instead in terms of their individual values and needs (Peterson, 2006). This perspective comes from the phenomenological approach to psychology, which uses a person's conscious knowledge of the world to understand what is meaningful for them and attempts to make sense of their experiences, rather than the latter first (Peterson, 2006). Additionally, humanistic psychologists typically hold the general belief that individuals are innately good, and psychosocial problems result from deviations from a natural state of being. This is not to naively say that people are never destructive or ignore that evil exists in the world, but

instead implies that individuals should be trusted to adjust themselves in the direction of optimal integration within their environment (Tageson, 1982). Further, humanistic psychology is more concerned about a person's end-goal in life, such as self-actualization or realization, as opposed to homeostasis in the psychologically maladjusted person (Buhler, 1971).

Often thought of as humanistic psychology's contemporary successor, positive psychology was only widely recognized as an established branch of psychology in 1998. However, the roots of positive psychology can be traced back to the philosophies of *eudaimonia*, referring to "happiness" or "virtues," put forth by Aristotle and other ancient Greek and Roman thinkers. Today, the broad field of positive psychology incorporates a range of topics including mindfulness (Malinowski, 2013), flow (Shernoff, & Csikszentmihalyi, 2009), risk and resilience (Masten, 2011), character strengths and virtues (Park & Peterson, 2006b), happiness (Seligman, 2002), optimism (Schneider, 2001), hope (Snyder, 2000), gratitude (Froh, Yurkewicz, & Kashdan, 2009), and positive emotions (Waugh, & Fredrickson, 2006), among others. Positive psychologists are interested in studying the absence of disease and also the presence of something positive in a person's life (Seligman & Csikszentmihalyi, 2000). An encompassing goal of positive psychology is to help individuals flourish and thrive by focusing on their positive capacities (Seligman, 2011).

Seligman (2002) proposed that positive emotions are involved in increasing happiness and well-being for both the past, present, and future states of being. Examples of positive emotions that lead to increased happiness are satisfaction (past) and optimism or hope (future). Present positive emotions include pleasure states such as bodily senses (delightful sights and sounds, or moments of bliss), and gratifications, which are activities that an

individual enjoys (such as dancing, or engaging in a good conversation). With respect to youth development, positive emotions in adolescents have been found to predict greater satisfaction with school, increase adaptive coping strategies, and student engagement (Lewis, Huebner, Reschly, & Valois, 2009).

Seligman (2002) further proposed that in order for gratifications to be increased more permanently, individual strengths and virtues must be fostered. The idea of achieving happiness or thriving in life depends on a person believing that their life has been "authentic" (Seligman, 2002). Authenticity, as described by Seligman (2002), is about obtaining gratification and positive emotions via a person's unique signature strengths. Signature strengths, as defined by Peterson and Seligman (2004), are "strengths of character that a person owns, celebrates, and frequently exercises" (p. 18). In addition, Seligman (2002) differentiated between three ways of studying a person's life: *the good life*, in which a person uses strengths to obtain gratification; *a meaningful life*, whereby personal strengths are used to pursue something larger then oneself, and; a *full life*, which focuses on the experience of positive emotions (in the past, present, and future), and appreciating positive feelings to create meaning in life.

Interventions in the field of positive psychology have been empirically investigated and provide evidence for enhancing positive youth development. For example, gratitude interventions are widely studied and implemented with youth who display a myriad of negative dispositions. In one study, researchers assigned students with low levels of positive affect to either a gratitude intervention or a writing about daily events condition and found that youth with low positive affect who were assigned to the gratitude condition, reported more gratitude and overall positive affect after a two-month follow up (Froh, Kashdan,

Ozimkowski, & Miller, 2009). Such interventions are important for enhancing a student's satisfaction with life, which allows them to grow closer to self-actualization.

In addition, the branch of positive psychology offers a complementary lens through which Maslow's (1943) theory of human development and motivation may be studied in the context of positive youth development. Maslow's theory of reaching self-actualization after meeting a hierarchy of basic needs resonates with modern notions of thriving and optimal development that are commonly studied in positive psychology. That is, in order for students to be able to thrive and experience positive development, they need to have their basic needs met (e.g., food, shelter, feelings of safety).

Presently, arguments have been posited that humanistic theories have lost their popularity, but the central tenets are still conveyed to society via positive psychology, which seeks to empirically investigate these constructs that are essentially humanistic (Schneider, Bugental, & Pierson, 2001). Although humanistic psychology and positive psychology are often considered "close relatives," scholars in both fields argue that there are important distinctions (Peterson, 2006). Key differences that have been proposed between the two schools of thought include: (a) positive psychology recognizes that both the good and bad sides of life are genuine, while humanistic psychologists state that humans are innately good; and (b) humanistic psychology has been incredulous about scientific investigation in the past, whereas positive psychology is more committed to research and the scientific method (Peterson, 2006, p. 10). These distinctions have been highly debated among leading scholars from both fields. Seligman and Csikszentmihalyi (2000) recognize that their theories of the good life and human flourishing were not original, and further claim that their predecessors (e.g., humanists) "failed to attract a cumulative, empirical body of research to ground their

ideas" (p. 13). The authors further delineate how positive psychology differs by the commitment of the field to furthering scientific understanding of effective interventions to foster thriving (Seligman & Csikszentmihalyi, 2000). In a rebuttal to Seligman and Csikszentmihalyi, Taylor (2001) refutes these claims by providing specific references to counteract the claims of having no research traditions and an overall unscientific outlook on psychology. The present dissertation recognizes that differences exist between the schools of thought, however, this investigation is grounded in an agreement with Robbins (2008), who stated that the differences being debated between positive and humanistic psychology may have been exaggerated at the political and rhetorical level (Robbins, 2008). Contemporary methods of assessing positive-based human capacities is evidenced by models such as strengths-based assessment, complete mental health, dual-factor models of mental health, and the newly conceptualized construct known as *covitality* (Renshaw et al., 2014).

Strengths-Based Assessments

Strength-based assessment has found its niche within contemporary positive psychology and offers a complementary evaluation component for treatment modalities such as solution-focused therapy (Rashid & Ostermann, 2009). Although various frameworks have been proposed for conceptualizing strengths-based models of assessing mental health, a common underlying assumption, as Rashid and Ostermann (2009) describe, is that "strengths contribute to well-being in the same way that weaknesses contribute to psychopathology" (p. 489). Further, many researchers and practitioners who use strengths-based approaches have conceptualized their frameworks using resilience theory (Rawana & Brownlee, 2009). The evaluation of strengths is essential for implementing balanced or multicomponent assessment practices and provides clinicians with a more complete understanding of their life

circumstances (Rashid & Ostermann, 2009; Simmons & Lehmann, 2013). In strength-based assessments, a clinician explores strengths in addition to weaknesses in order to help clients deal more effectively with their difficulties (Rashid & Ostermann, 2009).

Rashid and Ostermann (2009) provided 10 recommendations for implementing strengths-based evaluations that can be used by practitioners from a variety of theoretical approaches. Some of the key suggestions that these authors shared include: (a) select instruments with psychometric evidence to support high validity and reliability for assessing positive based traits (e.g., Positive and Negative Affect Schedule [PANAS]; Watson, Clark, & Tellegen, 1988; Lauernt, Potter, & Catanzaro, 1994), and the Life Orientation Test-Revised (Scheier, Carver, & Bridges, 1994), among others]; (b) assess strengths early in therapy (e.g., assess for *flourishing* patterns of mental health); and (c) help clients identify their own strengths, and encourage them to utilize their strengths when problem-solving. See Rashid and Ostermann (2009) for a complete overview of 10 key steps for implementing strengths-based assessments. Recently, researchers have identified over 140 tools with acceptable psychometric properties that may be incorporated into strengths-based assessment practices to assess a variety of positive attributes (e.g., well-being, mindfulness, optimism, resilience, emotional intelligence) among diverse populations (Simmons & Lehmann, 2013).

Dual-Factor Approach to Assessing Mental Health in Youth

A seminal study by Greenspoon and Saklofske (2001) proposed what is considered one of the first integrated frameworks for assessing mental health among youth (Grades 3 through 6). Specifically, these researchers used indicators of subjective well-being (SWB) as well as psychopathology (PTH), which were conceptualized as interrelated yet distinct (polar) continua on a mental health continuum. This model sought to explore the idea that an

elevation in SWB is not necessarily associate with to a decrease in symptoms of psychopathology, and that there may be some students who may be at-risk of experiencing diminished psychological health despite having some levels of positive well-being (Greenspoon & Saklofske, 2001). These researchers described four distinct mental health groups that have unique needs and strengths some if which had been undetected by unidimensional mental health frameworks. Two groups are understood as the expected patterns of mental health, those students who are functioning typically (high SWB and low PTH; group 1), or atypically (low SWB and high PTH; group 2). However, using a combination of discriminating variables (positive and negative predictors), researchers were able to create two additional groups of children: group 4 characterized as having high SWB and high PTH, and group 3 demonstrated low scores on both SWB and PTH (Greenspoon & Saklofske, 2001). These offered ideas for future research to investigate which factors differentiate these four quadrants of complete mental health, with important implications regarding service delivery of mental health prevention and interventions efforts.

Complete Mental Health

The notion of assessing mental health from a multidimensional framework has also been advocated in the public health field. In an attempt to unify historically opposing notions of health (e.g., pathogenic and salutogenic), or absence of disease versus presence of positive states of functioning, Keyes (2005a, 2005b) has described a cohesive model to understand health at a population level (Keyes, & Michalec, 2010). Defined as, "not merely the absence of psychopathology, but also the presence of sufficient levels of emotional, psychological, and social well-being [flourishing]" (Keyes & Nichalec, 2010, p. 126), complete mental health assessment seeks to measure two distinct continua among the population.

Keyes (2005) operationalized the top tier of mental health functioning, "flourishing," as individuals who report high levels on one or more measures of hedonic well-being (i.e., subjective well-being), and high levels on at least six measures of eudaimonic well-being (i.e., positive psychological functioning). Conversely, a person is described as "languishing" if they display low levels on at least one subjective well-being measure and impairment in at least six measures of positive functioning (Keyes, 2005; Keyes & Nichalec, 2010). Flourishing, as a state of being, is characterized by general positive emotions about life, and optimal social and psychological functioning (Keyes, 2003). On the other hand, a state of languishing is marked by limited or no positive emotions towards life, poor social and psychological functioning, and absence of depression (Keyes, 2003).

Covitality

Construct overview. A recently developed model, known as covitality, offers another strengths-based approach towards measuring mental health functioning from a youth's perspective. Conceptually defined as, "the synergistic effect of positive mental health resulting from the interplay among multiple positive-psychological building blocks" (Renshaw et al., 2014, p. 12), covitality is a recently established positive psychological construct that measures human strengths in combination (Furlong, You, Renshaw, Smith, O'Malley, 2014). Analogous to comorbidity, which refers to the coexistence of symptoms of psychopathology, covitality is proposes constructs that conceptually organize a combination of internal and external assets that are critical for healthy and positive functioning.

The measurement of covitality is comprised of 12 positive psychological dispositions or self-schemas that map onto four core psychological mindsets (Renshaw et al., 2014). In regards to adolescent well-being, these 12 core traits are understood as *psychological*

dispositions that when combined, promote a student's positive mental health. The four positive mental health domains and their respective psychological dispositions are as follows: (a) *belief-in-self* (self-efficacy, self-awareness, and persistence), (b) *belief-in-others* (school support, peer support, and family coherence), (c) *emotional competence* (emotional regulation, empathy, and behavioral self-control), and (d) *engaged living* (gratitude, zest, and optimism). Each of the indicators comprising these mental health domains have drawn empirical support from literature in the fields of social emotional learning (SEL; for belief-in-self and emotional competence), childhood resilience (for belief-in-others), and positive psychology (for engaged living). Figure 1 presents a summary of the origins of the included indicators as well as a visual representation of the conceptual model underlying the covitality construct.

This model assumes an underlying cognitive framework, which describes students as, "actively constructing a worldview of who they are and coming to conclusions about their fit within their social contexts" (p. 4; Renshaw et al., 2014). The covitality model also draws on literature from the fields of social psychology, self-concept, and cognitive therapy, which help explain how youth develop their cognitive self-schemas to better understand and organize their experiences (Renshaw et al., 2014). Further, inherent in the model of covitality is a cumulative resilience (assets) framework (Masten, 2011), whereby the 12 core dispositions are understood to be more robust when occurring in combination (Furlong et al., 2014, Jones et al., 2013).

Table 1 provides a summary of the operational definitions for each of the 12 positive psychological dispositions that comprise the covitality model. Importantly, these conceptualizations are broader in scope to account for the subtle definitional nuances utilized

by various studies. In addition, given that each of the 12 dispositions is comprised of three indicators, each addressing different aspects of the trait, some definitional variations are to be expected. For example, items comprising the *self-awareness* trait encompass aspects such as mindfulness (e.g., "conscious absorption in the present"; Drake, Duncan, Sutherland, Abernethy, & Henry, 2008, p. 50), one's purpose in life, as well as understanding one's behavior (Renshaw et al., 2014). Sample questions for each of the 12 psychological dispositions can be found under the Social Emotional Health Survey—Secondary (SEHS-S) measures section.

The conceptual model underlying covitality has been translated into a measure for adolescents, known as the Social and Emotional Health Survey—Secondary (SEHS–S; refer to measures section for detailed description). The measurement model underlying adolescent covitality assumes the 12 positive psychological dispositions to be correlated and map onto four key developmental domains (e.g., belief-in-self, belief-in-others, emotional competence, and engaged living). These four core domains are, in turn, related to a higher, second-order construct—covitality (Furlong et al., 2014). Each of the 12 indicators form a subscale on the SEHS-S, and scores are combined to yield an overall total covitality composite score (CoVi).

Initially piloted with children in Grades 4 through 6 (using the elementary school version known as the Positive Experiences at School Scale [now called the Social Emotional Health Survey-Elementary]), an abbreviated conceptualization of the covitality construct was found to be a strong predictor of positive indicators or student functioning. Specifically, student covitality scores were found to be highly predictive of student engagement in prosocial behaviors, caring relationships, acceptance at school, and negatively related to rejection at school (Furlong, You, Renshaw, O'Malley, & Rebelez, 2013a). Among

adolescents, indicators comprising the SEHS–S have been found to significantly predict a student's self-reported subjective well-being (e.g., SWB; life satisfaction, positive and negative affect), higher GPAs, and feelings of safety at school (Furlong et al., 2014). In addition, higher covitality scores among adolescents were negatively related to higher engagement in substance use, presence of depressive symptoms, and experiences of psychological distress (e.g., social-emotional-behavioral symptoms; Furlong et al., 2014; You et al., 2014). Data from a study of college-aged students also supported the covitality construct as a predictor of quality of life indicators. Specifically, Jones et al. (2013) found significant relations between undergraduate covitality and personal adjustment (e.g., positive relationships with parents, interpersonal friendships, and self-esteem), and a significant negative relation with internal emotional symptoms.

Further, the SEHS–S and covitality model have been proposed to have clinical and research applications. Dowdy et al. (2014) described one potential application of the SEHS–S as a critical component in schoolwide (universal) screenings of complete mental health. The SEHS–S has also been described as an appropriate tool to use within individual strengths-based assessments in clinical settings (Renshaw et al., 2014), as it has been found to significantly predict fundamental school-based and quality of life outcomes (You et al., 2014).

CoVi indicators and educational correlates. A number of significant and positive relations have been identified as indicators of positive mental health (e.g., *psychological dispositions*; see Table 1 for summary of literature review). Among the indictors comprising the belief-in-self domain, higher levels of adolescent mindfulness, persistence/grit, and self-efficacy, respectively, were found to be significantly predictive of academic competence

(Greco, Baer, & G. T. Smith, 2011), enjoyment of school (Martin, & Marsh, 2006), and higher grades (Capara, Vecchio, Guido, Gerbino, & Barbaranelli, 2011; Duckworth & Quinn, 2009; Zhu, Chen, Chen, & Chern, 2011; Zuffiano et al., 2013) for a broad range of international students (e.g., Australia, Taiwan, United Kingdom, Italy, and the United States).

Similarly, indicators relating to peer, teacher, and family support (e.g., belief-in-others domain), have received extensive empirical attention. All of these indicators have been highly associated with higher academic achievement and competence in school, with the highest correlations (range of r = .23 to .27) occurring between a student's sense of family togetherness and support at home and better overall grades (Chen, 2005; Danielsen, Samdal, Hetland, & Wold, 2009; Ozer, & Schotland, 2011; Rosalind, 2010; Stewart & Suldo, 2011).

Although there is limited research investigating the associations between empathy and academic achievement among adolescent students, other positive indicators of emotional competence have been studied. In particular, studies investigating the relations between emotional regulation and associated academic performance have found significant positive relations (range of r = .25 to .28), suggesting that higher levels of emotional regulation may be predictive of better grades in school among adolescents. Further, studies examining self-control and academic achievement have found consistent positive relations (range of r = .25 to .42), indicating that students who are able to demonstrate appropriate self-control tend to perform better in school (Bertrams, 2012; Kuhnle, Hofer, & Kilian, 2012; Vidal Roderio, Emery, & Bell, 2012).

In regards to the fourth social-emotional health domain, *engaged living*, research investigations between indicators of gratitude, zest, and optimism and performance in school

seem to be in the emerging stages, with gratitude and optimism receiving the bulk of empirical attention. Using structural equation modeling, Froh, Emmons, Card, Bono, and Watkins (2011), found gratitude to be a unique predictor of higher grade point averages and other indicators of positive youth functioning (r = ~.28). Similarly, investigations of youth self-reported optimism and academic performance have found strong support for positive significant relations (range of r = .13 to .27; Creed, Patton, & Dee, 2002; Lounsbury, Sundstrom, Loveland, & Gibson, 2002; Vidal Roderio et al., 2012).

CoVi indicators and subjective well-being correlates. Although there is some variability in definitions of subjective well-being (SWB), a frequently cited model by Diener, Suh, Lucas, and Smith (1999), conceptualizes SWB as a multidimensional construct comprised of emotional responses (pleasant and unpleasant affect), and global judgments of satisfaction in life (Long, Huebner, Wedell, & Hills, 2012). Although much of literature investigating associations between SWB and positive indicators of mental health have focused on adult populations, research within the past decade has provided much needed attention to explaining these phenomena among youth. Table 1 provides an overview of some of the recent empirical studies of positive psychological traits and SWB among youth. Overall, these studies provide strong evidence supporting the validity of each of the 12 psychological dispositions in predicting and relating to higher levels of self-reported SWB among adolescents.

Gender differences among CoVi indicators. Although Furlong et al. (2013b) found evidence to support measurement invariance of the SEHS-S across gender, results from latent mean analyses suggest that male and female students tend to differentially endorse specific subscales. For example, females strongly endorsed items related to belief-in-self and

emotional competence, whereas males tended to report stronger agreement with items on the belief-in-self subscale (You, Furlong, Felix, & O'Malley, 2015). Given that empirical research into the covitality construct has only recently begun to emerge, there is limited available evidence to describe how adolescent males and females uniquely experience these 12 important positive psychological traits in combination.

In reviewing literature pertaining to gender differences among each of the 12 positive SEHS-S traits individually, only empathy, emotion regulation, gratitude, and optimism had evidence to support meaningful differences in responses among male and female adolescents. In regards to levels of expressing empathy, researchers have long noted that females tend to demonstrate higher levels of empathy during the early and middle adolescent years (Hanson & Kim, 2007; Hanson & Mullis, 1985). Froh et al. (2009) found gender to be a moderator between gratitude and family support, whereby males reported receiving more social benefits from gratitude. Other studies have found that girls tended to express more gratitude than boys, and reported feeling grateful for friends and family rather than material objects (Gordon, Musher- Eizenman, Holub, & Dalrymple, 2004). In a study investigating the role of perceived emotional intelligence and dispositional optimism-pessimism in predicting psychological adjustment in teenagers, Extremera, Duran, and Rey (2007) found significant mean differences between males and females in their self-reported levels of optimism. However, other researchers have found no such differences in levels of self-reported optimism across gender (Ho, Cheung, & Cheung, 2010).

A substantial body of literature has examined differences between boys' and girls' implementation of emotion regulation; however, findings tend to be mixed. For example, Bowie (2010) found lower levels of emotion regulation among girls to be predictive of later

engagement in relational aggression, yet gender was not a significant moderator between emotion regulation and overt aggression. To better understand the types of emotion regulation strategies used by male and female adolescents, Luo, Wang, Zhang, and Shen (2010) examined cognitive coping strategies used by Chinese adolescents when coping with stressful life events. These researchers found significant age and gender differences in the use of emotion regulation strategies among adolescents, with females reporting more adaptive cognitive strategies than males (Luo et al., 2010). In looking at patterns of parent-child discussions of emotion, Zeman, Cassano, Perry-Parrish, and Stegall (2006) found that parents differentially display rules and describe emotional behavior in stereotypical gender ways. That is, parents tended to more frequently use emotion words during discussions with their daughters, and more often discussed feelings of anger and sadness with their sons. Thus, researchers hypothesized that females learn to view emotions as something that can be shared with others, while boys learn to express their emotion through more externalized behaviors (Zeman et al., 2006). In a psychometric investigation of the Behavioral and Emotional Rating Scale, Second Edition (BERS-2), Duppong Hurley, Lambert, Epstein, and Stevens (2014) did not find any significant differences of emotion regulation scores among gender or ethnicity subsamples, suggesting that both male and females, as well as various ethnic groups, tend to report similar patterns of emotion regulation strategies.

Among the self-efficacy, self-awareness, school support, peer support, and empathy domains, Hanson and Kim (2007) implemented a Multiple Indicators Multiple Causes (MIMIC) model and found no evidence of differential item functioning by sex, indicating that these scales perform equally well for males and females (e.g., same construct being measured in males and females). More research is needed among the family coherence, self-

control, grit/persistence, and zest domains to better understand how male and female adolescents experience these areas of functioning.

Indicators of Adolescent Psychosocial Difficulties

When assessing psychological difficulties among adults and children, clinicians have relied on measures to indicate whether individuals are displaying negative internalizing (depression or suicidality) or externalizing symptoms (e.g., harassment, victimization, property damage, physical fights), as signifiers of traditional notions of psychopathology (Suldo & Shaffer, 2008). Among children and adolescents, social functioning is an important indicator of psychological adjustment. That is, youth with diminished social well-being might be experiencing less than optimal mental health. Decades of research show that victimization and bullying (negative social exchanges) are inextricably linked with diminished psychological health. Students who have experienced higher frequencies of victimization or bullying are at a greater risk of experiencing depression and or have thoughts of committing suicide (Klomek, Marrocco, Kleinman, Schonfeld, & Gould, 2007). Similarly, students who experience internalizing symptoms of psychopathology (e.g., depression or suicidality) have been shown to more frequently engage in bullying behaviors (Klomek et al., 2007).

Indicators of Quality of School Life

While adolescent psychosocial difficulties and related social-emotional and academic prosperity are important factors to consider when implementing a complete mental health assessment, indicators of an adolescent's quality of life at school are also critical components that help translate how students with various mental health profiles are actually experiencing school. Although there is no universally accepted definition of quality of school life (QSL),

an early conceptualization from Epstein and Mcpartland (1976) posited that quality of school life could be assessed through three dimensions: (a) general satisfaction with school, (b) commitment to school work, and (c) attitudes towards teachers. Karatzias, Power, and Swanson (2001) offer a more contemporary conceptualization of quality of school life. These researchers sought to develop a scale to measure a student's quality of life at school using performance indicators in order to improve the quality of educational services in the United Kingdom. Their conceptualization of QSL was largely influenced by Huebner's notions of school (Huebner, 1994) and general life satisfaction (Huebner, 1991a, 1991b), which provide subjective and cognitive appraisals about quality of life at a global and domain specific (e.g., school setting) level. In addition, Karatzias et al. (2001) also highlighted the importance of including affective dimensions in the meaning of indicators when conceptualizing quality of school life, (e.g., school support). Appropriate for youth in secondary education settings, Karatzias et al. (2001) provided the following definition of quality of school life: "a general sense of student well-being, determined strictly by school-related factors and educational experiences resulting from pupils' involvement in school life and their engagement in school climate" (p. 266). This definition translated to 14 different measurement domains, some of which include attainment (i.e., participation in class activities), relationships (e.g., feeling close with teachers, staff and peers), school factors (e.g., fairness, welcoming environment), and subjective environmental factors (e.g., feeling safe at school). Included in these domains were items conceptualized as school connectedness (i.e., "degree of closeness or attachment to teachers, trust in them, and commitment to conventional school goals, as well as involvement in extracurricular activities" (p. 31), and meaningful participation in school (i.e., "the involvement of the

student in relevant, engaging, and interesting activities with opportunities for responsibility and contribution" (Karatzias et al., 2001, p. 28). Connectedness and participation are important protective factors that enhance academic success and help buffer against engagement in risk behaviors (Austin, Bates, & Duerr, 2011).

What Has Been Done? Recommendations from the Literature

Cumulative Assets and Resilience Models

Resiliency refers to the capacity of human beings to experience good outcomes despite having faced serious threats (adversities) to their adaptation or development (Masten, 2001). Resiliency is not only an attribute of an individual; rather, it is a complex process involving both internal cognitive, personality factors, and the functioning of external protective factors, such as caring adults (Garmezy & Masten, 1986). Further, resiliency can be understood as a process that unfolds within the context of development and many other temporal and contextual factors (Masten, 2001). Protective factors—both internal and external sources that help a person thrive in spite of adverse circumstances—are critical to identify when examining resiliency as they help provide a clear picture of what makes some individuals more resilient than others (Garmezy & Masten, 1986).

Developed by the Search Institute, the 40 Developmental Assets model offers a framework for understanding core elements (e.g., skills, experiences, relationships, and behaviors) that help youth develop positively and enhance their sources of resiliency. Over a decade of research has demonstrated that the more cumulative assets that a child acquires, the better chance he or she has at experiencing optimal development and less engagement in risk behaviors (Benson, Scales, & Syvertsen, 2011; Leffert et al., 1998; Scales, 1999). The developmental assets approach to prevention and intervention efforts with at-risk students

aims to help youth develop their capacity for resilience by building upon internal and external assets, such as social relationships, experiences, environments, and interaction patterns (Edwards, Mumford, Shillingford, & Serra-Roldan, 2007). Researchers have found that students with access to multiple developmental assets (i.e., thirty or more) engage in more socially appropriate behaviors, participate more in school, and overall are more successful in school (Benson et al., 1999; Murphey, Lamonda, Carney, & Duncan, 2004; cited in Edwards, Mumford, Shillingford, & Serra-Roldan, 2007). Compared to youth with 20 or fewer sources of support and strengths, students with 31 or more developmental assets are considered to be thriving in life (Benson, Scales, & Roehlkepartain, 2011). Specifically, researchers have found that among students in Grades 6 through 12, those with developmental assets within the thriving range (e.g., 31 or more) reported: having better grades, persisting when faced with difficult tasks, taking on leadership positions, engaging in substantially less drinking and substance use, engaging in and experience violence less often, and having zero to few suicide attempts or symptoms of depression (Benson et al., 2011). Adequate adolescent development has been associated with youth who display a range of 21 to 30 developmental assets (Benson et al., 2011). Through their review of a developmental assets prevention framework for at-risk youth, Edwards et al. (2007) highlighted the need for stakeholders to attend to positive developmental assets in order to identify specific characteristics vulnerable youth need for enhanced positive development.

Character Strengths and Virtues

In an effort to describe positive human qualities that enable individuals to develop optimally and live a "good life," Park and Peterson (2005) described 24 character strengths (virtues) among youth. Using the Values in Action Inventory–Youth version (VIA-Y),

researchers have been able to identify character strengths (e.g., gratitude, humor, love, hope, teamwork, and zest) that predict more positive youth development (Park & Peterson, 2006a, 2006b). Rooted in moral competence, these character strengths are understood to be multidimensional constructs that are comprised of positive traits inherent in adolescent's feelings, thoughts, and behaviors (Park & Peterson, 2006b). The VIA-Y has been recommended as a useful tool for helping youth recognize their signature strengths, which can have important implications for youth experiencing academic success as well as social and psychological well-being (Park & Peterson, 2006b). Given that different strengths are endorsed by youth at various developmental stages, Park and Peterson (2006b) recommended future researchers to consider utilizing a developmental framework when assessing character strengths.

PERMA

In a recently revised model of well-being, Seligman (2011) describes the following five elements: **P**ositive emotions, **E**ngagement, **R**elationships, **M**eaning and purpose, and **A**ccomplishment. In contrast to his earlier unidimensional theory of authentic happiness, the underlying premise of the PERMA model is that individuals achieve a flourishing state of mental health by increasing frequent experiences of positive emotions, engagement, positive relationships, and meaning and accomplishment in everyday life. In a recent investigation of the PERMA model among a purposive sample of adolescent males, Kern, Waters, Adler, and White (2014) found factor analytic support for four of the five proposed factors (i.e., positive emotion, engagement, relationships, and accomplishment constructs); however, more research is necessary to examine the applicability of this model among a more heterogeneous population of students. Although research with the PERMA model of well-being for youth

development is in the preliminary stages (visit http://margaretkern.org for update on ongoing research in Australian schools), this model offers an example of a contemporary attempt to integrate multiple indicators of positive mental health to yield a more complete understanding of mental health.

Five C Model of Positive Youth Development (PYD)

A growing framework for conceptualizing and studying adolescent youth development is the positive youth development (PYD) perspective (Bowers, Li, Kiely, Brittian, Lerner, & Lerner, 2010). While several hypotheses have been offered for conceptualizing PYD, this approach generally seeks to enable adolescents to reach their full potential by helping them align their various strengths with resources that promote healthy development across various systems in their environment (Lerner, Phelps, Forman, & Bowers, 2009; Zarrett & Lerner, 2008).

To date, one of the most empirically validated frameworks of PYD is the Five Cs Model (Bowers et. al., 2010; Heck & Subramaniam 2009; Lerner et al., 2005; Phelps et al., 2009). Derived from longitudinal data from the 4-H Study of PYD (a longitudinal and collaborative effort to identify individual and contextual factors associated with positive youth development), the Five Cs model postulates that positive youth development comprises of psychological, behavioral, and social characteristics that can be characterized by the following five interactive Cs: Competence, Confidence, Connection, Character, and Caring (Bowers et al., 2010). Adolescents require healthy development in each of these five areas, and as youth build these domains over time, they are more likely to be on a thriving life trajectory rather than become thwarted by engaging in risk or other unhealthy behaviors (Bowers et al., 2010). Youth with thriving developmental trajectories are hypothesized to

develop a sixth "C" (Contribution), which entails behaviors associated with contributing to oneself, family, community, and civil society (Lerner, 2004). The conceptual framework behind the Five Cs has been translated into a measurement model which consists of five latent constructs that map onto a second higher order PYD latent variable, which has been found to be predictive of, and related to, adolescent experiences of depression, engagement in risk behaviors, and contribution type behaviors (Jeličić, Bobek, Phelps, Lerner, & Lerner, 2007). This is one of the few existing approaches that attempts to integrate multiple indices of PYD (including academic achievement and self-esteem measures) to achieve a more holistic conceptualization and assessment of youth development (Geldhof et al., 2014; see Lerner et al., 2013 for an updated empirical review of PYD research and practical implications).

Dual-Factor Models

Among the pioneering models for integrating both positive (e.g., subjective well-being, SWB) and negative (e.g., psychopathology, PTH) aspects of psychological functioning are the dual-factor models of mental health among adolescents. While empirical investigations of dual-factors models and its application with adolescent populations have only recently begun to emerge, there has been an increase in the number of studies that have utilized a more integrated approach since Greenspoon and Saklofske introduced their model in 2001. A search on PsychINFO yielded over 88 studies that have cited the dual-factor model, which has been considered in various investigations of youth well-being, psychopathology, and development.

In their seminal study, Greensoon and Saklofske (2001) introduced a dual-factor model of assessing mental health among youth. Using a sample of 407 students in Grades 3

through 6, Greensoon and Saklofske (2001) implemented discriminant function analysis to classify students based on their assignment in one of the four following groups: *Group 1* = high SWB and low PTH; *Group 2* = low SWB and high PTH; *Group 3* = low SWB and PTH; and *Group 4* = high SWB and PTH. Membership in each of the four groups was explored by various predictor variables (e.g., temperament, personality, self-concept, locus of control, and interpersonal relations). Results from this study provided the first support for the importance of simultaneously asking students about their satisfaction with life on mental health screeners, which can detect additional groups of at-risk students that may have been largely overlooked on traditional measures of psychopathology (Suldo & Shaffer, 2008). That is, some students who reported diminished life satisfaction also experienced diminished psychological well-being despite not presenting as clinically significant on measures of psychopathology; and more importantly, having knowledge about a student's perception of life satisfaction was predictive of both positive and negative functioning and adjustment (Greensoon & Saklofske, 2001).

Based on their findings, Greensoon and Saklofske (2001) proposed a number of recommendations for future research. Some of these recommendations included: (a) further validation/replication of the dual-factor model and examination of the underlying profiles among students in groups 2 and 3, (b) replication of this method using a broader age sample within the child population, and (c) use of appropriate measures to assess applicability of the dual-factor model among adolescents and adult populations.

Other studies have investigated the applicability of this model with various age groups, using a four-group classification approach determined by clinical cutpoints (Kelly, Hills, Huebner, & McQuillin, 2012; Lyons, Huebner, Hills, & Shinkareva, 2012; Suldo,

Thalji, & Ferron, 2011). In the first study of dual-factor assessment of mental health among early adolescents (Grades 6-8), Suldo and Shaffer (2008) utilized cutpoint criteria associated with the national norms for each measure to assign students into one of the four mental health quadrants, which they conceptualized as: *Complete mental health* (high SWB, low PTH), *Vulnerable* (low SWB and PTH), *Troubled* (low SWB and high PTH), and *Symptomatic but Content* (high SWB and PTH). Specifically, student's with *T* scores of 60 or greater (i.e., "at risk" or "clinically significant range") on internalizing and externalizing symptoms were categorized as having high psychopathology, while student's with *T* scores below 60 (i.e., "normal range") were considered to have low psychopathology. In regards to SWB classification, Suldo and Shaffer (2008) classified all students above the 30th percentile in the average to high SWB group, whereas students below this percentile were classified in the low SWB group.

The implications of their findings also highlighted the importance of identifying the *vulnerable* and *symptomatic but content* youth to better understand their unique educational, social, and physical health functioning compared to peers with comparable levels of functioning. In their study, Suldo and Shaffer (2008) highlighted a number of limitations and areas for future research. The proposed recommendations included investigating the dual-factor model of mental health among high school students, and obtaining data from a diverse sample of students with respect to age, ethnicity, geographic location, and socioeconomic circumstances.

Research using dual-factor approaches for adolescent mental health assessment is somewhat limited in that these approaches have relied on the use of cutpoints to determine high versus low groups. This approach was in effect an elementary cluster analysis, which

was appropriate for this early line of research. More advanced statistical methodology, such as latent class mixture modeling, could potentially identify more complex empirical profiles that provide new information about critical aspects of the relations between psychological distress and thriving indicators.

Mixture Modeling in Adolescent Mental Health Assessment

Overview of Latent Profile and Latent Class Analysis

Latent Profile Analysis (LPA, also known as Latent Class Cluster Analysis) and Latent Class Analysis (LCA) are subsumed under a category of statistical techniques known as mixture modeling. Although several statistical models (e.g., LCA, LPA, growth mixture models, and factor mixture models among others), are often referred to as *mixture models*, the term is used to describe statistical methodology that: (a) express the distribution of variables as a mixture of a finite number of constituent distributions, and (b) express the population distribution as a finite mixture of a set of unknown (unobserved, or latent) groups (Masyn, 2013). In short, mixture models attempt to mix responses together from various participants, and can be understood as a multivariate regression that attempts to uncover relations between observed dependent variables and categorical or continuous latent variables (Hadzi-Pavlovic, 2009; Muthén & Muthén, 1998-2012). Such approaches allow researchers to obtain detailed information related to underlying latent groupings and distinguish specific variables correlated with the types of involvement or groups (Stormont, Herman, Reinke, David, & Goel, 2013).

Complementary to cluster and factor analytic models (variable-centered), latent profile and class methodology offer a person-centered approach to explaining underlying multivariate relations among observed responses (DiStefano & Kamphaus, 2006;

McCutcheon, 1987; Nylund, Bellmore, Nishina, & Graham, 2007). Person centered methodologies are often used to categorize a population of heterogeneous individuals based on a pattern of associations among responses to various indicators of a latent construct (Masyn, 2013). Direct person-centered frameworks assume the overall population to be heterogeneous and contain a finite number of latent homogenous clusters with multivariate normality (Masyn, 2013).

Originally described by Lazarsfeld and Henry (1968), latent structure models, such as LCA and LPA, provide a method for identifying latent classes based on observable response patterns in applied social science survey research. That is, these procedures aim to identify latent classes or profiles that underlie different patterns of categorical (LCA) or continuous (LPA) observed variables (Hadzi-Pavlovic, 2009; McCutcheon, 1987; Young, 1982). LCA procedures are acceptable to use with multiple discrete (categorical) indicators of a latent variable (Goodman, 1974), whereas LPA enables characterization of an underlying nominal latent variable from several continuous manifest observations (Masyn, 2013; McCutcheon, 1987). LPA approaches enables researchers to group individuals based on shared response patterns that distinguish members from other groups (Stormont et al., 2013). In both approaches, the resulting classes of individuals are characterized by the frequency (LCA) of endorsing, or means (LPA) on specific indicators rather than direct response patterns (Maysn, 2013). In contrast to traditional methods of classification based on predetermined cutpoint criterion, mixture models assume and attempt to identify underlying latent variable(s) to determine the probabilities associated with an individual's group membership (Nylund et al., 2007b). Importantly, LPA and other mixture models allow for the inclusion of covariates, which enables researchers to achieve a more detailed

understanding about the nature of the relations (e.g., individual variability) between latent classes and covariates, among other empirical objectives (e.g., establishing further construct validity, hypothesis testing, richer characterization; Maysn, 2013).

Mixture modeling in adolescent mental health assessments. Mixture models are extremely useful in mental health assessments as they are able to model diagnostic classifications for clinical symptoms, and provide strong validity evidence of underlying groups to support a given criteria of clinical symptoms (Young, 1982). Using LCA and LPA models with mental health assessments allows researchers and practitioners to better evaluate internal construct validity by comparing a selected diagnostic system (e.g., DSM-V) with underlying relations (patterns) implicit in the corresponding evaluation criteria (Young, 1982). One of the first studies to apply mixture modeling (LCA) with psychological data within a clinical context was conducted by Young (1982). In his seminal study, Young (1982) importantly noted, "…patients with a particular diagnosis will not necessarily show all of its clinical features and patients without the diagnosis may show some of them, the features are likely to be present to varying degrees" (p. 286), highlighting a critical advantage of using LCA methodology within a mental health framework. Young (1982) identified a number of other benefits for utilizing LCA analyses within mental health contexts, including using the results to refine diagnostic criteria to be more aligned with underlying latent models. When conducting a LCA with mental health assessment data, individuals are classified on various observable variables, and then a cross-classification table is computed displaying the number of individuals that performed similarly (e.g., patterns of overlapping categories) for each cell in the classification table (Young, 1982).

To date, there are relatively few published studies that have implemented LCA or

LPA procedures to investigate positive mental health profiles among adolescent students. Rather, the majority of studies have applied LCA analyses to classify and understand adolescents at risk for a variety of psychosocial difficulties, such as disruptive behavioral disorders (Lee & Thompson, 2009; Van Lier, Verhulst, & Crijnen, 2003), victimization and harassment (Bradshaw, Waasdorp & O'Brennan, 2013; Giang, & Graham, 2008; Nylund, Bellmore, Nishina, & Graham, 2007; Whiteside et al., 2013; Williford, Brisson, Bender, Jenson, & Forrest-Bank, 2011), bipolar disorder (Stringaris, Stahl, Santosh, & Goodman, 2011), Attention Deficit Hyperactivity Disorder (ADHD; Volk, Todorov, Hay, & Todd, 2009), schizotypal traits (Cella et al., 2013), and risk predictors of suicide patterns (Jiang, Perry, & Hesser, 2010; Wong & Maffini, 2011). These studies have provided information regarding: (a) identification of struggling youths who would have been otherwise overlooked by less sophisticated methodology (Mezulis, Stoep, Stone, & McCauley, 2011), (b) a better understanding of experiences and underlying latent profiles among students with co-occurring psychosocial difficulties (Dembo, Wareham, Poythress, Meyers, & Schmeidler, 2008; Ferdinand, de Nijs, van Lier, & Verhulst, 2005; Mezulis, 2011; Wadsworth, Hudziak, Heath, Achenbach, & Thomas, 2001), (c) identification of associated risk and protective factors with particular groups of youth (Whiteside et al., 2013), (d) support for multidimensions of adolescent psychopathology (e.g., distinct internalizing and externalizing dimensions; Olino, Klein, Farmer, Seeley, & Lewinsohn, 2012), and (e) other descriptive information delineating the unique features and needs of each identified class (e.g., probability of being a specific gender, ethnicity, sexual orientation, etc.).

Study Purpose

Contributions and Purpose

For decades, scientific investigations regarding the assessment and treatment of mental health among adolescents have focused on methods for diagnosing and reducing symptoms of psychopathology. While the basic tenets of positive approaches to understanding the human psyche became popular in the 1950s, empirical evidence for the applications and effectiveness of these frameworks are in their early stages. Considering that the literature on mental health among adolescents is based primarily on a unidemensional model of adolescent mental health (e.g., psychopathology or well-being independently), the proposed study aims to contribute by responding to recommendations for further investigations of adolescent mental health as a multifaceted construct that incorporates a strengths-based perspective (Greenspoon & Saklofske, 2001; Keyes, 2003, 2010).

Although recent frameworks have been proposed for assessing adolescent health that take into account both positive and negative aspects of adolescent psychological health (e.g., dual-factor and dual continua/complete mental health models), existing evidence for these models have a number of limitations that warrant further research regarding these models' ability to appropriately and efficiently capture adolescent psychological functioning. First, the majority of studies investigating adolescent mental health from a dual-factor framework have included multiple survey measures, making the process time consuming and burdensome for students. For example, Lyons et al. (2012) used five different scales, totaling over 170 survey items. Similarly, Suldo, and Shaffer (2008) included more than seven measures, resulting in nearly 300 survey questions. While the proposed study includes a large number of survey items (consistent with previous studies), this framework offers a more efficient approach to assessing complete mental health among adolescents using the Social Emotional Health Survey (36 items) and a few indicators of internalizing and

externalizing psychopathology, with more attention focused on identifying the presence of positive psychological traits that are crucial for positive psychological well-being. In addition, this will be the first study to include an indicator of wellness that promotes personal assets that is based on a combination of positive psychology traits (e.g., covitality), providing a more complete measure of positive mental health among adolescents.

Next, previous studies examining adolescent mental health from a dual-factor model have been more successful at predicting (correctly classifying) student experiences of psychopathology, whereas attempts to identify significant variables relating to students' experiences of positive mental health have had limited success (Lyons et al., 2012). For example, in Lyons et al. (2012), predictor variables (e.g., personality indicators, perceived parental support, acute stressful life events, life satisfaction) were strongly related to membership in a group experiencing symptoms of psychopathology (e.g., troubled, vulnerable and symptomatic but content groups). However, none of these indicators were predictive of, or highly related to, adolescent experiences of positive mental health. The present study hopes to fill this gap in the literature by identifying the indicators most highly associated with students experiencing positive mental health using covitality (rather than global life satisfaction) as a predictor of adolescent psychological well-being.

This dissertation contributes to the field by implementing statistical methodology to categorize students using a dual-component measurement framework (see Data Analysis section for description). To date, there are no known studies that have utilized LCA or LPA procedures to identify patterns of mental health among adolescents using dual-factor approaches. Generally, published studies on this topic have utilized traditional statistical procedures (e.g., cutscores, multinomal regression, logistic regression, discriminate function

analysis) to categorize students into four mental health quadrants (Greenspoon & Saklofske, 2001; Lyons et al., 2012; Suldo & Shaffer, 2008; Suldo, Thalji, & Ferron, 2011). Nylund et al. (2007) noted several benefits of using latent variable models over other methods, including: (a) models can be replicated on independent samples; (b) variables do not need to be standardized, and all variables (e.g., predictor, outcome, covariates, distal outcomes) can be included simultaneously; (c) the number of classes is based on statistical fit indices rather than arbitrary cutpoint values; and (d) missing data are handled through Full information Maximum Likelihood procedures, and cases are only eliminated if data are missing across all indicators.

Using cutpoint scores can limit the validity of results substantially. Specifically, cutpoint procedures can sometimes result in misclassification and suggest differences between groups of students that are more arbitrary (Nylund et al., 2007a). Thus, latent profile analysis is more likely to yield more robust results and provides unbiased estimates of the number of underlying mental health classes (e.g., whether more than four groups of adolescent mental health functioning is more accurate). In addition, this study will match a measurement/statistical model with a conceptual dual-factor framework by uniquely assessing underlying typologies of positive and negative indicators of mental health as well as their interplay, by imposing fewer restrictions on the data to better understand experiences of students more authentically (e.g., no arbitrary cutpoints to assign students to groups).

Further, this study attempts to address recommendations proposed by leading researchers on dual-factor and complete mental health approaches to measuring mental health among youth. One main limitation Suldo and Shaffer (2008) highlighted in their work with early adolescents was that their sample was drawn from a restricted population of

students from one school with large demographic homogeneity. These authors, along with Greenspoon and Saklofske (2001) and Grzywacz and Keyes (2004) recommended future research to include a larger, more representative samples of youth to replicate dual-factor and complete mental health models, especially with high school students. Thus, the present study responds to these recommendations by using a large, demographically and geographically diverse sample of high school students from across the state of California.

Lastly, the proposed study expands upon previous SEHS–S research by providing further evidence to support its psychometric properties and applications. Given that previous structural equation modeling (variable centered models) has been conducted to establish psychometric support for the covitality construct (Furlong et al., 2014; You et al., 2014; You et al., 2015), this study adds to the literature by illustrating an alternative way to represent covitality using a person-centered approach. In particular, this study aims to highlight the applicability of the SEHS–S and covitality construct as a component of screening efforts to capture complete mental health functioning among adolescents.

Questions and Hypotheses

To address the gaps and recommendations made by leading scholars and expand upon previous work conducted on the SEHS–S and covitality construct, the following questions and hypotheses were explored (see Figure 2 for visual representation). Table 2 provides a summary of the questions, hypotheses, proposed analyses and specific variables of interest.

Question 1: Using the four first-order factors of the SEHS-S (IVs), what are the underlying typologies of covitality for males and females uniquely? How do the profiles vary after controlling for ethnicity and school of attendance (CVs)?

Hypothesis 1a: For female students, the number of classes of covitality that will

converge will be roughly similar to the number of first-order latent factors from Renshaw et al. (2014): belief-in-self, belief -in-others, emotional competence, and engaged living.

Hypothesis 1b: For male students, the number of classes of covitality that will converge will be roughly similar as the number of first-order latent factors from Renshaw et al. (2014): belief-in-self, belief-in-others, emotional competence, and engaged living.

Question 2: What is the underlying number of latent classes among indicators of psychosocial distress (e.g., internalizing and externalizing symptoms- IV's)? How do the classes vary after controlling for ethnicity and school of attendance, (CVs)?

Hypothesis 2a: For female students, indicators of internalizing and externalizing distress will form at least two distinct classes, and one or more classes will yield students who display a similar amount of internalizing and externalizing symptoms (with a higher percentage of females endorsing internalizing symptoms).

Hypothesis 2b: For males, indicators of internalizing and externalizing distress will form at least two distinct classes, and one or more classes will yield students who display a similar amount of internalizing and externalizing symptoms (with a higher percentage of males endorsing externalizing symptoms).

Question 3: Utilizing a dual-component measurement model, what profiles of mental health will emerge when a student's covitality typology (indicator of

positive well-being-IV) is compared with their psychosocial distress class (internalizing and externalizing mental health issues-IV)?

Hypothesis 3: Expanding on previous cutpoint dual-factor methods for well-being classification using the SEHS-S (Dowdy et al., 2014) the following six profiles of adolescent mental health are hypothesized to emerge uniquely for males and females:

a. High CoVi & no/low distress group

b. High CoVi and Internalizing (*INT)* group

c. High CoVi and Externalizing (*EXT)* group

d. Neutral group (Average CoVi and some psychosocial symptoms)

e. At-Risk Externalizing (low CoVi and *EXT*)

f. At-Risk Internalizing (low CoVi and *INT*)

Question 4: (a) Which covitality profile(s) report the highest levels of engagement in risk taking behaviors (e.g., substance use, driving drunk or with other drunk driver)? (b) Which covitality profile(s) report the highest levels of quality of school life (e.g., school connectedness and meaningful participation)? (c) How do these profiles vary across self-reported grades?

Hypothesis 4a Students in the positive/high mental health groups will report engaging in substantially less risk taking behaviors than students in the at risk/low covitality groups.

Hypothesis 4b: Students in the high covitality groups will report higher levels of school connectedness and meaningful participation at school than students classified in the low covitality groups.

Hypothesis 4c: Students in the high covitality classes will report having higher grades

at school than students in the low covitality classes.

Method

Participants

In the 2012-2013 school year, 12,279 adolescents from 17 high schools throughout California completed the Social Emotional Health Survey (SEHS-S) and the California Healthy Kids Survey (CHKS; Core Module A). Participating schools varied in their geographical location (i.e., urban, suburban, and rural), and socioeconomic circumstances (i.e., percentage of students qualifying for Free and Reduced Price Meals [FRPM] at school). The percent of students who qualified for FRPM across schools ranged from 30% to 90%. Participants were in Grades 9 through 12, with a mean age of 16.0 years (see Table 3 for summary of participant demographics). Students from a variety of ethnic backgrounds are represented in this sample, however, the majority of students self-reported their ethnicity as Hispanic (57.6%). Approximately 2% of students indicated that they were a part of a Migrant Education Program or had a family member who worked in agriculture. A majority of students indicated that they lived at home with one or more parents/guardians (62.2%).

Measures

Social and Emotional Health Survey–Secondary (SEHS–S). Building upon the Resilience Youth Development Module (RYDM; Furlong, Ritchey & O'Brennan, 2009; Hanson & Kim, 2007) of the California Healthy Kids Survey (described in following section), the SEHS–S is a multidimensional assessment of 12 positive psychological traits that are considered to be core psychological self-schemas of adolescents' psychological well-being (Furlong et al., 2014; You et al., 2014). Based on the conceptual model underlying the covitality construct described previously, the SEHS–S consists of 36 items (12 subscales

with 3 items per subscale) that load onto four first-order latent traits (see Figure 3). The four-first order latent traits and associated subscales are as follows: belief-in-self (self-awareness, persistence, self-efficacy), belief-in-others (school support, family coherence, peer support), emotional competence (empathy, self-control, delay of gratification), and engaged living (gratitude, zest, optimism). Together, these four first-order latent traits make up the second-order covitality meta-construct (You et al., 2014). The sources of each of the indicators in the SEHS–S can be found in Figure 1. The covitality total score ranges from 36 to 150.

Students are asked to answer questions related to their functioning in the 12 positive psychological domains using Likert-type response scales. For the gratitude and zest subscales, students are asked to select a response indicating "how true" each statement is about themselves from five response options (1 = *not at all*, 2 = *very little*, 3 = *somewhat*, 4 = *quite a lot*, and 5 = *extremely*). For the other 10 subscales, students were asked to select an option from the following four response options: 1= *not at all true of me*, 2 = *a little true of me*, 3 = *pretty much true of me*, and 4 = *very much true of me.* Each of the questions and their associated response scales can be found in Table 4.

Although it is a recently developed instrument, investigations of the psychometric properties of the SEHS–S have supported the reliability and validity of the measurement model (Furlong et al., 2014; Lee, You, & Furlong, in press; You et al., 2014; You et al., 2015). In their first study regarding the development and validity of the SEHS–S, Furlong et al. (2013b) conducted a series of confirmatory factor analyses (CFA), structural equation path model (SEM), multigroup invariance tests, latent mean differences, Analysis of Variances (ANOVAs), and chi-squared tests of associations, with a sample of 4,189 California students in Grades 8, 10, and 12. Results from the two factor analyses suggested

retaining 36 of the highest loading indicators from the original 51-item instrument, which corresponded to an overall adequate fitting model with all items highly loading (factor loadings from .52 to .82) onto their respective latent traits, $\chi^2 = 401.16$, $df = 50$, $p < .05$, CFI = 0.919, SRMR = 0.048, RMSEA = 0.071, 90% CI [0.067, 0.072]. Multigroup invariance analyses revealed full measurement invariance across gender. Results from tests of latent mean differences revealed that female students were more likely to strongly endorse indicators associated with the belief-in-others and emotional competence factors, whereas male students were more likely to endorse items related to belief-in-self (Furlong et al., 2014). Next, path analysis results found covitality to be a strong predictor of self-reported subjective well-being among adolescents, providing evidence to support the predictive validity of the SEHS-S. Furthermore, Furlong et al. (2013b) found evidence to support convergent validity of the SEHS-S. Specifically, overall covitality levels were associated with higher academic achievement and perceptions of school safety, whereas lower levels of covitality were related to higher engagement in substance use and experiences of depressive symptoms. Taken together, these results provide evidence to support the theoretical model underlying the SEHS-S and its capacity to accurately and reliably measure the multidimensional covitality construct.

To further examine the predictive and concurrent validity, and other psychometric properties of the SEHS-S, You et al. (2015) coadministered the Behavioral Emotional Screening System-Student Form (BESS; Kamphaus & Reynolds, 2007), and conducted a series of CFAs and SEMs with another sample of 2,240 students in Grades 9–12 from California. In the first CFA model, results replicated the factor structure of the 12 subscales, with three of the highest indicators loading onto their respective latent traits. Results from

the second CFA reconfirmed the hypothesized structure underlying the SEHS-S. Using SEM, You et al. (2014) found covitality to be a significant negative predictor of social-emotional-behavioral symptoms among adolescents, as measured by the BESS. In addition, results from this investigation found that adolescents with higher covitality scores were more likely to have higher school course grades at the end of the school year. These analyses also revealed full factorial invariance for older (16-18 years) and younger (13-15 years) adolescents, suggesting its capacity to appropriately measure covitality for adolescents of all ages. When summed across all 36 items, the reliability of the total covitality score was strong, $\alpha = .92$, with an approximately normal distribution (skewness = -0.54, kurtosis = 0.49).

Structural stability was investigated with a sample of 115 students who completed the SEHS-S at two time periods, approximately one year apart (Furlong et al., 2014). Overall, researchers found the stability coefficients for four latent constructs of the SEHS-S, and the covitality meta-construct to have strong trait-like stability: belief-in-self ($r_{12} = .56$), belief-in-others ($r_{12} = .57$), emotional competence ($r_{12} = .57$), engaged living ($r_{12} = .45$), and covitality ($r_{12} = .60$).

The SEHS-S has been translated into several languages, and data are in the process of being collected from adolescents living in Australia, Japan, Korea, Turkey, Malta, Lithuania, and Latvia (Furlong et al., 2014). Further investigations of the reliability and validity of this instrument in assessing covitality with international populations are beginning to emerge, with similar promising evidence (Dowdy et al., 2014).

Taken together, these initial investigations provide psychometric evidence supporting the SEHS-S theoretical model and its capacity to accurately and reliably measure the

multidimensional covitality construct. In addition to the building body of research supporting the psychometric properties of the SEHS-S, this tool has predicted other areas of adolescent functioning, including school-based (e.g., academic achievement) and quality-of-life (e.g., subjective well-being) outcomes (see Renshaw et al., 2014 for overview of these findings).

California Healthy Kids Survey (CHKS). Originally developed in the late 1990s by WestEd's Health and Human Development Program in collaboration with Duerr Evaluation Resources for the California Department of Education (CDE), the CHKS was designed to measure health, resilience, and risk related behaviors as self-reported by youth. Data from the CHKS is typically used to gather information regarding student needs, barriers to learning, program development and progress monitoring was required biennially by the federal Elementary and Secondary Education Act (ESEA), Title IV (WestEd, 2013).

Based on a modular structure, the survey is comprised of a core module A and various supplemental modules (e.g., tobacco, school climate, drug free communities, sexual behavior, gang risk awareness, resilience and youth development, among others) that can address specific needs of schools and districts. The Core module A version used in this study was comprised of 112 items from the CDC's Youth Risk Behavior Survey and the California Substance Use Survey (WestEd, 2013). Although there are no recent published studies regarding the psychometric properties of the updated Core Module A (other supplemental modules, such as the Resilience and Youth Development and School Climate modules have recent psychometric evidence to support its reliability and validity), this instrument has been extensively reviewed and continuously updated for over a decade (Hanson & Kim, 2007). Module A asks students a broad range of questions related to resilience and youth

development protective factors (e.g., caring relationships, high expectations, opportunities for meaningful participation), health-risk behaviors (e.g., alcohol, tobacco, and other substance use), violence and safety at school (e.g., bullying and harassment) as well as physical education and eating habits. Students are also asked to provide demographic information (e.g., age, grade, gender, and ethnicity) and self-report their grades and attendance. Students are asked to think about activities they may have done during a variety of time periods, such as throughout their lifetime, over the past 12 months, or within the past 30 days. Answer options are provided in Likert-type scales, and vary for each set of questions. Of particular interest for the present study were items related to negative internalized (e.g., thoughts of suicide, feelings of depression), and externalized (e.g., harassment and bullying, damaging school property on purpose, physical fight at school) indicators of mental health functioning (see Table 5 for corresponding survey item question, subscales, and response options). Other important indicators from the CHKS that were used in the present study include: (a) items related to engagement in risk behaviors (e.g., alcohol, tobacco, illicit substance use, and driving drunk/riding in car with drunk driver), and (b) indicators of quality of life at school (e.g., school connectedness and meaningful participation at school). Internal consistency estimates for the current sample yielded adequate reliability coefficients for the school connectedness ($\alpha = .82$) and meaningful participation ($\alpha = .79$) subscales. Table 5 provides a summary of all indicator abbreviations, associated instrument, corresponding survey item number, and response options.

Validity and demographic items. To assess the reliability and truthfulness of student responses, seven indicators from the CHKS were included as fictional or exaggerated items to see how carefully and truthfully students were responding to survey questions and to

counteract potential exaggerations in their responses. Recommendations from CHKS data use and dissemination guidelines (Austin, Bates, & Duerr, 2013) and other researchers (Cornell, Klein, Konold, & Huang, 2012) suggest eliminating cases that fail two or more indicators of validity and reliability. Indicators of unreliable or invalid responses are evaluated by the following: (a) responses corresponding to a level of drug use that is implausibly high (e.g., exaggerated drug use), (b) inconsistency in responses about trying or using substances (e.g., report never using a drug in their lifetime yet respond to yes using a drug in the past 30 days), (c) selecting a fake drug that was included in a list of real drugs, and (d) responding "hardly any" to the question about how many questions were answered honestly. Subsequently, students who failed two or more of these reliability and validity checks were removed from the dataset to ensure that data included the most accurate and valid responses. Additional demographic items (e.g., gender, age, grade, ethnicity, school of origin, and home living circumstances) were also included in the survey to gather information related to generalizability of student responses and as covariates to assess mean group differences.

Procedure

Students completed the SEHS-S and CHKS during the 2012-2013 school year as part of the California Safe and Supportive Schools initiative (S3), funded by the U.S. Department of Education to monitor and enhance student development. Of the 17 schools that participated, 11 were administered the surveys via a secure online portal monitored by WestEd researchers, and six schools completed the paper-and-pencil version. School personnel were instructed to allow students a full class period (approximately 50 minutes) to complete the surveys. Students were asked to answer questions from the CHKS core module

A and the School Climate Supplement before completing SEHS-S items. Prior to survey administration, parent permission was obtained and students were informed that their participation was voluntary, and were ensured their responses would remain anonymous. School personnel were provided with specific administration instructions, which can be accessed at: http://chks.wested.org/administer/instructions. Teachers and proctors were available to answer student questions during test administration, and students were requested to answer the questions truthfully. Permission to access this dataset was requested from the California Department of Education and granted upon agreement to the terms of confidentiality.

Data Analytic Strategy

Data screening. Prior to conducting the three-phase mixture model, data were screened for violations of multivariate assumptions. The original dataset consisted of 16,907 cases; however, data were screened to ensure that only valid and reliable responses were included in analyses. First, cases with incomplete or out of range responses on grade, age, gender, and ethnicity variables were deleted in a listwise fashion (n = 928). Next, participants with missing data across all SEHS-S indicators were deleted (n = 1,636; the most likely reason is that the SEHS-S survey was voluntarily completed after two other surveys and students did not have sufficient time to complete all items). Thus, these cases did not include responses that could be interpreted as missing at random. Students who failed two out of seven standard reliability and validity items on the CHKS were also were also deleted from the dataset due to the possibility of unreliable response patterns (n = 255). Further, students with five or more incomplete responses for the nine items comprising each of the SEHS-S subscales were excluded from analyses to control for the possibility of nonrandom

missing data (n = 1,247). Lastly, Mahalanobis distances and Q-Q plots were requested in SPSS version 21 to assess for multivariate outliers on all variables included in this study. Results yielded 562 cases that exceeded the critical chi-squared value, suggesting the presence of multivariate outliers χ^2 (14) = 36.12, p < .001 (Tabachnick & Fidell, 2007), and were subsequently deleted. After implementation of data screening procedures, a final sample of 12,279 adolescents was retained for the present study.

Normality of subscale distributions were assessed via examination of histograms and cutoff values of |2.0| for skewness (Chou & Bentler, 1995), and |7.0| for kurtosis (Curran, West, & Finch, 1996). All values of skewness and kurtosis were within acceptable limits for each of the four SEHS-S subscales, depression, quality of school life indicators, and alcohol and marijuana use, suggesting no major violations to normality. Variables that displayed evidence of slight positive skewness include the following: harassment/bullying (skewness = 1.1, *SE* = .02), fighting at school/property damage composite (skewness = 1.1, *SE* = .02), and suicidality (skewness = 1.9, *SE* = .02). Student reports of cigarette use, prescription pain killer use, and driving with someone under the influence of alcohol were all non-normally distributed and had positive skewness values that exceeded normal limits.

LPA and other mixture models utilize Full Information Maximum Likelihood (FIML) estimation, which allows and accounts for data that are incomplete or missing at random (MAR; Enders & Bandalos, 2001; Nylund et al., 2007). This estimation procedure has been compared to other techniques for handling missing data (e.g., listwise deletion, pairwise deletion, similar response pattern imputation), and was found to be more a more efficient and accurate method (Enders & Bandalos, 2001).

Internal consistency estimates suggest strong reliability among the 36 included

indicators of covitality ($\alpha = .95$). Sample means, standard deviations, and a correlation matrix for all composite indicators used in the LPA and LCA are summarized in Tables 6 through 8.

Three-phase mixture model (LPA and LCA) with covariates. The primary objective of this study was to investigate the underlying typologies of the covitality construct and implement a novel dual-component measurement model in attempts to more accurately capture underlying latent relations among indicators of student covitality and psychosocial distress to yield a descriptive and parsimonious picture of complete mental health among adolescents. To accomplish this, a three-phase mixture model and automatic three-step method for inclusion of covariates were implemented using MPLUS version 7.1 (Muthén & Muthén, 1998-2012) and SPSS statistical software (version 21, see Figure 2). Given participants in this study come from a variety of cultural backgrounds and from schools with varying characteristics (e.g., size, location, rural versus urban), ethnicity and school variables were dummy coded and included as covariates in attempts to control for extraneous sources of variance. The three-step method is a recently developed approach for including covariates in mixture models that attempts to account for the error associated with nonperfect class assignment and thereby limiting their influence on the class enumeration process (Nylund-Gibson, Grimm, Quirk, & Furlong, 2014; Vermunt, 2010). In addition, post-hoc examinations of mean differences across the profiles of covitality and indicators of engagement in risk behaviors (tobacco, alcohol, marijuana, and prescription pain killer use and drunk driving) and quality of school life (school connectedness and meaningful participation subscales of the CHKS) were investigated using Analysis of Variance (ANOVAs). Given that previous research has identified latent mean differences between

males and females on a few of the SEHS-S subscales (Furlong et al., 2014), each phase was repeated independently for males and female so that results more accurately reflect dual-component profiles of mental health for male and female students uniquely.

Phase I. First, an unconditional LPA with 1 to 6 classes was specified using continuous data from the four positive mental health domains of the SEHS-S (belief-in-self, belief-in-others, emotional competence, and engaged living) to investigate the underlying typologies of the covitality construct (step 0 of the 3-step method for inclusion of covariates) for males and females separately. This LPA model attempts to explore how the conceptual framework underlying covitality represents the observed data from a person-centered approach (compared to previous factor analytic/variable-centered approaches). After estimating the unconditional LPA and deciding on the most parsimonious model, a conditional model was specified and ethnicity and school of attendance were included as dichotomized covariates (step 1 of the 3-step method). In step 2, the classification error was automatically fixed to the logit values (from step 1) associated with each indicator. Lastly, after fixing the logit values for each indicator, ethnicity and class were specified to regress on each of the LPA classes in the model (see Nylund-Gibson et al. [2014] and Vermunt [2010] for detailed three-step methodology). Resulting output provides logits, means associated with each class/profile and the each ethnic and school group covariates (coded as 1), and pairwise tests of significance, which were compared to a specified referent class (i.e., *above average covitality* group). In addition, odds ratios can be calculated by exponentiating the logit values, which provide an estimate of effect size.

Phase II. Next, an LCA with 1 to 6 classes was specified to explore underlying profiles associated with categorical indicators of internalizing and externalizing psychosocial

distress (i.e., *fights at school/damage school property*, *victimization*/*harassment*, *depression*, and *suicidality*). The same 3-step process was repeated using the most parsimonious model from the LCA and instead of means of the covariates, output for the conditional LCA provides the proportion of individuals coded as a "1" on ethnicity and school, which is compared to a referent class from the most parsimonious LCA model (e.g., low psychosocial distress class).

Phase III. Modeling a novel dual-component measurement structure, phase III crosstabulated the latent class variable identified by LPA (positive mental health profiles) with the LCA variable (psychosocial distress classes) to explore a more compete profile of adolescent mental health functioning from a dual-factor framework with no restrictions on the data. Phase III served to illustrate an application of the SEHS-S as a comprehensive measure of positive mental health that can be used as a component in dual-factor mental health screening efforts.

Class enumeration and retention. In LPA, an underlying population-based model is used to identify classes of individuals that respond similarly (mean scores) on some level of a continuous latent variable (Muthén & Muthén, 2000, 2004). The number of latent profiles and classes underlying the observed sample is typically unknown a priori, and both LPA and LCA procedures make the degree of uncertainty explicit when classifying cases into latent groups (DiStefano & Kamphaus, 2006; Muthén & Muthén, 2000, 2004). Once groups are identified, an individual case is assigned a probability value between 0 and 1, and is placed in the class with the largest probability of an underlying relation (DiStefano & Kamphaus, 2006; Hadzi-Pavlovic, 2009). The two most commonly implemented methods of latent class and profile model estimation are maximum likelihood and maximum-posterior (DiStefano &

Kamphaus, 2006). LPA estimates model parameters, which are the means, variances, and covariances for each indicator variable (e.g., mean score on the belief-in-self subscale) as well as the likelihood of specific group membership (DiStefano & Kamphaus, 2006; Masyn, 2013). In LCA, there are two main parameters of importance in: (a) the proportion of the overall sample that comprise each class (class parameters) and (b) the probability of an individual in each latent class responding in a specific way on the observed measures (item parameters; Hadzi-Pavlovic, 2009; Nylund et al., 2007b). To illustrate, a class specific item probability of .85 corresponds to an individual in class *Y* having an 85% probability of endorsing that particular item. In the proposed study, item probabilities will be interpreted at the subscale level, whereby a student in a given class (e.g., internalizing group) has a corresponding probability (e.g., 85%) of endorsing a particular indicator of psychosocial distress (e.g., symptoms of depression). A strong degree of endorsement on a particular item (e.g., item probability of .90) is indicative of a high level of class homogeneity, and that item could be understood as typical for a particular class (Maysn, 2013). In addition to having a high degree of class homogeneity, it is desirable for LPA to have a high level of class separation, which allows researchers to distinguish among groups, and can be calculated using an item endorsement odds ratio (OR) with values > 0.50 or < 0.20 corresponding to a high degree of separation between classes for a specific indicator (Maysn, 2013). Estimated class proportions provide information regarding the interpretation of classes as typical or atypical compared to the overall population (Maysn, 2013). In addition, in LPA, variable means are examined to further distinguish groups and it is assumed that the latent groups explain within group associations, and observed variables are uncorrelated (Hadzi-Pavlovic, 2010)

Using an iterative process, classes are added in LPA and LCA until there are no improvements in model fit (Nylund et al., 2007b). In an unconstrained LPA model (i.e., restrictions imposed on the model parameter values), results yield ordered and nonordered class types. Ordered classes refer to item probability profiles that do not cross one another, whereas nonordered class probability profiles tend to cross one another (Nylund et al., 2007b). Using a series of modeling steps, LPA and LCA begins with specification of the independence model (unconditional model) and subsequently increases the number of classes until model fit is no longer improved (Maysn, 2013; Nylund et al., 2007b).

To determine the best fitting model, a number of statistical criterion and substantive theory are considered. Nylund et al. (2007b) provided the following recommendations regarding determination of model fit in LCA models, which are also applicable to LPA: (a) consider a combination of statistical indicators and theoretical frameworks rather than a single indicator to decide on the optimal fitting model; (b) smallest yielded values on the Akaike Information Criterion (AIC; Akaike, 1977); Bayesian Information Criterion (BIC; Schwartz, 1978), Adjusted BIC (ABIC; Sclove, 1987); and (c) nonsignificant *p*-values associated with likelihood ratio tests, which assesses fit between two nested models that differ by one class (*K*-1; the Bootstrap Likelihood Ratio Test–BLRT, and the Lo–Mendall–Rubin Test– LMRT). Among these indices of fit, the BLRT and BIC indices have been found to provide the most reliable estimates of model fit (Nylund et al., 2007b). In addition, entropy (i.e., probability density distribution underlying the latent class model, with values closer to 1 indicating better prediction) should also be considered when determining the accuracy of a model in predicting class membership (Akaike, 1977; DiStefano & Kamphaus, 2006; Vermunt & Magidson, 2002). Generally, smaller fit indices indicate a better model fit

to the data.

Results

Results are provided methodically in the following four sections. Phase I presents results from two foundational analyses: (a) the exploratory and unconditional LPA model, which allows for the identification of the underlying latent structure and number of covitality profiles; and (b) the conditional LPA model using the three-step method of inclusion of covariates, which tests the differences between the latent profiles of covitality across a student's school of attendance and ethnic background. In phase II, results from the unconditional LCA (using four indicators of adolescent psychosocial distress) are provided first, followed by results from the conditional LCA model, which also incorporated the three-step method for inclusion of school and ethnicity covariates. Phase III provides results for the novel dual-component method for assessing complete mental health, whereby the best fitting LPA and LCA models were crosstabulated to gain a comprehensive understanding about how a student's positive mental health class (e.g., covitality subtype) compares with their classification on negative mental health indicators. Finally, results from post-hoc mean difference tests are provided to gain descriptive information about how each of the covitality subtypes report engaging with various risk and quality of life indicators. Together, these results help capture a more complete mental health profile for adolescents.

Overall, 96.9% of participants had all data for all variables used in the latent profile analysis (phase I). Among variables used in the latent class analysis (phase II), 99.6% had complete data for the victimization and externalizing behavior indicators, 97.8% provided data on the depression item, and 97.6% provided responses on the suicidality variable. The minimum covariance coverage recommended by Muthén and Muthén (1998-2012) for

reliable model convergence is 0.100. In this study, coverage estimates well exceeded the recommended values (ranging from 0.970–0.990). In addition, residual values were all within acceptable limits (< 3.065; Muthén & Muthén, 1998-2012).

Phase I

The unconditional LPA models, which included the four continuous subscales of the SEHS-S (i.e., belief-in-self, belief-in-others, emotional competence, and engaged living), were run by first specifying a single class, independence model, followed by the exploration of models with additional classes. Fit information (i.e., log likelihood ratio, BIC, ABIC, and *p* values for the LMRT and BLRT) and entropy values for LPA models with one to six classes are provided separately for females and males in Tables 9 and 10. LPA models with more than six classes ceased to be well identified for both genders, thus those results are not reported.

Based on model fit information, entropy values, and examination of BIC plots (see Figures 4a and 4b) for the six LPA models, the four-class model appears to be the most parsimonious and provides the best fit to the data for both males and females (females: BIC = 158877.131, ABIC = 158804.043, LMRT and BLRT, *p*-values < .001; males: BIC = 144851.245, ABIC = 144778.158 LMRT and BLRT, *p*-values < .001). Based on the distinct pattern of mean scores across the four SEHS-S subscales, the following labels are offered for the four ordered classes: *very low covitality* (Class 1), *below average covitality* (Class 2), *average covitality* (Class 3), and *above average covitality* (Class 4). Given that mixture modeling allows for an alternate method for representing patterns among underlying constructs (compared to variable-centered approaches), the four-class model also makes conceptual and theoretical sense since previous findings have found sound support for four

first-order factors underlying the SEHS-S and covitality construct (Furlong et al., 2014). Further, although the profiles that emerged for the male and female samples looked similarly (i.e., four profiles with similar class proportions), subsequent analyses will be conducted independently so that covariate effects may be assessed separately rather than via examination of interaction effects.

Conditional LPA covariate model. Using the optimal fitting four-class model identified in the unconditional LPA model, a three-step process was implemented using school and ethnicity variables to validate the four covitality profiles. That is, type of school and student reported ethnicity was regressed onto each of the four covitality profiles. First, class proportions and classification probabilities for the unconditional and conditional models were compared to determine whether the covariates influenced the class enumeration process. Class proportions and classification probabilities remained unchanged in the conditional model, suggesting that the four SEHS-S indicators solely identified the latent classes.

In LPA, substantive meaning and class differentiation among latent classes is gained through examining item/subscale means. Figures 5 (females) and 6 (males) provide profile plots and class proportions—the four subscales of the SEHS-S are on the *x*-axis and mean scores across the *y*-axis. For females, the *very low covitality* group (Class 1, see Figure 5) includes 1.8% of students. This class is clearly distinguishable from the other three classes in that their mean scores were substantially below average (approximately 2 *SD*s below the mean) on all four SEHS-S subscales (see Table 6 for summary of means and *SD*s for each of the SEHS-S domains). Thus, given their response pattern, this class of students will be referred to as the *very low covitality* class. This class represents a small group of students

with critically low levels of covitality. Students in this class are likely to describe themselves as not very confident or aware of their problem-solving abilities. Students in the *very low covitality* class may also be distinguished from other students in that they are more likely to report having limited support from teachers, family, or peers. In addition, these youth may be more likely to not accept responsibility for their actions, and display lower levels of empathy (i.e., not feeling bad for others when their feelings are hurt) and behavioral self-control (i.e., not thinking before acting). The resulting profiles of covitality emerged in an ordered pattern (i.e., profiles did not cross one another), starting with the *very low covitality* group (Class 1; solid line with dots), followed by a *below average covitality* (Class 2, 21.5%; dashed line with square), *average covitality* (Class 3, 49.4%; solid line with triangle), and *above average covitality* (Class 4, 27.3%; dashed line with diamond) groups. Given the ordered pattern of the four-class LPA, this suggests that within each class, students are tending to report similar mean levels on all four SEHS-S domains. The ordered pattern among the profiles provides additional information to support the high reliability among the SEHS-S subscales. Results should be interpreted with respect to means across the subscales rather than the subscales being used as indicators to distinguish between types of covitality. A nonordered pattern among SEHS-S profiles would have indicated varying types of covitality or separations between indicators. Thus, the ordered classes may be understood as capturing the underlying continuum of covitality as a single, higher-order factor, and the profiles provide classification information based on the varying degrees of covitality that were obtained in the current sample. The pattern of very low, below average, average, and above average mean scores across each of the four subscales of the SEHS-S was nearly identical for males (see Figure 6). In addition, for both males and females, the *average*

covitality class was the largest group. Interestingly, a larger proportion of males were classified in the *very low covitality* group compared to females (4.3% compared to 1.8%).

Logits, standard errors (SE), *p*-values, and odds ratios (OR) for each of the covariates included in the model are summarized in Table 11 (females) and Table 12 (males). Negative logit values suggest that for a given covariate, students are more likely to be categorized in the referent group rather than the comparison class when the *p*-value is less than 0.05. Given that the Hispanic ethnic group and *average covitality* class comprised the largest proportion of students in the overall sample, these groups were set as the reference class. Although there were statistically significant differences among covariates, there were no meaningful differences among the covariates for male or female students (e.g., all logit values were in negative direction). This suggests that the covitality profiles are heterogeneous in relation to reported ethnicity and qualification for free and reduced priced meals. In other words, each ethnic group represented in this sample had a similar likelihood of being categorized into the four profiles of covitality.

Phase II

Following a similar process as the LPA, a series of unconditional LCA models, building from one to six classes, were specified. Four discrete indicators of internalizing (depression and suicidality) and externalizing (fighting and damaging property at school, and experience of harassment and bullying) symptoms were included. Fit information and entropy values for each of the LCA models are provided separately for males and females in Tables 13 and 14. After introducing a sixth class, the LCA ceased to be well identified for both genders. Thus, only results for models with one to five classes are reported. Based on model fit information, entropy values, and examination of BIC versus *K* (class) plots (see

Figures 7a and 7b), the four-class model appears to be the most parsimonious and provides the best fit to the data for both males, BIC = 19152.561, ABIC = 19066.762, LMRT and BLRT *p*-values, < .001, and females, BIC = 25375.810, ABIC = 25290.011, LMRT and BLRT, *p*-values < .001. Based on the pattern of probability plots across the psychosocial distress items, the following labels are offered for the four classes: *low psychosocial distress* (Class 1), *internalizing* (*INT*; Class 2), *externalizing* (*EXT*; Class 3) and, *INT and EXT combined* (Class 4).

Conditional LCA covariate model. Using the best fitting four-class model identified in the unconditional LCA model, an additional three-step process was implemented using school and ethnicity covariates to validate the four psychosocial distress classes.

In LCA models, substantive meaning and class differentiation is achieved through examination of conditional item probabilities. Figures 8 (females) and 9 (males) provide profile plots and class proportions, with the four indicators of psychosocial distress on the *x*-axis and probability of item endorsement across the *y*-axis. The profiles of adolescent psychosocial distress emerged in a nonordered pattern (i.e., item probability plots crossed with one another), for both males and females. In Class 1 (dashed line with circles; males = 59.4% and females = 51.6%), the pattern of item endorsement was close to zero on all four indicators of psychosocial distress, suggesting that students in this class are typically functioning and report no major internalizing or externalizing distress. Given this pattern of item nonendorsement, Class 1 for both males and females can be characterized as the *low psychosocial distress group*. A pattern of likelihood of item endorsement across all distress indicators emerged among students assigned in Class 4 (dashed line with diamond shapes). This group of students endorsed both internalizing and externalizing psychosocial distress

items and can be referred to as the *INT and EXT combined* group. That is, these classes of students have likely experienced some level of bullying and harassment, depressive symptoms, and reporting getting into a fight(s) while at school. Interestingly, a larger percentage of female students (12.2%) were classified in the *INT and EXT combined* group than males (5.5%). Class 2 contains students who had higher probabilities of endorsing internalizing items (depression only among males), low to no endorsement of externalizing indicators (see solid line with squares in Figures 8 and 9). Thus, these classes can be referred to as the *internalizing* group. Inversely, the opposite pattern also emerged (Class 3; solid line with triangles), whereby students in this class endorsed externalizing distress indicators and nonendorsement of items related to internalizing mental health symptoms. With the exception of the *INT and EXT combined* classes, class proportions were fairly similar for males and females across the three other classes.

Logits, standard errors (SE), *p*-values, and odds ratios (OR) for each of the covariates included in the LCA model are summarized in Table 15 (females) and Table 16 (males). Hispanic students in the *no psychosocial distress* group were designated as the referent class for both genders. Although results yielded statistical significance within group comparisons, all logit values fell within the same direction (negative) for all ethnic groups, suggesting that all groups had a similar likelihood of being classified into each of the respective LCA classes. This pattern was consistent across gender. Similar to the results found with the covitality profiles, schools with less than 70% of students who qualified for FRPM programs did not significantly differentiate the LCA classes from one another.

Phase III

For each participant, associated LPA and LCA class specifications were saved and

merged with their responses on all indicators included in the study. In this final phase, student LPA and LCA assignment were crosstabulated in order to compare their covitality subtype with their psychosocial distress classification, which is an empirical application of a dual-component mental health model. Given that high entropy is associated with values close to 0.80, the entropy values obtained in the 4-class LPA and LCA models (ranging from 0.78 to 0.87) provide support that for at least 80% of the time, students were correctly classified in their latent classes (Clark, & Muthén, 2009; Nylund, Asparouhov, & Muthén 2007). Thus, the subsequent classification and analysis procedure can be considered a valid approach. Results for this crosstabulated dual-component model are presented in Figures 10 and 11. Overall, there were 16 unique groups of students that emerged when positive and negative classes were crossed (see Table 17). Sixty-six percent of females and 71% of males in the *above average covitality* class were classified in the no psychosocial distress groups (see Figures 10 and 11), with 34% of female and 28% of male students concurrently endorsed some level of externalizing and/or internalizing distress. This suggests that some students with high levels of positive psychological traits still report encountering psychosocial difficulties, which may be buffered by protective factors present in their lives. An unexpected pattern emerged among the *below average covitality* group, which had the lowest percent of students concurrently classified in the no psychosocial distress group. The largest proportion of students classified in the *INT* and *EXT* combined groups were concomitantly categorized in the *below average covitality* domains (22% of females and 9% of males; see Figures 8 and 9). Taken together, these results suggest that students with below average levels of positive mental health might be experiencing more significant externalizing and internalizing psychosocial difficulties than has previously been identified in other

traditional dual-factor methods for mental health screening.

Equality of Means

To better understand potential school experiences for students student in each of these classes experiences, post-hoc Analysis of Variances (ANOVAs) were conducted using five indicators of risk behavior (i.e., smoking cigarettes, drinking alcohol, marijuana use, prescription pain killer use, and drunk driving) and two positive quality of school life composites (i.e., school connectedness and meaningful participation). Means, standard deviations, significant equality tests, and effect size estimates for each of the four classes of covitality by risk behavior and quality of school life are presented in Tables 18 (females) and 19 (males). In addition, Table 20 (females) and 21 (males) display means, standard deviations, equality tests, and effect size estimates for the four covitality profiles by student-reported grades. Mean scores equate to the following: 1.0 to 1.9 = "A's"; 2.0 to 2.9 = "A's and B's"; 3.0 to 3.9 = "mostly B's"; and 4.0 to 4.9 = "C's and below."

In all class comparisons, Bonferroni adjustments were requested in order to account for potential inflation of type I error. Significant ($p < .001$) and strong (Cohen's d values > 1.00) mean differences were found between the four SEHS-S classes and quality of school life indicators for both genders, with slightly more powerful effects obtained among females across all indicators. Among the comparisons, a meaningful class differences was found between the *very low* and *above average covitality* classes on the school connectedness composite; females with very high levels of covitality reported feeling much more connected to their school than students with very low levels of covitality (Class 4 M = 18.66; Class 1 M = 12.65, Cohen's d = 1.45). This strong effect was also observed on the meaningful participation composite, with the *above average covitality* class reporting

significantly higher meaningful participation in school than females with very low and below average levels of covitality (Class 4 M = 7.99; Class 1 M = 4.89, Cohen's d = 1.35). Similar mean effects were observed among male students as well (see Table 19). These findings are consistent with Hypothesis 4_b (see Table 2). A main distinction between male and females was found in their mean ratings on levels of engagement in risk behaviors, in which there were fewer significant covitality class differences across the five risk behavior items among males (see Table 19). Lastly, and in congruence with Hypothesis 4_c, students in the *average* and *above average covitality* classes reported higher grades in school than students in the *very low* and *below average covitality* classes (see Table 20 for females and Table 21 for males).

Implications and Discussion

"The whole is more than the sum of its parts" — Aristotle

The goals of the present study were twofold: to investigate the underling typologies of covitality, and attempt to capture complete mental health among adolescents using a novel dual-component measurement approach as an alternative method for classifying adolescent mental health functioning. In addition, this study sought to further explore potential applications of the SEHS-S as a tool to identify specific profiles of students on the covitality continuum. Incorporating student covitality as an indicator of positive mental health enables researchers and practitioners to gain a more complete understanding about student's internal and external resources, which can be used to overcome adversity and promote well-being. Findings from this dual-component measurement model can aid researchers, educators, and mental health practitioners who wish to understand better the complex mental health patterns experienced by adolescents. Previous CFA and SEM models

(You et al., 2014) provided support for the underlying framework of the SEHS-S and the higher-order covitality construct (variable centered approach), the LPA and LCA methods implemented in this study contributed by helping to describe the way that the SEHS-S functions at a person-centered level. The ordered four-class model of covitality that emerged in this study (i.e., v*ery low*, *below average*, *average*, and *above average covitality* levels) provides concurrent support for the importance of measuring each of the 12 positive psychological dispositions in combination, and is in line with other two-continua complete mental health screening efforts to inform universal and targeted mental health services in schools (Dowdy et al., 2014). In other words, the lack of differentiated means within each SEHS-S class seems to support the general overarching properties of covitality; as youth develop and endorse more of these important positive psychological dispositions, the more strongly they bond together and have more powerful impacts on student well-being. This further emphasizes the importance of measuring these psychological dispositions simultaneously to most accurately capture mental health functioning among adolescents. While results of this study are partly in line with previous dual-factor research that have identified four different groups of students based on high or low scores of psychopathology and SWB (i.e., flourishing [high SWB and low psychopathology]; symptomatic but content [high SWB and high psychopathology], vulnerable [low SWB and low psychopathology], and troubled [low SWB and high psychopathology]; Greenspoon, & Saklofske, 2001; Lyons, Huebner, & Hills, 2013; NG, Chasmar, Franke, Otis, Smith, & Huebner, 2014; Suldo & Shaffer, 2008), the present study provides some evidence to suggest that mental health profiles may be more complex than what previously used screening methods have been able to capture. However, more robust indicators of psychosocial distress (e.g., the BESS or

BASC) are needed in future studies to further examine the patterns of complete mental health profiles.

In congruence with Hypotheses 1_a and 1_b (phase I), results suggest that the number of underlying typologies of covitality can be summarized in the same number of first-order latent factors of the SEHS-S for both genders. The number and proportion of students classified into each of the resulting four covitality profiles did not change when ethnicity and school covariates were included in the model, suggesting that the SEHS-S indicators adequately identified the underlying profiles. However, while a 4-class solution seems to provide the best fit to the data, closer examination of responses provided by the *very low covitality* class show that there may be a group of students who did not provide meaningful responses as they typically responded "not at all true of me" on SEHS-S items.

Hypotheses 2a and 2b (phase II) were also supported: indicators of psychosocial distress formed two distinct classes of internalizing only item endorsement and externalizing only item endorsement. Further, one resulting class displayed equal amounts of internalizing and externalizing item endorsement (i.e., *INT and EXT combined* class), and one class endorsed few to no items related to psychosocial distress. The hypothesis that males would be more often categorized in the externalizing class was not supported; males and females had similar class proportions on the externalizing only group, however, a larger percentage of females were classified in the *internalizing* only class than male students. In both phases, the ethnic distribution of students in each of the classes was similar as the overall population pattern. That is, a small number of students from each ethnic group were categorized in the very low Covi class, the majority (around 50%) were classified in the average Covi classes, and the rest fell about equally (between 20 and 27%) in the below

average and above average classes. Thus, each of the ethnic groups included in this study had similar likelihoods of being categorized in each of the four classes obtained in phase I and phase II.

Hypothesis 3 postulated that approximately six profiles of mental health would emerge when positive and negative mental health profiles were crosstabulated. While each of the hypothesized profiles did emerge, results suggested 16 observable mental health patterns, including the four profiles previously identified by researchers using the dual-factor method of mental health screening (Greenspoon, & Saklofske, 2001; Suldo & Shaffer, 2008). Within each of the four profiles of covitality, there were varying subprofiles of endorsement of psychosocial distress.

Other interesting findings from this study come from the post-hoc investigations of student reported quality of school life, namely school connectedness and meaningful participation. Hypothesis 4a was also supported, although the magnitudes of the effects were small. Students in the above average and average covitality classes reported engaging in less risk taking behaviors (i.e., substance use and driving with a drunk driver) than students in the *very low* and *below average covitality* groups. Support was also found for Hypotheses 4b and 4c, with a linear relation between each of the covitality groups and level of reported school connectedness, meaningful participation at school, and grades. That is, students in the *very low covitality* class reported feeling substantially less connected to school, reported participating in few meaningful activities in school, and reported lower grades (i.e., mostly C's and below) than students in the *average* and *above average covitality* classes. This finding is important in that it provides further research support for two major protective factors related to positive adolescent mental health (e.g., school

connectedness and meaningful participation), and underscores the importance of examining quality of student life indicators when trying to understand and capture complete mental health patterns (Bond et al., 2007).

Nylund et al. (2007b) noted the importance of being able to reliably identify classes of at-risk students and how they differ on various fit indices in order to inform interventions to meet the needs of students uniquely. Results from the present study provide support for the importance of evaluating and screening for complete student mental health among students, and the need for more flexible intervention efforts given the varying ways that students have been found to experience mental health. As illustrated in the previous sections, students in each of the covitality groups were found to show different profiles of mental health functioning when both positive and negative indicators of well-being are cross examined. A critical and interesting finding from phase III of this study is that the *very low covitality* class did not have the highest proportion of students who were classified in the *INT and EXT combined*, *internalizing*, or *externalizing* classes. This translates to a group of students who are reporting that they do not have substantial psychological distress, but at the same time are not experiencing life in a very positive way (i.e., languishing). This highlights the importance of how distress only screeners are inadequate at identifying complete psychological health, and the value of including positive based measures of psychological functioning to comprehensively evaluate and monitor mental health among students (Nylund-Gibson et al., 2014).

Overall, the *below average covitality* class had the largest number of students with the most psychosocial difficulties. This finding in particular has important implications for interventions and assessment practices because this is a group that often fails to be detected

because their symptoms are not severe enough to warrant immediate follow up. If only all positive or traditional symptom checklists were used to assess mental health concerns among adolescents then it is highly likely that this group of students with less than optimal positive mental health would go undetected or would be overlooked. Alternatively, even students in the highest positive mental health functioning groups reported experimenting with smoking cigarettes, marijuana, drinking alcohol, and other unhealthy behaviors. This highlights the need for intervention responses to be tailored to address the specific issues that students are struggling with in each group, especially those with below average levels of positive well-being. In regards to intervention implications, students in the very low and *below average covitality* groups may require immediate follow up or continuous monitoring from school mental health professionals. Given the distinct patterns of internalization and externalization item endorsement that emerged in the LCA, practitioners should seek to tailor intervention efforts to match specific student profiles. Further, when positive and negative factors are simultaneously examined, a wide array of patterns of adolescent mental health functioning may emerge, which can provide valuable information for school mental health professionals who seek to provide targeted mental health support.

Lastly, results from this study provide guidelines for practitioners to consider when screening for adolescent mental health needs. For example, results from this study provide practitioners with guidelines to use for decision cut-points based on the total scores, mean scores, and standard deviations associated with each of the four covitality profiles. In addition, practitioners may use these scores to inform their traditional methods for classifying student mental health in dual-factor or complete mental health approaches. Also, this study details measures for practitioners to consider when implementing complete mental health

assessments, including indicators related to school connectedness and meaningful participation that provide useful information about the quality of a student's school experiences.

Limitations and Future Directions

While this study has a number of strengths in terms of its sample size, diverse population representation, and robust statistical methods, there are some limitations that should be reviewed. First, given that the measures in this study rely upon student self-reports of their internal and external experiences, results may be influenced by a social desirability bias, which could influence the validity of findings (Huang, Liao, & Chang, 1998). Next LPA and LCA provide exploratory results regarding the number of underlying latent classes; thus no definitive conclusions regarding the true number of underlying classes should be drawn. Future studies should implement cross validation procedures to confirm the latent profile structure underlying the covitality construct, while taking substantive theory into consideration (Maysn, 2013).

Although the novel dual-component measurement model used in this study is unique in that it allowed for a more thorough examination of mental health subtypes than the four predetermined categories used in other dual-factor approaches (Greenspoon, & Saklofske, 2001; Nylund-Gibson et al., 2014; Suldo & Shaffer, 2008), the psychosocial distress items in this study were limited in their ability to capture the magnitude of student functioning. While the SEHS-S provided a continuous and comprehensive estimate of adolescent well-being, the categorical and dichotomous indicators from the CHKS may not have sufficiently captured student psychosocial difficulties. That is, the psychosocial distress indicators from the CHKS asked students to think about whether or not these INT and EXT experiences have

occurred over the past year, which does not provide very precise information regarding students' degree of distress. Continuous measures of adolescent social and behavioral functioning, such as the BESS, would allow for a more complete assessment of adolescent difficulties and has been shown to be a promising tool in dual-factor mental health screening efforts (Dowdy et al., 2014). Further, the use of more comprehensive measures (e.g., the SEHS-S and BESS) for assessing positive and negative aspects of adolescent mental health can push researchers and practitioners beyond dual-factors and toward the measurement of two complimentary yet distinct continua (Keyes, 2005, 2009), which can provide more complete assessments of adolescent well-being.

Another important limitation that should be noted is that the error terms associated with nonperfect class assignment from phase I and phase II were not accounted for during the crosstabulation. Thus, the resulting 16 distinct mental health profiles from phase III should be interpreted in light of this limitation. Future studies could improve upon the findings in this study by utilizing a longitudinal research design to monitor student-reported covitality levels and track complete mental health profiles to examine stability of mental health functioning across the adolescent years using latent transition analyses (LTA).

Further, given the consistently low covitality response patterns provided by a very small class of students (2% among females 4% among males), a three class model of covitality may provide more meaningful profiles given that this group of students may have reported "not at all true" across all SEHS-S items. It is recommended that future studies consider using a revised response scale on the SEHS-S, (e.g., from a 4-point scale to a 5-point scale) to better distinguish students. In addition, given that substantial gender differences were found in mean scores of covitality and other indicators of quality of school

life and risk engagement, researchers and practitioners should consider using separate norms for adolescent males and females when conducting mental health screenings.

Particular attention should also be given to the nature of ethnicity reporting in survey research. A commonly used method for gathering ethnicity data, such as the one utilized in this study, is the checklist method. In this approach, students are asked to check a box that they think best represents their ethnic background. In this study, students were first presented with the question, "Are you of Hispanic or Latino Origin?" Next, they were asked, "What is your race?" to which they were presented the following 6 answer options: American Indian/Alaskan Native, Asian, Black or African American, Native Hawaiian or Pacific Islander, White, and Mixed (two or more races). Although this method is time efficient, a major limitation is that it cannot accurately capture the multidimensional construct (Smith, Woo, & Austin, 2010). Thus, this method does not allow for students to self-identify their ethnicity, and students whose ethnic background is not represented in the checklist could lead to students feeling a sense of incongruence and alienation, especially among multiracial students (Nishina, Bellmore, Witkow, & Nylund-Gibson, 2010; Smith, Woo, & Austin, 2010). Smith, Woo, and Austin (2010) investigated thought processes of ethnic minority adolescents when responding to survey questions about race and ethnicity group membership in the United States. These researchers found that traditional methods for gathering racial and ethnic data from survey items were likely to yield an incomplete a representation of ethnic minority adolescents. In addition, questions were vulnerable to a number of performance problems, such as confusion during item responding, misreporting demographic information, and deficient response options. When racial/ethnic classification options are incongruent with the way in which a person self- can have undesirable effects on the

reliability and validity of survey results (Smith, Woo, & Austin, 2010). The process of ethnic identification is particularly salient during the adolescent developmental period, and is particularly important because positive ethnic identity development has been found to be an essential component in developing successful and healthy psychological adjustment (Lyles, 1985; Wakefield & Hudley 2007; cited in Smith, Woo, & Austin, 2010). To improve accurate ethnic/racial representation in survey research, future studies should consider alternative methods for gathering ethnicity information, such as: asking open-ended questions, adding more racial/ethnic categories, providing further clarification in instructions explaining the importance of providing both racial and ethnic responses, offering write-in options, and using the preferred terminology for each ethnic/racial group (Nishina et al., 2010; Smith, Woo, & Austin, 2010).

The potential applications of the SEHS-S as a critical component in complete mental health screenings are vast. Among school professionals, school psychologists and other school specialists can use this information to inform schoolwide prevention practices, including the implementation of mental health interventions (schoolwide or targeted) to improve adolescent development and well-being based on the specific patterns of well-being that emerge. Clinicians in applied psychological settings can also integrate the SEHS-S into individual comprehensive assessment procedures to gain a deeper understanding about adolescent well-being. At the systems level, such a strengths-based model has the potential to impact social policy not only in the state of California, but across other countries as well.

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Tables and Figures

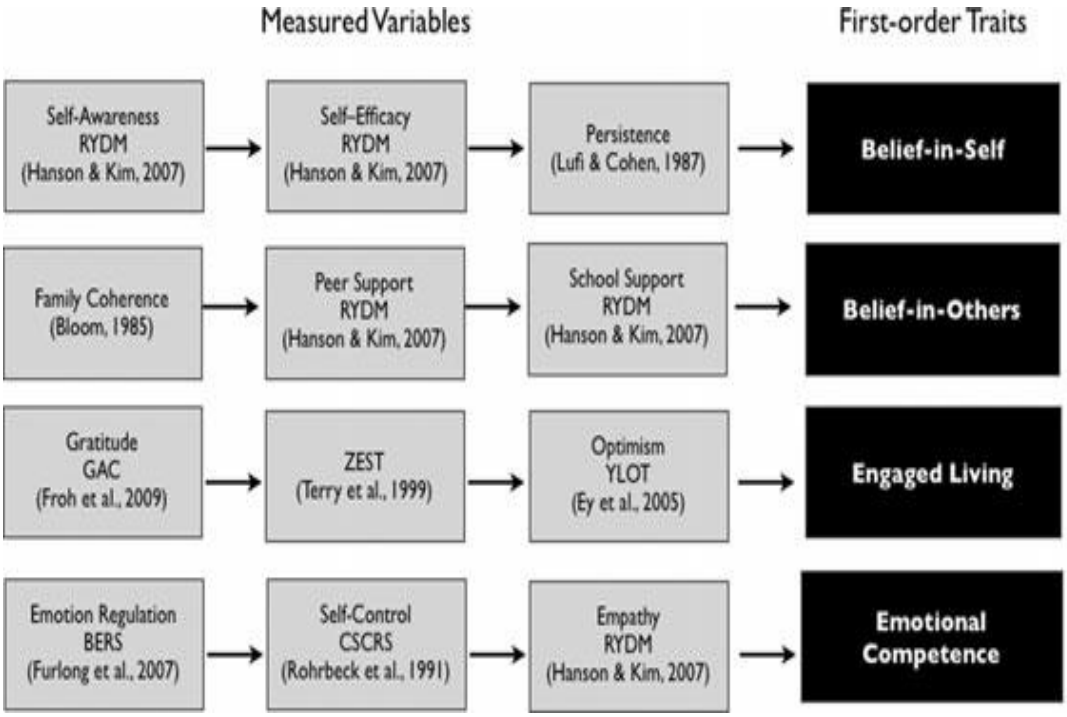

Figure 1. Covitality model underlying the Social and Emotional Health Survey. Adapted from Furlong et al. (2014).

Table 1

Definitions and Correlations of Covitality Indicators with Subjective Well-Being and Student/School Achievement

Covitality Indicator	Definition	Range of *r* with SWB[1] [95% CI]	References	Range of *r* with Achievement[2] [95% CI]	References
BELIEF-IN-SELF					
Self-Awareness	The process of attending to aspects of the self, such as private (covert) and public (overt; Abrams & Brown, 1989)	*r* = .24 to .35 [.17, .43]	Ciarrochi, Kashdan, Leeson, Heaven, & Jordan, 2011; Drake, Duncan, Sutherland, Abernethy, & Henry, 2008	*r* = ~.28 [.23, .33]	Greco et al., 2011
Persistence	Perseverance and passion for long-term goals, including working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and obstacles (Duckworth et al., , 2007)	*r* = .09 to .34 [-.03, .42]	Garcia, 2011; Garcia, Kerekes, & Archer, 2012	*r* = .24 to .32 [.15, .42]	Duckworth, & Quinn, 2009; Martin, & Marsh, 2006
Self-Efficacy	A mechanism of personal agency	*r* = .09 to .48 [-.03, .51]	Danielsen et al., 2009; Diseth et al.,	*r* = .17 to .44 [.06, .51]	Capara et al., 2011; Zhu et al.,

	entailing people's beliefs in their capabilities to exercise control over their level of functioning and environmental demands (Bandura et al., 1996)		2012 ; Fogle et al., 2002; Lightsey et al., 2011; Vecchio et al., 2007; Vieno et al., 2007		2011; Zuffiano et al., 2013
BELIEF-IN-OTHERS					
Peer Support	Processes of social exchange between peers, teachers, or family members that contribute to the development of behavioral patterns, social cognitions, and values (Farmer & Farmer, 1996)	*r* = .23 to .61 [.07, .63]	Danielsen et al., 2009; Flaspohler et al., 2009; Oberle et al., 2011; Schwarz et al., 2012; Vera et al., 2008	*r* = .10 to .22 [.01, .33]	Chen, 2005; Danielsen et al., 2009; Ozer, & Schotland, 2011; Rosalind, 2010
Teacher Support		*r* = .32 to .54 [.29, .61]	Danielsen et al., 2009; Ferguson et al., 2010; Flaspohler et al., 2009; Stewart, & Suldo, 2011	*r* = .15 to .33 [.05, .43]	Chen, 2005; Danielsen et al., 2009; Rosalind, 2010; Stewart, Suldo, 2011
EMOTIONAL COMPETENCE					
Empathy	The affective and cognitive skills for noticing and taking into account the emotional states of others (Garaigordobil, 2004)	*r* = ~.27 [.08, .44]	Oberle et al., 2010	*Limited available research*	
Emotional Regulation	The ability to express one's positive emotions	*r* = -.19 to -.28 [-.10, .-.38]	Haga et al., 2009; Saxena et al. 2011	*r* = .25 to .28 [.19, .45]	Gail & Arsenio, 2002; Vidal et

	(e.g., liking of others, joy) and monitor one's negative emotions (e.g., refrain from overreacting to situations eliciting anger, frustration, embarrassment, etc.; Fry et al., 2012)				al., 2012; Vukman, & Licardo, 2010
Self-Control	A competence which begins to develop in infancy and empowers people to gain access to the self and alternative behavioral options even in stressful situations by using effective affect-regulation (Hofer et al., 2011)	*r* =. 36 to .48 [.27, .55]	Fry et al., 2012; Hofer et al., 2011	*r* = .25 to.42 [.11, .48]	Bertrams, 2012; Kuhnle et al., , 2012; Vidal et al., 2012
ENGAGED LIVING					
Gratitude	A sense of thankfulness that arises in response to receiving any kind of personal benefit as a result of any transactional means (Emmons, 2007)	*r* = .11 to .60 [.06, .66]	Froh et al., 2011;Froh et al., 2009; Proctor et al., 2010	*r* = ~.28 [.23, .33]	Froh et al., 2011
Zest	Approaching life with excitement and energy (Park, & Peterson,	*r* = .31 to .50 [.24, .59]	Park, & Peterson, 2006a; Park, & Peterson, 2006b	*Limited available research*	

	2006b)				
Optimism	The degree to which a person subscribes to positive expectancies towards his or her future, including perceiving life goals as attainable (Utsey et al., 2008).	*r* = .24 to .65 [.11, .68]	Chang et al., 2007; Gadermann et al., 2011; Froh et al., 2009; Ho et al., 2010; Lai, 2009; Oberle et al., 2011; Piko et al., 2009;Veronese et al., 2012; Wong & Lim, 2009	*r* =.13 to .27 [.07, .39]	Creed et al., 2002; Lounsbury et al., 2002; Vidal Roderio et al., 2012

Note. [1] = Subjective well-being; [2] = School/student achievement.

Table 2

Summary of Questions, Hypotheses, Variables and Analyses

Questions	Hypotheses	IVs/DVs	CV	Analyses
Q1: Using the four first-order factors of the SEHS-S (IVs), what are the underlying typologies of covitality for males and females uniquely? How do the profiles vary after controlling for ethnicity and school of attendance, (CVs)?	*Hypothesis 1a*: For female students, the number of classes of covitality that will converge will be similar to the number of first-order latent factors from Renshaw et al., (2014): belief in self, self in others, emotional competence, and engaged living *Hypothesis 1b*: For male students, the number of classes of covitality that will converge will be similar to the number of first-order latent factors from Renshaw et al., (2014): belief in self, self in others, emotional competence, and engaged living	Four covitality subscales: belief-in-self, belief-in-others, social emotional competence, and engaged living	-Ethnicity -School	*LPA Phase 1*: Two exploratory LPAs with 1 to 6 classes will be specified uniquely for males and females using continuous scores from the four covitality subscales. Ethnicity and school of attendance will be included as CVs.
Q2: What is the underlying number of latent classes among indicators of psychosocial distress s (e.g., internalizing and externalizing symptoms-IV's)? How do the classes vary after controlling for ethnicity	*Hypothesis 2a:* For female students, indicators of internalizing and externalizing distress will form at least two distinct classes, and one or more classes will yield students who display an equal amount of internalizing and externalizing symptoms (with a higher percentage of females	CHKS items associated with conduct disorder (e.g., bullying, victimizing others, and damaging school property) CHKS items	-Ethnicity -School	*LPA Phase 2*: Two exploratory LCAs with 1 to 6 classes will be specified uniquely for males and females using categorical scores from internalizing and externalizing items

	and school of attendance, (CVs)?	endorsing internalizing symptoms). *Hypothesis 2b:* For males, indicators of internalizing and externalizing distress will form at least two distinct classes, and one or more classes will yield students who display an equal amount of internalizing and externalizing symptoms (with a higher percentage of males endorsing externalizing symptoms).	indicating internalizing difficulties (e.g., depression, and suicidality		from the CHKS. Ethnicity and school of attendance will be included as CVs.
	Q3: Utilizing a novel dual-component measurement model, what profiles of mental health will emerge when a student's covitality typology (indicator of positive well-being- IV) is compared with their psychosocial distress class (internalizing and externalizing mental health issues- IV)?	*Hypothesis 3*: Approximately six profiles of adolescent mental health will emerge for males and females uniquely: a. High Covi & no distress group (Thriving mental health) b. High Covi and INT group c. High Covi and EXT group d. Neutral group (average Covi and distress symptoms) e. At Risk Externalizing (low Covi and EXT) f. At Risk Internalizing (low Covi and INT)	Four covitality subscales (belief-in-self, belief-in-others, emotional competence, engaged living) CHKS items associated with conduct disorder (e.g., bullying, victimizing others, and damaging school property) CHKS items indicating internalizing difficulties (e.g., depression, and suicidality	-Ethnicity -School	*LPA Phase 3*: The latent profile variable identified by the LPA in phase I will be crosstabulated (Chi-Square tests) with the latent class variable identified by the LCA variable from phase II. This process will be completed twice for by gender.

Q4: (a) Which covitality profile(s) report the highest levels of engagement in risk taking behaviors (e.g., substance use, driving drunk or with other drunk driver)? (b) Which covitality profile(s) report the highest levels of quality of school life (e.g., school connectedness and meaningful participation)? (c) How do these profiles vary across self-reported grades?	*Hypothesis 4a:* Students in the positive/high mental health groups will report engaging in substantially less risk taking behaviors than students in the at risk/low covitality groups. *Hypothesis 4b:* Students in the high covitality groups will report higher levels of school connectedness and meaningful participation at school than students classified in the low covitality groups. *Hypothesis 4c:* Students in the high covitality classes will report having higher grades at school than students in the low covitality classes.	LPA/Covitality Profiles (IVs) Substance use, Risk behavior, Quality of School Life, Student Reported Grades (DV's)	Series of Analysis of Variance (ANOVA)

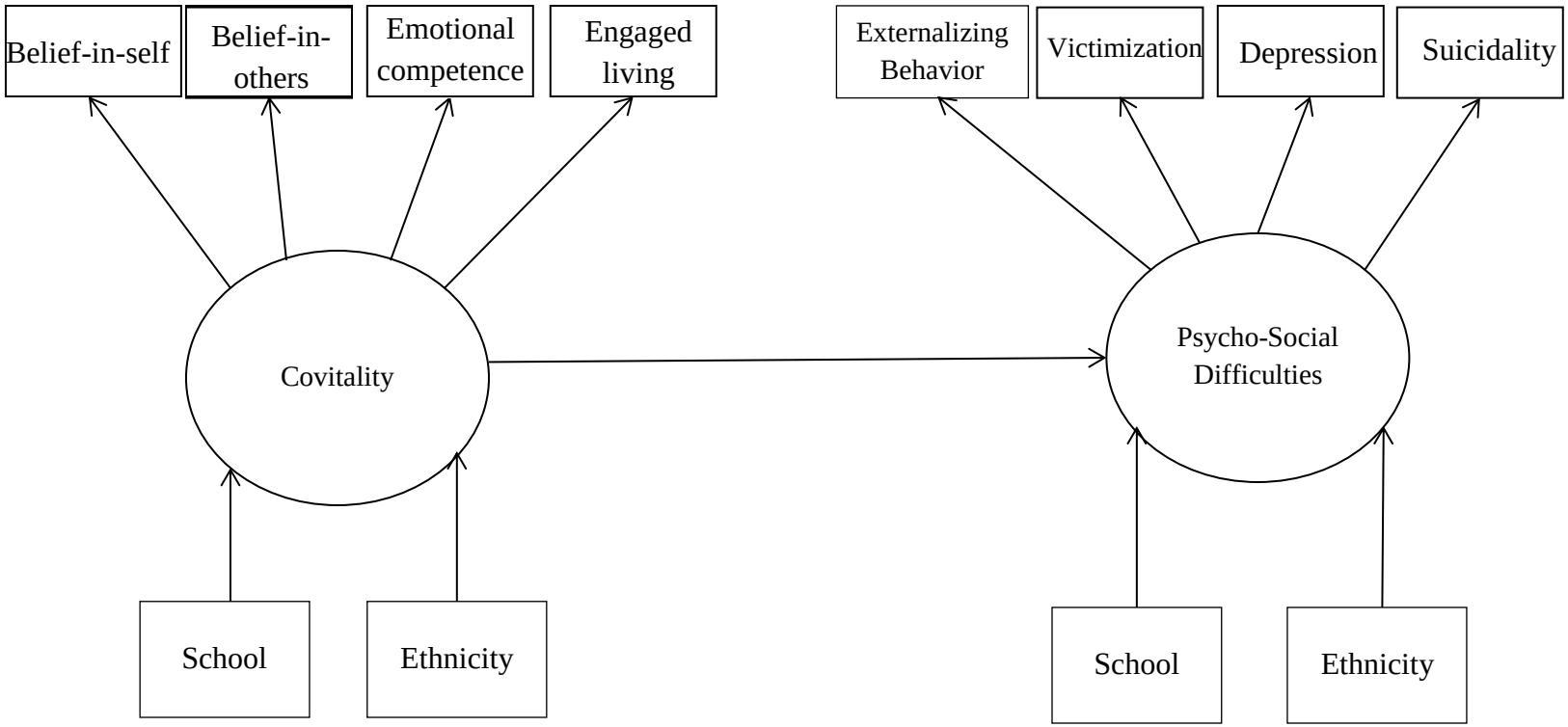

Figure 2. Three-phase LPA analysis plan using dual-component measurement model.

Table 3

Participant Demographic Information

Demographic Variable	*n*	%
Gender		
Male	6,195	48.2%
Female	6,651	51.8%
Grade (*M* = 10.42)		
9th	3,582	27.9%
10th	3,191	24.8%
11th	3,146	24.5%
12th	2,927	22.8%
Age (*M* = 15.95)		
14	1,745	13.6%
15	3,212	25.0%
16	3,259	25.4%
17	3,151	24.5%
18+	1,479	11.5%
Ethnicity		
Hispanic	7,393	57.6%
Asian	902	7.0%
Black	1,137	8.9%
Pacific Islander	265	2.1%
White	2,792	21.7%
American Indian or Alaskan Native	287	2.2%
Mixed	4,114	32.0%
Not reported	3,349	26.1%

Note. Total *N* = 12,846, includes cases with incomplete SEHS-S-S items and failed reliability.

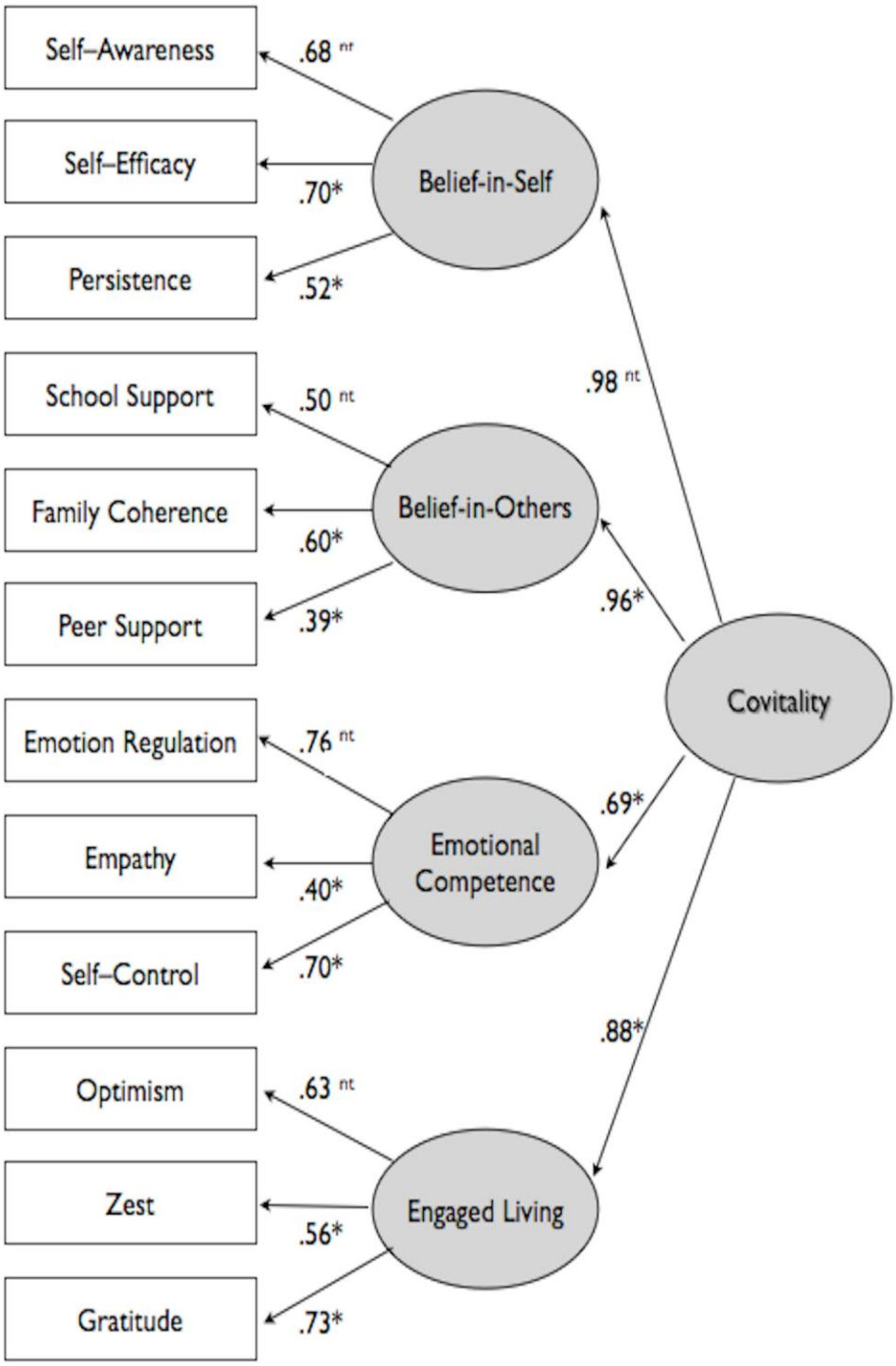

Figure 3. Covitality measurement model and factor loadings. Adapted from You et al., 2013.

Table 4

Items, Response Format, and Scales on the Social and Emotional Health Survey

Items, response format, prompts and scales
BELIEF-IN-SELF
Self-efficacy
Prompt: Select the answer that best describes how true you feel that this statement is about you personally…
Response 1 = not at all true 2 = a little true 3 = pretty much true 4 = very much true
1. I can work out my problems
2. I can do most things if I try
3. There are many things that I do well
Self-awareness
Prompt: Select the answer that best describes how true you feel that this statement is about you personally…
Response 1 = not at all true 2 = a little true 3 = pretty much true 4 = very much true
4. There is a purpose to my life
5. I understand my moods and feelings
6. I understand why I do what I do
Persistence
Prompt: Select the answer that best describes how much you feel that this statement is like you personally
Response 1 = not at all true 2 = a little true 3 = pretty much true 4 = very much true
7. When I do not understand something, I ask the teacher again and again until I understand
8. I try to answer all the questions asked in class
9. When I try to solve a math problem, I will not stop until I find a final solution
BELIEF-IN-OTHERS
School support
Prompt: At my school, there is a teacher or some other adult…
Response 1 = not at all true, 2 = a little true, 3 = pretty much true, 4 = very much true
10. …who always wants me to do my best
11. …who listens to me when I have something to say
12. …who believes that I will be a success
Family coherence
Prompt: How much do you agree or disagree with this statement…
Response 1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree
13. My family members really help and support one another
14. There is a feeling of togetherness in my family

15. My family really gets along well with each other

Peer support

Prompt: Select the answer that best describes how true you feel that this statement is about you

personally…

Response I = not at all true, 2 = a little true, 3 = pretty much true, 4 = very much true

16. I have a friend my age who really cares about me
17. I have a friend my age who talks with me about my problems
18. I have a friend my age who helps me when I'm having a hard time

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EMOTIONAL COMPETENCE

Emotional regulation

Prompt: Select the answer that best describes how true you feel that this statement is about you

personally…

Response 1 = not at all like me, 2 = not very much like me, 3 = like me, 4 = very much like me

19. I accept responsibility for my actions
20. When I make a mistake I admit it
21. I can deal with being told no

Empathy

Prompt: Select the answer that best describes how true you feel that this statement is about you

personally…

Response 1 = not at all like me, 2 = not very much like me, 3 = like me, 4 = very much like me

22. I feel bad when someone gets her or his feelings hurt
23. I try to understand what other people go through
24. I try to understand how other people feel and think

Behavioral self-control

Prompt: Select the answer that best describes how true you feel that this statement is about you

personally…

Response 1 = really untrue 2 = sort of untrue, 3 = true, 4 = really true

25. I can wait for what I want
26. I don't bother others when they are busy
27. I think before I act

ENGAGED LIVING

Gratitude

Prompt: Select the answer that best describes how much you have experienced this feeling ''since yesterday''

Response 1 = not at all, 2 = a little, 3 = moderately, 4 = quite a bit, 5 = extremely

28. Grateful
29. Thankful
30. Appreciative

Zest

Prompt: These words describe feelings people have. Please read each one carefully. How much do you
have this feeling right now?

Response 1 = not at all, 2 = a little, 3 = moderately, 4 = quite a bit, 5 = extremely

31. Energetic
32. Active
33. Lively

Optimism

Prompt Select the answer that best describes how true you feel that this statement is about you personally.

Response 1 = not true of me, 2 = sort of not true of me, 3 = sort of true of me, 4 = true of me

34. Each day I look forward to having a lot of fun
35. I usually expect to have a good day
36. Overall, I expect more good things to happen to me than bad things

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Note. Table adapted from Furlong et al. (2014).

Table 5

Summary of Subscale and Indicator Abbreviations, Survey Item Number(s) and Response Options

Indicator abbreviation	Survey number and question	Corresponding subscales	Response options
SEHS-S = Social Emotional Health Survey-Secondary			
BIS = Belief-in-Self	Items 1 through 9	Self- Efficacy, Self-Awareness and Persistence	*See Table 4*
BIO = Belief-in-Others	Items 10 through 18	School Support, Family Coherence, and Peer Support	
EC = Emotional Competence	Items 19 through 27	Emotional Regulation, Empathy, Behavioral Self-Control	
EL = Engaged Living	Items 28 through 36	Gratitude, Zest, Optimism	
EXT = Externalization	*In the past 12 months have you*: A102— Been in a physical fight at school? A108— Damaged school property on purpose?	School Harassment, Victimization, and Safety	
HAR = Harassment and Bullying	*In the past 12 months have you*: A100— Been pushed, shoved, slapped, hit or kicked by someone who wasn't just kidding around?; A103— Had mean rumors or lies spread about you? A103— Been made fun of because of your looks or the way you talk?	School Harassment, Victimization, and Safety	Recoded: 1 = 0-1 times 2 = 2-3 times 3 = 4 or more times
DEP = Depression	*In the past 12 months did you*: A123— Feel so sad/hopeless almost every day for 2 weeks+ that stopped doing some usual activities?	Mental Health	1 = No 2 = Yes

SUCD = Suicidality	*In the past 12 months did you*: A124— Ever seriously consider suicide?	Mental Health	1 = No 2 = Yes
QSL-SC = Quality of School Life-School Connectedness	A11—I feel close to the people at this school? A12— I am happy to be at this school? A13— I feel like I am part of this school? A14— The teachers here treat students fairly? A15— I feel safe in my school?	School Connectedness Composite	1 = Strongly disagree 2 = Disagree 3 = Neither disagree or agree 4 = Agree 5 = Strongly agree
QSL-MP = Quality of School Life-Meaningful Participation	A22— I do interesting activities at school. A23— At school I help decide things like class activities or rules. A24— I do things at school that make a difference.	Meaningful Participation Composite	1 = Not at all true 2 = A little true 3 = Pretty much true 4 = Very much true
A35 = Tobacco	A35— In your lifetime have you ever smoked a whole cigarette?"	Tobacco Use (Risk Behavior)	
A37 = Alcohol	A37— In your lifetime have you ever had at least one drink of alcohol?	Alcohol and Other Drug Use (AOD-Risk Behavior)	1 = 0 times 2 = 1 time 3 = 2 times 4 = 3 times 5 = 4 to 6 times 6 = 7 or more times
A38 = Marijuana	A38— In your lifetime have you ever used marijuana?	AOD- Risk Behavior	
A47 = Prescription Pain Killers	A47— In your lifetime have you ever used prescription pain killers?	AOD- Risk Behavior	
A89 = Drinking and Driving	A89— In your lifetime have you ever driven when you had been drinking alcohol or ridden in a car driven by a friend who had been drinking?	Drinking and Driving (Risk Behavior)	1 = Never 2 = 1 time 3 = 2 times 4 = 3 to 6 times 5 = 7 or more

Table 6

Correlation Matrix, Means, and Standard Deviations for LPA and LCA Indicators for Total Sample (N = 12,279)

	Total Covi	BIS	BIO	EC	EL	EXT	HAR	DEP	SUCD
Belief in Self (BIS)	.85**								
Belief in Others (BIO)	.80**	.58**							
Emotional Competence (EC)	.80**	.66**	.52**						
Engaged Living (EL)	.82**	.57**	.52**	.45**					
Externalizing Behavior (EXT)	-.07**	-.08**	-.06**	-.01	-.08**				
Harassed/Bullied (HAR)	-.08**	-.09**	-.07**	-.00	-.09**	.89**			
Depression (DEP)	-.18**	-.20**	-.13**	-.00	-.21**	.25**	.27**		
Suicide (SUCD)	-.18**	-.21**	-.15**	-.01	-.21**	.22**	.25**	.42**	
M	106.17	25.78	26.94	26.84	26.35	1.33	1.35	1.31	1.16
SD	21.61	6.10	6.05	6.17	7.92	0.50	0.58	0.46	0.36

**$p < .01$.

Table 7

Correlation Matrix, Means, and Standard Deviations for LPA, Risk Behaviors, and Quality of School Life Indicators (N = 12,279)

	Total Covi	BIS	BIO	EC	EL	QOSL-SC	QOSL-MP	A35	A37	A38	A47	A89
Belief in Self (BIS)	.85**											
Belief in Others (BIO)	.80**	.58**										
Emotional Competence (EC)	.80**	.66**	.52**									
Engaged Living (EL)	.82**	.57**	.52**	.45**								
QOSL-SC	.41**	.32**	.43**	.26**	.32**							
QOSL-MP	.40**	.35**	.38**	.26**	.31**	.41**						
Tobacco (A35)	-.09**	-.06**	-.10**	-.04**	-.08**	-.11**	-.07**					
Alcohol (A37)	-.07**	-.05**	-.07**	-.04**	-.07**	-.10**	-.07**	.44**				
Marijuana (A38)	-.10**	-.06**	-.12**	-.08**	-.07**	-.13**	-.10**	.48**	.63**			
Pain Killers (A47)	-.07**	-.06**	-.06**	-.04**	-.07**	-.09**	-.06**	.35**	.23**	.32**		
Drinking/Driving (A89)	-.09**	-.07**	-.09**	-.07**	-.07**	-.10**	-.06**	.26**	.36**	.30**	.21**	
M	106.17	25.78	26.94	26.84	26.35	16.93	6.52	1.56	2.81	2.44	1.36	1.45
SD	21.61	6.10	6.05	6.17	7.92	4.04	2.53	1.38	2.12	2.08	1.13	1.03

Note. QOSL-SC = quality of school life-school connectedness; QOSL-MP = quality of school life-meaningful participation; A35 = tobacco use; A37 = alcohol use; A38 = marijuanna use; A47 = prescription pain killer Use; and A89 = driving and driving.

**$p < .01$.

Table 8

Correlation Matrix, Means, and Standard Deviations for LCA, Risk Behaviors, and Quality of School Life Indicators (N = 12,279)

	EXT	HAR	DEP	SUCD	QOSL-SC	QOSL-MP	A35	A37	A38	A47	A89
EXT											
HAR	.89**.										
DEP	.25**	.27**									
SUCD	.22**	.25**	.42**								
QOSL-SC	-.13**	-.14**	-.15**	-.14**							
QOSL-MP	-.01	-.01	-.08**	-.07**	.41**						
Tobacco (A35)	.09**	.07**	.09**	.12**	-.11**	-.07**					
Alcohol (A37)	.11**	.10**	.13**	.12**	-.10**	-.07**	.44**				
Marijuana (A38)	.10**	.07**	.10**	.11**	-.13**	-.10**	.48**	.63**			
Pain Killers (A47)	.11**	.09**	.08**	.10**	-.09**	-.06**	.35**	.23**	.32**		
Drinking/Driving (A89)	.08**	.07**	.08**	.07**	-.10**	-.06**	.26**	.36**	.30**	.21**	
M	1.33	1.35	1.31	1.16	16.93	6.52	1.56	2.81	2.44	1.36	1.45
SD	0.50	0.58	0.46	0.36	4.04	2.53	1.38	2.12	2.08	1.13	1.03

Note. See Table 5 for summary of subscale and indicator abbreviations. $^{**}p < .01$.

Table 9

Fit information and Entropy Values for LPA Phase 1 for Females with 2–6 Classes for Unconditional Models Considered (*n* = 6,651)

# of classes	Log Likelihood	BIC	ABIC	LMRT *p*-value	BLRT *p*-value	BF	cmP	# of free parameters	Entropy
1	-83555.139	167180.421	167154.999	—	—	0	0	8	—
2	-80691.185	161496.354	161455.043	0.00	0.00	< .01	< .01	13	.75
3	-79792.198	159742.219	159685.020	0.00	0.00	< .01	< .01	18	.74
4	**-79337.734**	**158877.131**	**158804.043**	**0.00**	**0.00**	**< .01**	**< .01**	**23**	**.78**
5	-79174.818	158595.138	158506.161	0.00	0.00	< .01	< .01	28	.79
6	-79056.900	158403.142	158298.276	0.00	0.00	0	1	33	.76

Note. Bold values indicate preferred model based on fit indices.

Table 10

Fit information and Entropy Values for LPA Phase 1 for Males with 2–6 Classes for Unconditional Models Considered (*n* = 6,195)

# of classes	Log Likelihood	BIC	ABIC	LMRT *p*-value	BLRT *p*-value	BF	cmP	# of free parameters	Entropy
1	-77981.149	156031.697	156006.275	—	—	0	0	8	—
2	-74552.297	149217.366	149176.056	0.00	0.00	0	0	13	.84
3	-73170.943	146498.035	146440.836	0.01	0.00	0	0	18	.79
4	**-72325.861**	**144851.245**	**144778.158**	**0.00**	**0.00**	**<0 .01**	**< 0.01**	**23**	**.83**
5	-72165.335	144573.566	144484.590	0.00	0.00	<0 .01	< 0.01	28	.82
6	-71990.100	144266.471	144161.607	0.00	0.00	0	1	33	.81

Note. Bold values indicate preferred model based on fit indices.

Table 11

Covariate Table for 4-Class LPA Model for Females

Covitality profiles	Effect	Logit	SE	Logit/SE	*p* -value*	OR
Class 1: Very Low	Low FRPM	-0.26	0.23	-0.97	0.33	0.77
	Mixed	—	—	—	—	—
	Am Indian/ Alaskan	-3.13	0.65	-4.79	0.00	0.04
	Asian	-3.63	0.53	-6.86	0.00	0.03
	Black	-2.18	0.29	-7.60	0.00	0.11
	Hawaiian/PI	-2.69	0.65	-4.12	0.00	0.07
	White	-3.56	0.33	-10.79	0.00	0.03
Class 2: Below Average						
	Low FRPM	-0.24	0.10	-2.37	0.02	0.79
	Mixed	—	—	—	—	—
	Am Indian/ Alaskan	-0.80	0.28	-2.92	0.00	0.44
	Asian	-0.94	0.19	-4.97	0.00	0.39
	Black	-0.66	0.16	-4.14	0.00	0.52
	Hawaiian/PI	-0.85	0.35	-2.43	0.02	0.43
	White	-0.70	0.12	-5.80	0.00	0.50
Class 4: Above Average						
	Low FRPM	0.06	0.09	0.61	0.54	1.06
	Mixed	—	—	—	—	—
	Am Indian/ Alaskan	-1.10	0.30	-3.63	0.00	0.33
	Asian	-0.52	0.16	-3.24	0.00	0.59
	Black	-0.41	0.15	-2.82	0.01	0.66
	Hawaiian/PI	-0.32	0.28	-1.16	0.25	0.73
	White	-0.37	0.11	-3.35	0.00	0.69

Note. Hispanic students with Average covitality (Class 3) were designated as referent group.
*Significant at the $p < .05$ level

Table 12

Covariate Table for 4-Class LPA Model for Males

Covitality Profiles	Effect	Logit	SE	Logit/SE	*p* -value	OR
Class 1: Very Low						
	Low FRPM	-0.44	0.18	-2.47	0.01	0.64
	Mixed	—	—	—	—	—
	Am Indian/ Alaskan	-1.68	0.38	-4.47	0.00	0.19
	Asian	-2.58	0.33	-7.74	0.00	0.08
	Black	-1.62	0.22	-7.34	0.00	0.20
	Hawaiian/PI	-2.19	0.50	-4.39	0.00	0.11
	White	-2.45	0.23	-10.64	0.00	0.09
Class 2: Below Average						
	Low FRPM	-0.15	0.11	-1.46	0.15	0.86
	Mixed	—	—	—	—	—
	Am Indian/ Alaskan	-0.44	0.26	-1.70	0.09	0.64
	Asian	-1.04	0.18	-5.75	0.00	0.35
	Black	-0.88	0.17	-5.23	0.00	0.41
	Hawaiian/PI	-0.88	0.31	-2.86	0.00	0.41
	White	-1.00	0.13	-7.88	0.00	0.37
Class 4: Above Average						
	Low FRPM	0.45	0.10	4.69	0.00	1.57
	Mixed	—	—	—	—	—
	Am Indian/ Alaskan	-1.08	0.30	-3.66	0.00	0.34
	Asian	-1.29	0.17	-7.61	0.00	0.28
	Black	-0.78	0.15	-5.27	0.00	0.46
	Hawaiian/PI	-0.89	0.27	-3.27	0.00	0.41
	White	-0.75	0.11	-6.99	0.00	0.47

Note. Hispanic students with average covitality (Class 3) were designated as referent group.
FRPM= Students who qualify for Free and Reduced Priced Meals

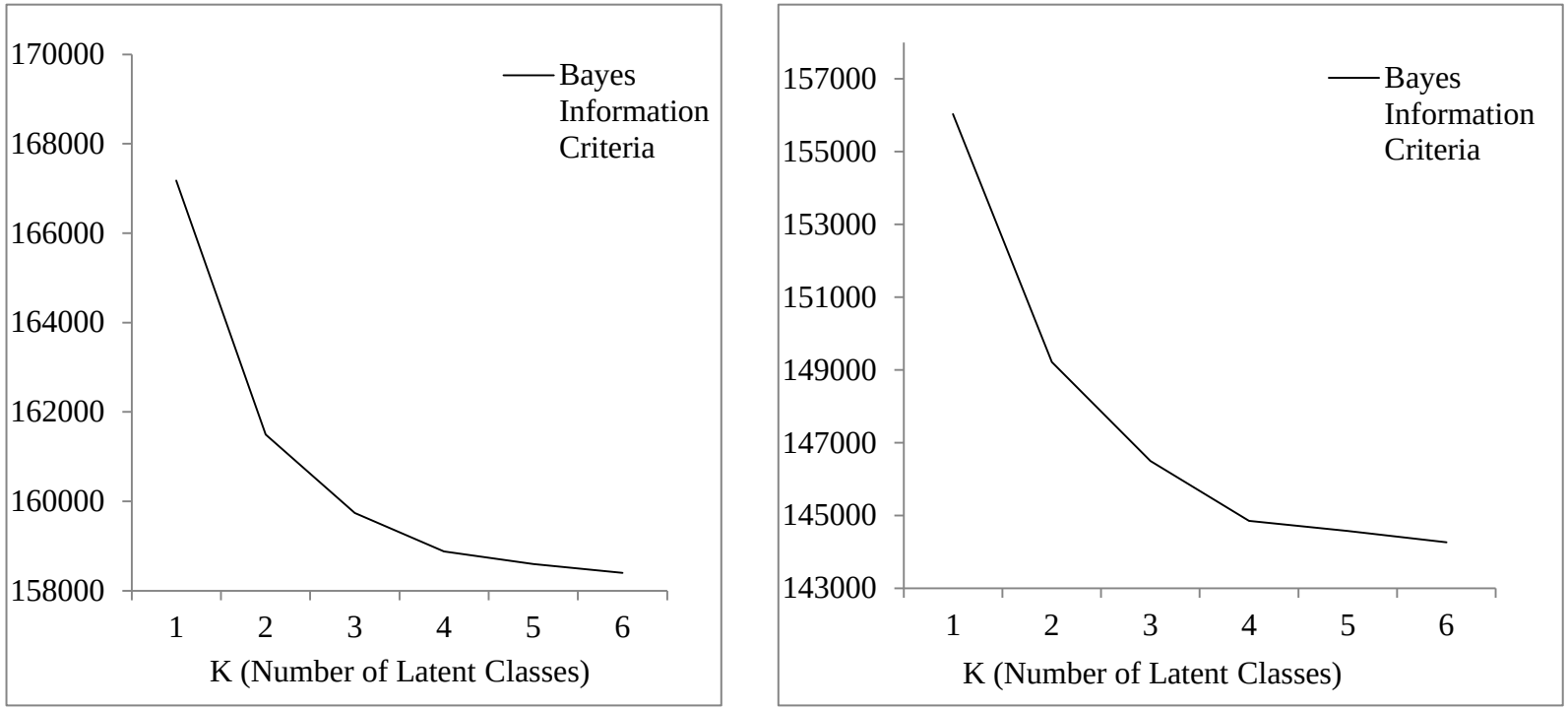


Figure 4$_a$ and 4$_b$. Phase I unconditional LPA BIC by K (class) plot for females (a) and males (b) for covitality.

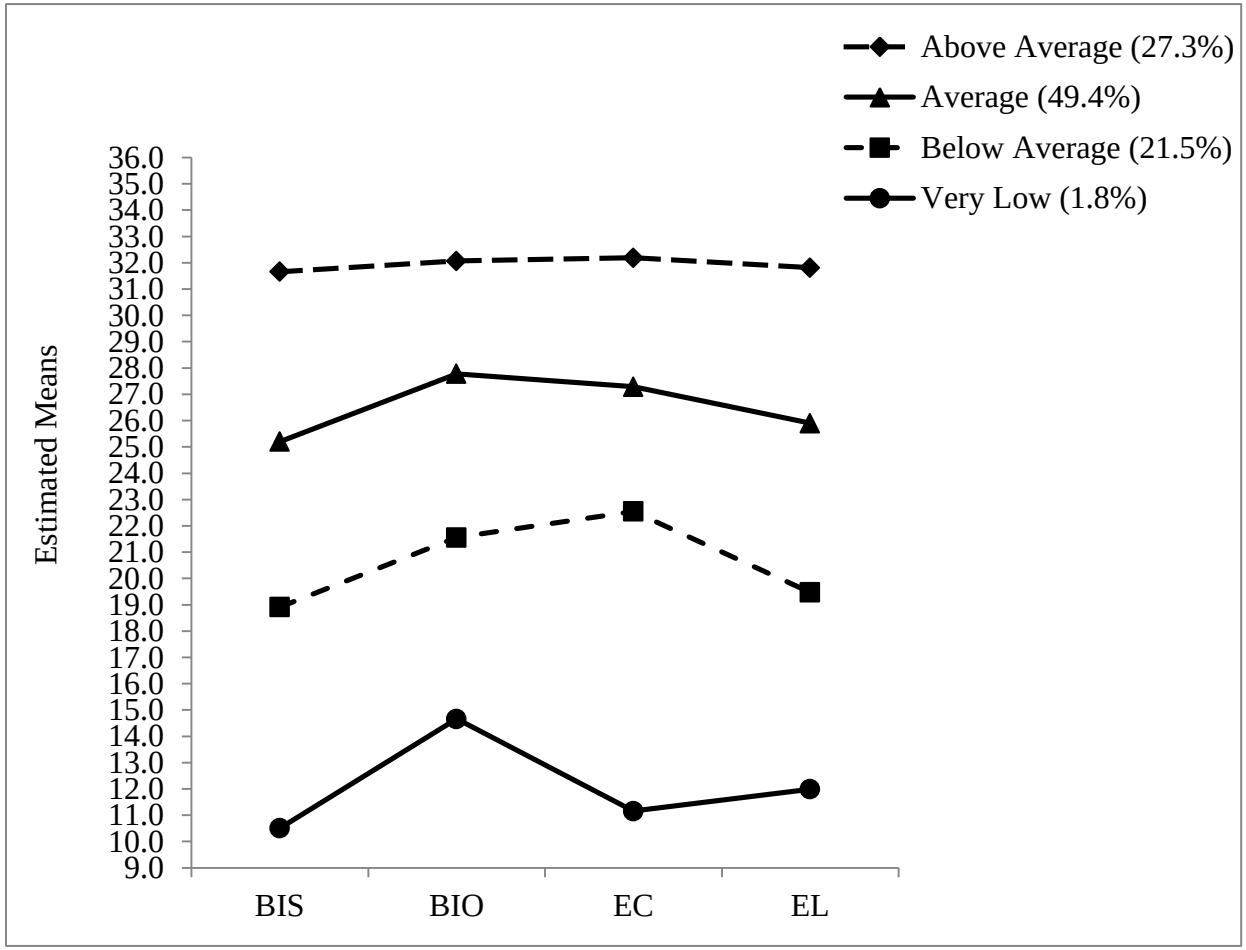


Figure 5. Conditional covitality profile plots and class proportions for females (BIS = Belief-in-Self, BIO = Belief-in-Others, EC = Emotional Competence, EL= Engaged Living).

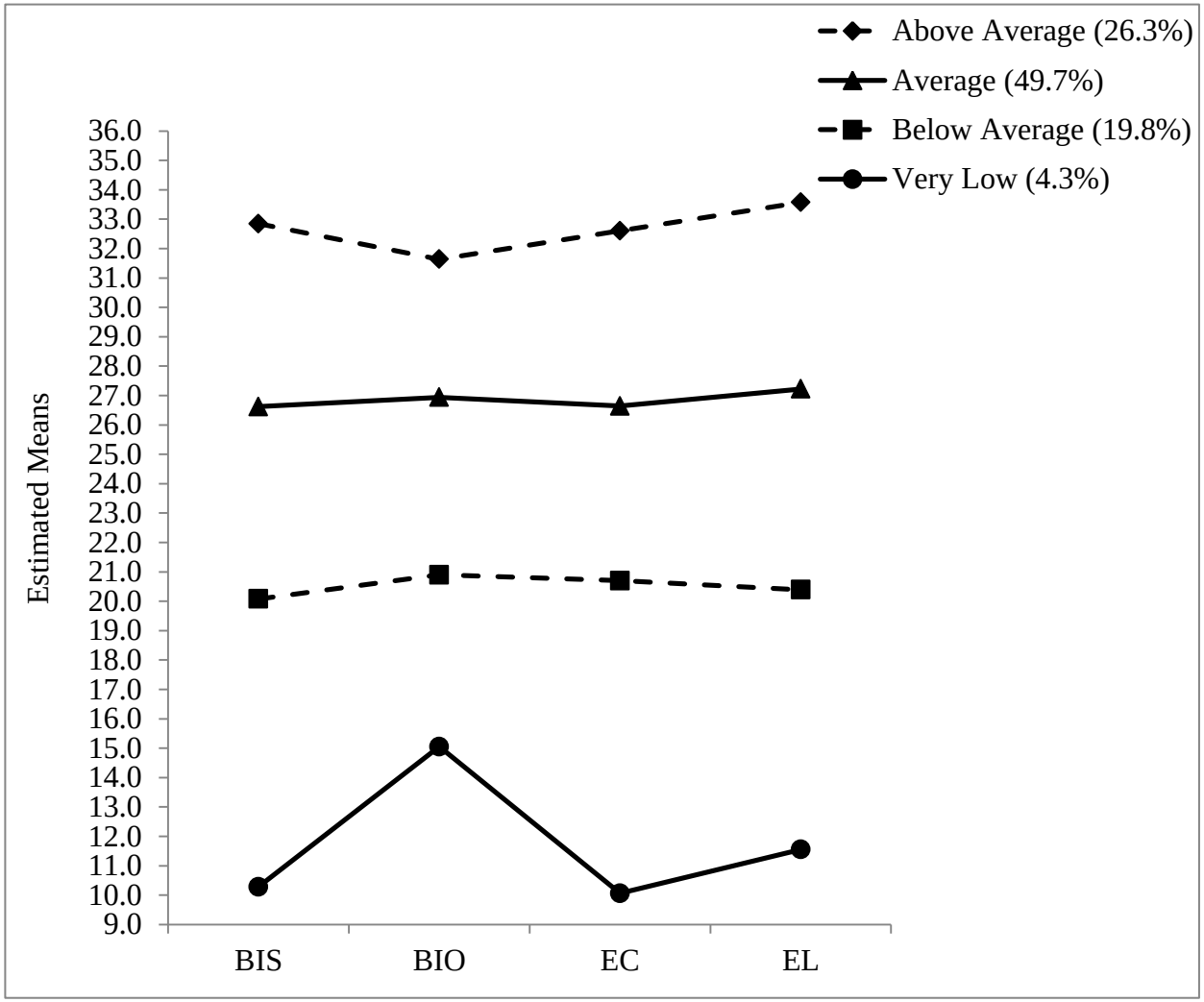


Figure 6. Conditional covitality profile plots and class proportions for males. (BIS = Belief-in-Self, BIO = Belief-in-Others, EC = Emotional Competence, EL= Engaged Living).

Table 13

Fit information and Entropy Values for LCA Phase 2 for Females with 2–5 Classes for Unconditional Models Considered (n = 6,651)

# of classes	Log Likelihood	BIC	ABIC	LMRT *p*-value	BLRT *p*-value	BF	cmP	# of free parameters	Entropy
1	-17160.380	34373.357	34354.290	—	—	0	0	6	—
2	-13080.680	26275.319	26234.008	0.00	0.00	< 0 .01	< 0 .01	13	.99
3	-12808.084	25791.489	25727.934	0.00	0.00	< 0 .01	< 0 .01	20	.90
4	**-12569.563**	**25375.810**	**25290.011**	**0.00**	**0.00**	**0.003**	**0.003**	**27**	**.83**
5	-12533.123	25364.294	25256.250	0.00	0.00	0	1	34	.86

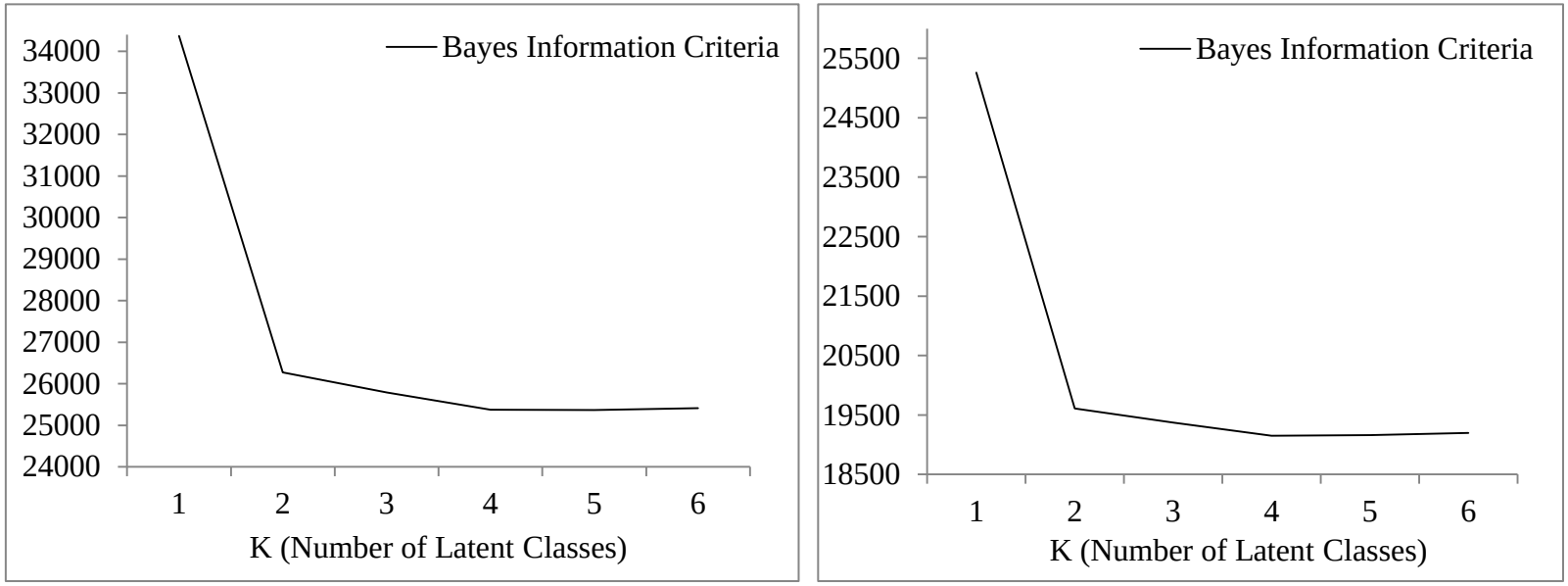
Note. Bold values indicate preferred model based on fit indices.

Table 14

Fit Information and Entropy Values for LCA Phase 2 for Males with 2–5 Classes for Unconditional Models Considered (*n* = 6,195)

# of classes	Log Likelihood	BIC	ABIC	LMRT *p*-value	BLRT *p*-value	BF	cmP	# of free parameters	Entropy
1	-12603.236	25258.500	25239.434	—	—	0	0	6	—
2	-9749.447	19611.623	19570.312	0.00	0.00	< 0.01	< 0.01	13	.98
3	-9598.277	19369.983	19306.429	0.00	0.00	< 0.01	< 0.01	20	.96
4	**-9459.216**	**19152.561**	**19066.762**	**0.00**	**0.00**	**32.93**	**0.97**	**27**	**.87**
5	-9432.360	19159.550	19051.508	0.00	0.00	0	1	34	.91

Note. Bold values indicate preferred model based on fit indices and model parsimony.



(a) (b)

Figure 7a and 7b. Phase II unconditional LCA BIC by K (class) plot for females (a) and males (b) for psychosocial distress indicators.

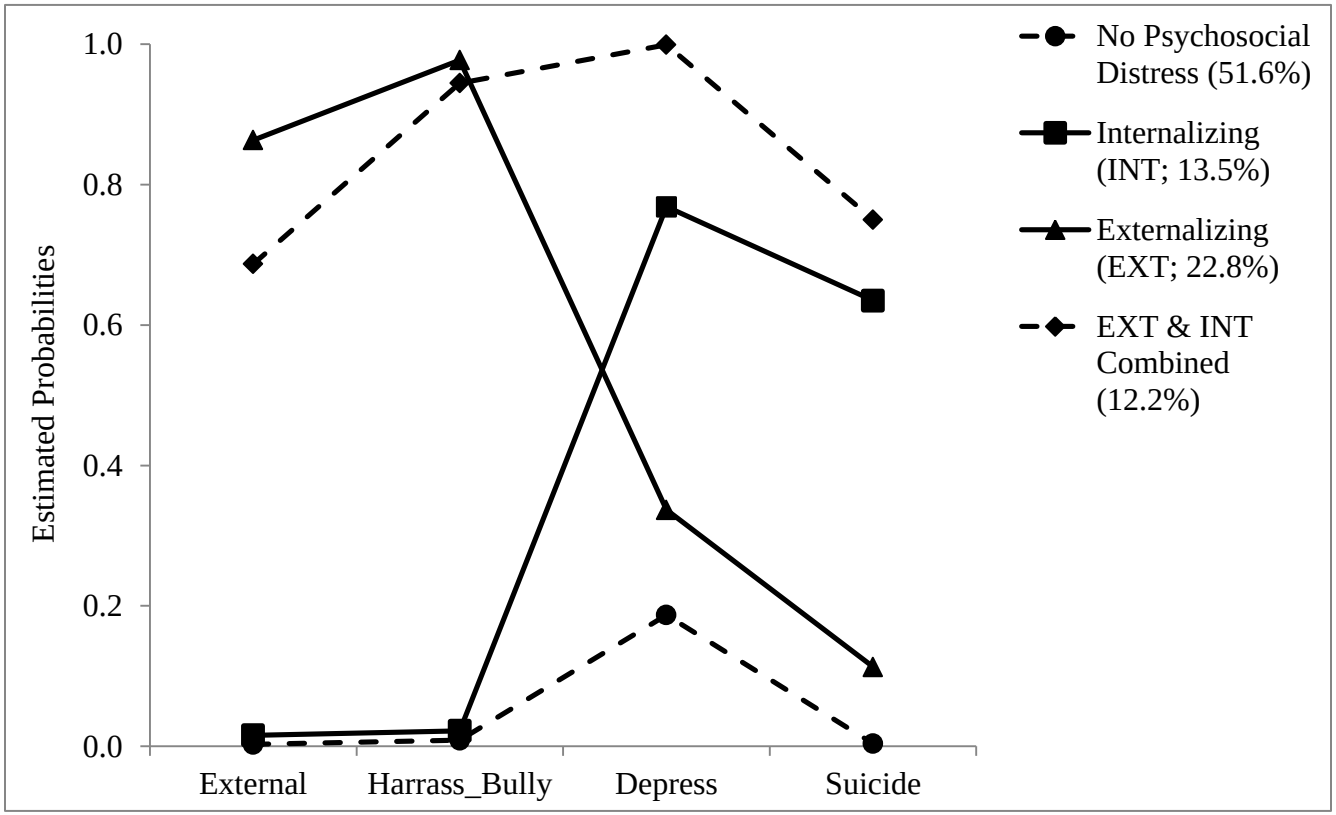


Figure 8. Conditional psychosocial distress items and class probability plots and proportions for females.

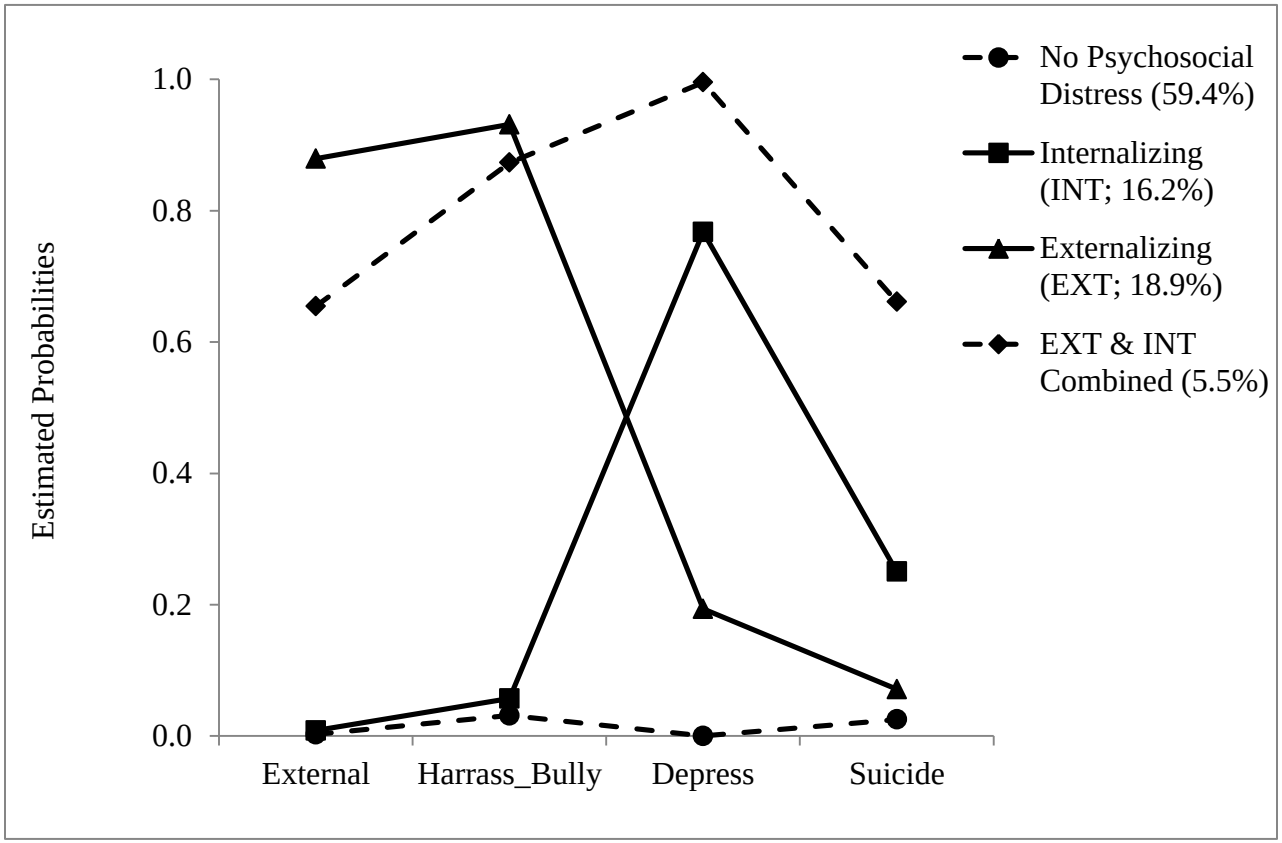


Figure 9. Conditional psychosocial distress items and class probability plots and proportions for males.

Table 15

Covariate Table for 4-Class LCA Model for Females

	Effect	Logit	SE	Logit/SE	*p*-value	OR
Psychosocial Distress Classes						
Class 2: Internalization (INT)						
	Low FRPM	-0.04	0.13	-0.33	0.74	0.96
	Mixed	—	—	—	—	—
	Am Indian/ Alaskan	-0.82	0.33	-2.50	0.01	0.44
	Asian	-1.39	0.26	-6.18	0.00	0.25
	Black	-1.63	0.21	-7.65	0.00	0.20
	Hawaiian/PI	-1.17	0.39	-2.99	0.00	0.31
	White	-1.20	0.15	-8.62	0.00	0.30
Class 3: Externalization (EXT)						
	Low FRPM	0.14	0.09	1.51	0.13	1.15
	Mixed	—	—	—	—	—
	Am Indian/ Alaskan	-0.72	0.26	-2.78	0.00	0.49
	Asian	-0.87	0.16	-5.30	0.00	0.42
	Black	-0.73	0.15	-4.98	0.00	0.48
	Hawaiian/PI	-0.82	0.29	-2.86	0.00	0.44
	White	-0.66	0.11	-6.02	0.00	0.52
Class 4: Combined INT and EXT						
	Low FRPM	0.23	0.12	1.99	0.05	1.30
	Mixed	—	—	—	—	—
	Am Indian/ Alaskan	-1.59	0.37	-4.37	0.00	0.20
	Asian	-1.77	0.22	-8.24	0.00	0.17
	Black	-1.94	0.21	-9.28	0.00	0.14
	Hawaiian/PI	-1.20	0.32	-3.79	0.00	0.30
	White	-1.36	0.13	-10.65	0.00	0.26

Note. Hispanic students with no psychosocial distress (Class 1) were designated as referent group.
FRPM= Students who qualify for Free and Reduced Priced Meals

Table 16

Covariate Table for 4-Class LCA Model for Males

Psychosocial Distress Classes	Effect	Logit	SE	Logit/SE	*p*-value	OR
	Low FRPM	-0.14	0.11	-1.30	0.20	0.89
Class 2:	Mixed	—	—	—	—	—
Internalization	Am Indian/ Alaskan	-1.40	0.30	-4.70	0.00	0.25
(INT)	Asian	-1.20	0.18	-6.51	0.00	0.30
	Black	-1.43	0.18	-7.90	0.00	0.24
	Hawaiian/PI	-1.33	0.33	-3.98	0.00	0.26
	White	-1.32	0.13	-10.21	0.00	0.27
Class 3: Externalization (EXT)						
	Low FRPM	0.29	0.09	3.18	0.00	1.34
	Mixed	—	—	—	—	—
	Am Indian/ Alaskan	-1.48	0.26	-5.72	0.00	0.23
	Asian	-1.31	0.15	-8.62	0.00	0.27
	Black	-0.79	0.13	-6.35	0.00	0.45
	Hawaiian/PI	-1.14	0.25	-4.61	0.00	0.32
	White	-1.34	0.11	-12.53	0.00	0.26
Class 4: Combined INT and EXT						
	Low FRPM	0.09	0.18	0.53	0.60	1.09
	Mixed	—	—	—	—	—
	Am Indian/ Alaskan	-2.86	0.58	-4.98	0.00	0.06
	Asian	-2.67	0.34	-7.96	0.00	0.07
	Black	-2.71	0.33	-8.17	0.00	0.07
	Hawaiian/PI	-2.17	0.45	-4.77	0.00	0.10
	White	-2.27	0.20	-11.21	0.00	0.10

Note. Hispanic students with no psychosocial distress (Class 1) were designated as referent group.

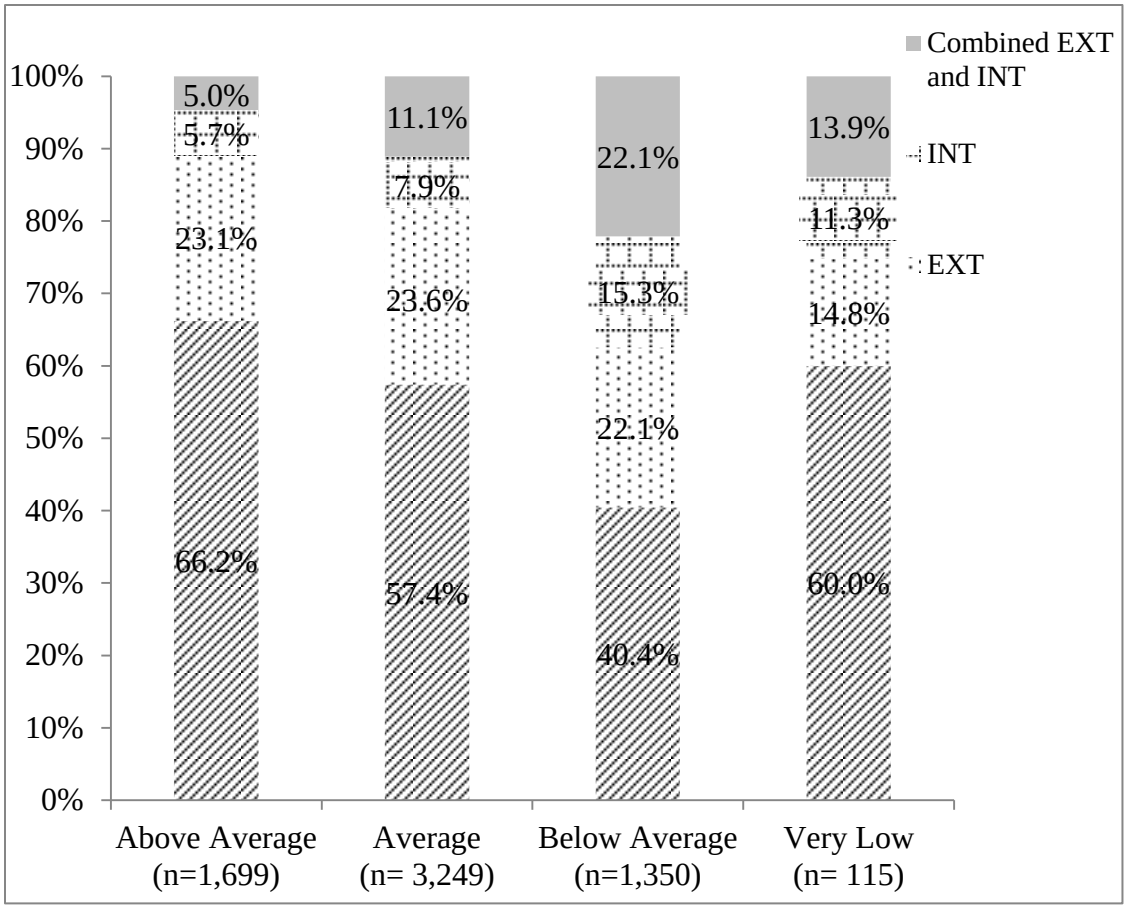


Figure 10. Crosstabulated covitality and psychosocial distress classes for females.

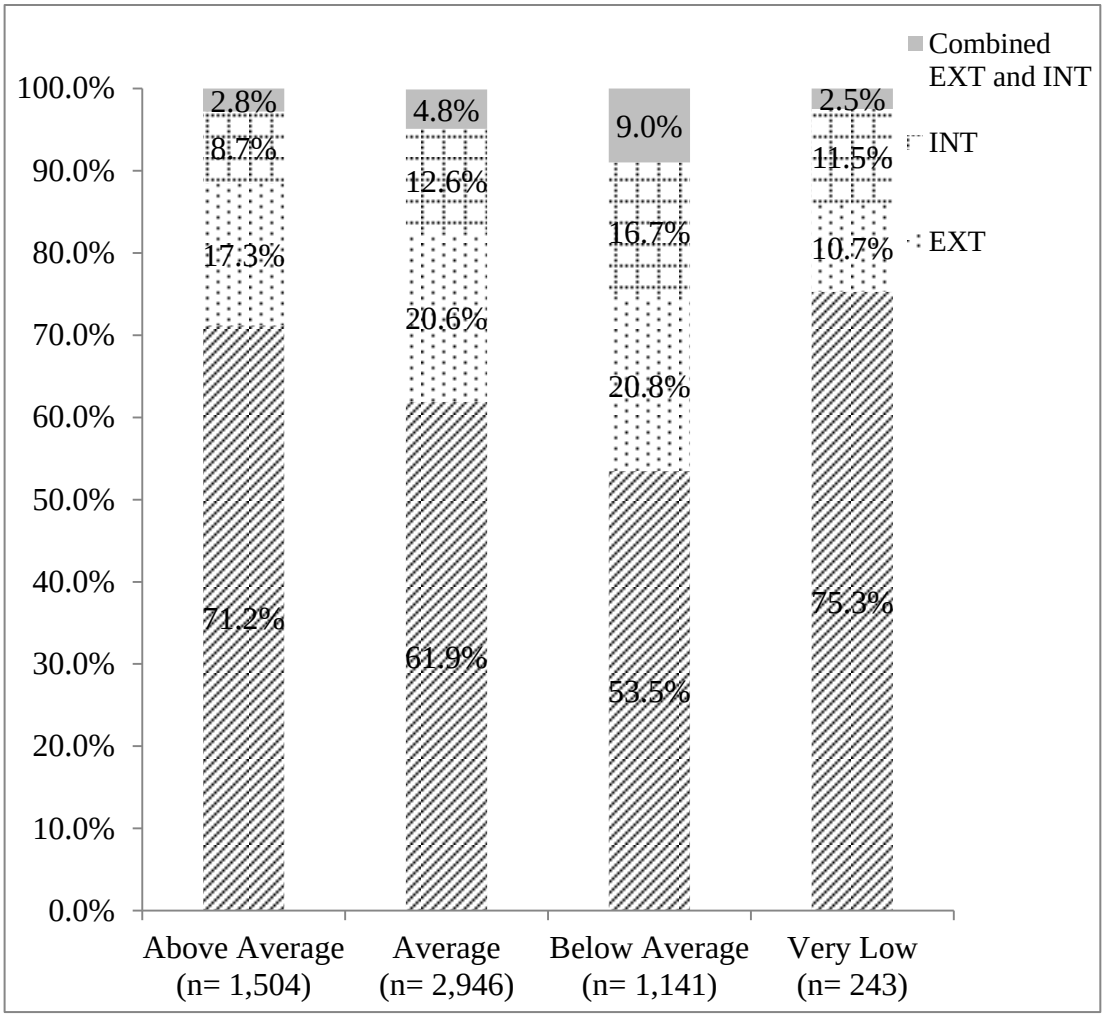


Figure 11. Crosstabulated covitality and psychosocial distress classes for males.

Table 17
Sixteen Profiles from Dual-component Measurement Model (LPA X LCA)

Psychosocial Distress Class	*Covitality Profile* Above Average	Average	Below Average	Very Low
No Distress	***Flourishing:*** High Covi with no distress F = 66.2%, M = 71.2%	Avg Covi with no distress F = 57.4%, M = 61.9%	Below Avg Covi with no distress F = 40.4%, M = 53.5%	***Vulnerable:*** Very Low Covi with no distress F = 60.0%, M = 53.5%
Externalizing (EXT)	***Symptomatic but Content*:** High Covi with EXT F = 23.1%, M = 17.3%	Avg Covi with EXT F =2 3.6%, M = 20.6%	Below Avg Covi with EXT F= 22.1%, M= 20.8%	***Troubled*** Very Low Covi with EXT F = 14.8, M = 10.7%
Internalizing (INT)	***Symptomatic but Content*:** High Covi with INT F = 5.7%, M = 8.7%	Avg Covi with INT F= 7.9%, M= 12.6%	Below Avg Coi with INT F = 15.3%, M = 16.7%	***Troubled*** Very Low Covi with INT F = 11.3, M = 11.5%
Combined EXT and INT	***Symptomatic but Content*:** High Covi with distress F = 5.0%, M = 2.8%	Avg Covi with distress F = 11.1%, M = 4.8%	Below Avg Covi with distress F = 22.1%, M = 9.0%	***Troubled:*** Very Low Covi with distress F = 13.9, M = 2.5%

Table 18

Means, SD, and Equality Tests Across Profiles of Covitality Among Female Students

	Class 1 Very Low Covi (n = 115)	Class 2 Below Avg Covi (n = 1,353)	Class 3 Average Covi (n = 3,255)	Class 4 Above Avg Covi (n = 1,702)	F	Class Comparisons	d
QOSL-SC							
M	12.65	14.49	16.73	18.66	366.54	2 vs 1	0.45
SD	(4.43)	(3.71)	(3.58)	(3.84)		3 vs 1	1.02
						4 vs 1	1.45
						2 vs 3	0.61
						2 vs 4	1.10
						3 vs 4	0.52
QOSL-MP							
M	4.89	5.05	6.31	7.99	426.05	1 vs 3	0.65
SD	(2.05)	(2.05)	(2.33)	(2.55)		1 vs 4	1.35
						2 vs 3	0.57
						2 vs 4	1.23
						3 vs 4	0.69
Tobacco							
M	1.56	1.76	1.48	1.31	32.16	3 vs 2	0.20
SD	(1.31)	(1.55)	(1.27)	(1.03)		4 vs 2	0.35
						4 vs 3	0.15
Alcohol							
M	2.81	3.33	2.92	2.61	29.50	3 vs 2	0.19
SD	(2.09)	(2.16)	(2.10)	(2.05)		4 vs 2	0.34
						4 vs 3	0.15
Marijuana							
M	2.78	2.81	2.38	2.09	34.01	4 vs 1	0.35
SD	(2.11)	(2.18)	(2.02)	(1.89)		3 vs 2	0.21
						4 vs 2	0.35
						4 vs 3	0.15
Pain Pills							
M	1.40	1.60	1.36	1.23	25.55	3 vs 2	0.19
SD	(1.22)	(1.40)	(1.12)	(0.92)		4 vs 2	0.32
						4 vs 3	0.13
Drinking & Driving							
M	1.52	1.64	1.46	1.31	25.28	3 vs 2	0.16
SD	(1.07)	(1.19)	(1.03)	(0.88)		4 vs 2	0.32
						4 vs 3	0.16

Note. Bonferroni estimates reported; QOSL-SC = quality of school life-school connectedness; QOSL-MP = quality of school life-meaningful participation. All class comparison $p < .001$.

Table 19

Means, SD, and Equality Tests Across Profiles of Covitality Among Male Students

	Class 1 Very Low Covi (n = 244)	Class 2 Below Avg Covi (n = 1,146)	Class 3 Average Covi (n = 2,957)	Class 4 Above Avg Covi (n = 1,507)	Overall Test (F-test)	Class Comparisons)	d
QOSL-SC							
M	14.25	15.11	17.34	19.00	278.85***	1 vs 3	0.73
SD	(4.93)	(3.83)	(3.45)	(4.19)		3 vs 4	0.43
						1 vs 2	0.20
						1 vs 4	1.04
						2 vs 4	0.97
QOSL-MP							
M	5.83	5.33	6.49	7.88	268.46***	1 vs 3	0.27
SD	(2.70)	(2.23)	(2.25)	(2.57)		2 vs 3	0.52
						3 vs 4	0.58
						1 vs 4	0.78
						2 vs 4	1.06
Tobacco							
M	1.78	1.78	1.60	1.55	6.51***	4 vs 2	0.15
SD	(1.67)	(1.59)	(1.44)	(1.40)			
Alcohol							
M	2.46	2.79	2.75	2.55	4.79	n/a	—
SD	(2.04)	(2.11)	(2.13)	(2.09)			
Marijuana							
M	2.55	2.73	2.49	2.28	9.90***	4 vs 2	0.21
SD	(2.13)	(2.19)	(2.12)	(2.03)			
Pain Pills							
M	1.36	1.44	1.34	1.30	3.68	n/a	—
SD	(1.11)	(1.18)	(1.10)	(1.07)			
Drinking & Driving							
M	1.52	1.54	1.44	1.34	8.73***	4 vs 2	0.19
SD	(1.12)	(1.13)	(1.04)	(0.92)			

Note. Bonferroni estimates reported. All class comparison $p < .001$.

Table 20

Means (SDs) and Equality Tests Across Profiles of Covitality and Self- Reported Grades (Females)

	Class 1 Very Low Covi (n = 115)	Class 2 Below Avg Covi (n = 1,353)	Class 3 Average Covi (n = 3,255)	Class 4 Above Avg Covi (n = 1,702)	*F*	Class comparisons	*d*
M	3.82	3.88	3.26	2.65	138.2	1 vs 4	0.65
SD	2.10	1.84	1.67	1.50	4		
						2 vs 3	0.35
						2 vs 4	0.73
						3 vs 4	0.38

Note. 1.0-1.9 = "A's"; 2.0-2.9 = "A's and B's"; 3.0-3.9 = "Mostly B's"; 4.0-4.9 = "C's and below." All class comparison $p < .001$.

Table 21

Means, SD, and Equality Tests Across Profiles of Covitality and Self- Reported Grades (Males)

	Class 1 Very Low Covi (n = 244)	Class 2 Below Avg Covi (n = 1,146)	Class 3 Average Covi (n = 2,957)	Class 4 Above Avg Covi (n = 1,507)	*F*	class comparisons	*d*
M	3.52	4.27	3.55	2.96	120.16	Class 2 vs 3	0.39
SD	(2.11)	(1.96)	(1.70)	(1.62)		Class 3 vs 4	0.35
						Class 1 vs 2	0.37
						Class 1 vs 4	0.30
						Class 2 vs 4	0.73

Note. 1.0-1.9 = "A's"; 2.0-2.9 = "A's and B's"; 3.0-3.9 = "Mostly B's"; 4.0-4.9 = "C's and below." All class comparison $p < .001$.