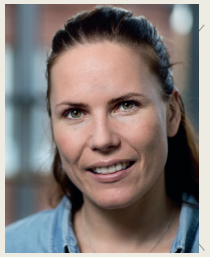
PSYCHOLOGICAL PERSPECTIVES ON ALCOHOL USE AMONG YOUNG ADOLESCENTS – Mental health and personality Karin Boson

PSYCHOLOGICAL PERSPECTIVES ON ALCOHOL USE AMONG YOUNG ADOLESCENTS
Mental health and personality

The main aim of this doctoral thesis was to investigate how mental health and personality traits are related to alcohol use and inebriation in early adolescence. The studies applied a gender perspective to enhance understanding of factors contributing to alcohol use in girls and boys. Participants in all three studies constitute a community population sample recruited through the Swedish multidisciplinary *Longitudinal Research program on Development In Adolescence* (LoRDIA). Roughly the same adolescents were followed from early to middle adolescence (from approximately age 12 to 15). The first study examines the relation between mental health problems (i.e., patterns of self-reported internalizing and externalizing problems), mental well-being, and alcohol experience among girls and boys aged 12 to 13 years. The second investigates the psychometric properties of a Swedish version of the Junior Temperament and Character Inventory (JTCI), a personality measurement for children and adolescents, and the congruence between self and caregiver ratings. The third study aimed to predict alcohol inebriation and potential gender-specific patterns at 13 to 15 years by using the JTCI and a two-continua model of mental health (mental health problems plus mental well-being).

Findings from this thesis improve our knowledge of how mental health (both positive and negative aspects) relate to early alcohol use, and how personality traits (i.e., temperament and character) function as important underlying factors in both mental health and alcohol use. Gender-specific considerations are suggested when developing and conducting preventative interventions targeting psychological risks and protective factors against early alcohol use among young adolescents.



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ISBN: 978-91-7833-192-5 (PDF)
ISBN: 978-91-7833-191-8 (Print)
ISSN: 1101-718X Avhandling/Göteborgs universitet, Psykologiska inst.

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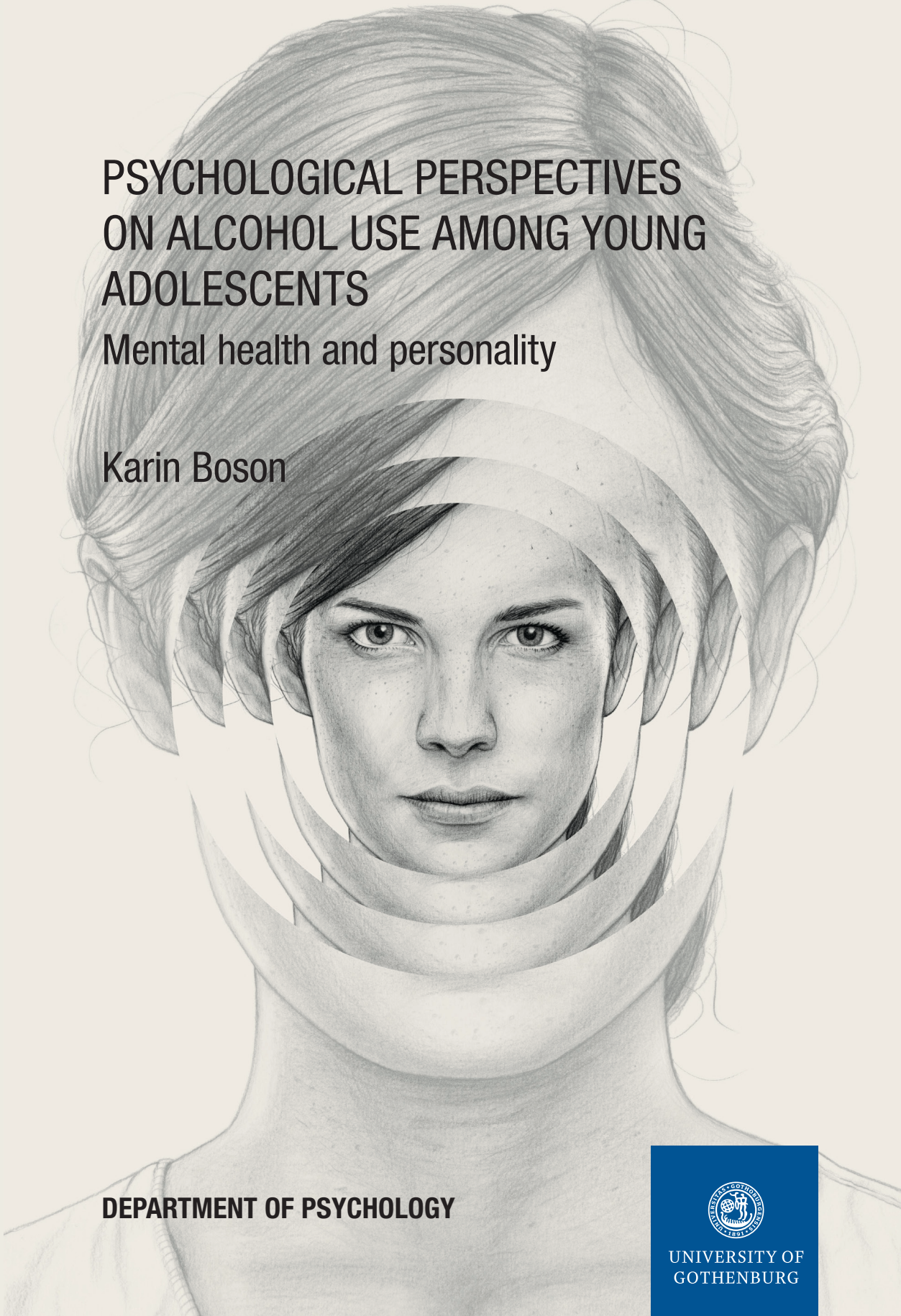

DEPARTMENT OF PSYCHOLOGY

UNIVERSITY OF GOTHENBURG

Psychological perspectives on alcohol use among young adolescents

Mental health and personality

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Karin Boson, 2018

Doctoral Dissertation in Psychology
Department of Psychology
University of Gothenburg
November 30, 2018

Cover layout: Ann-Sofie Sten
Cover illustration: Børge Bredenbekk
Printing: BrandFactory, Gothenburg, Sweden, 2018
ISBN: 978-91-7833-192-5 (PDF)
ISBN: 978-91-7833-191-8 (Print)
ISSN: 1101-718X Avhandling/Göteborgs universitet, Psykologiska inst.
Electronic version: http://hdl.handle.net/2077/57885

Abstract

Boson, Karin (2018). Psychological perspectives on alcohol use among young adolescents: Mental health and personality. Department of Psychology, University of Gothenburg, PO Box 500, SE-405 30 Gothenburg, Sweden.

Alcohol use is an important risk factor in psychosocial development through adolescence that has been incompletely examined among the youngest adolescents. The aim of this doctoral thesis is to investigate how mental health and personality traits are related to alcohol use and inebriation in early adolescence. Participants were recruited through the Swedish multidisciplinary *Longitudinal Research program on Development In Adolescence* (LoRDIA). In **Study I**, patterns of self-reported internalizing and externalizing problems and well-being in relation to alcohol experiences were investigated among 1383 adolescents aged 12 to 13. Person-oriented analyses were applied to the data with the purpose of finding specific configurations ("types") that were more frequent than expected by chance. Boys with early alcohol debut reported generally high well-being and no concurrent internalizing or externalizing problems. Girls with both internalizing problems and low well-being, however, were statistically over-represented among those with alcohol experiences. Hence, both gender and mental well-being need to be taken into account when describing and explaining early alcohol initiation among young adolescents. In **Study II**, the psychometric properties of a Swedish version of the Junior Temperament and Character Inventory (JTCI), a personality measurement for children and adolescents, were investigated, as was congruence between self and caregiver ratings. The study included 1046 girls and boys aged 12 to 14 years and 654 caregivers. Internal consistency and convergent validity were analyzed. Norms for the Swedish self and caregiver version of JTCI were established and the congruence on these reports was investigated. The internal structure of the JTCI was not fully satisfactory; the dimension Persistence did not form a reliable construct in the Swedish self-report version. Revision and expansion of this dimension is therefore suggested. Obtaining the child's own perspective as well as the caregiver's is preferable to using just one report to provide a thorough understanding of the child's personality. The results also support the importance of age- and gender-specific norms on the JTCI. **Study III** aimed to predict alcohol inebriation and potential gender-specific patterns among 853 adolescents, aged 13 to 15 years by using a biopsychosocial model of personality traits and a two-continua model of mental health (internalizing and externalizing problems plus well-being). Pathways to inebriation were more similar than different for girls and boys and high Novelty Seeking, low Cooperativeness (direct effects) and low Self Directedness (indirect effect via externalizing problems) were significant predictors. Specifically for girls, low Harm Avoidance (direct effect) was a significant predictor. Mental well-being had no effect on inebriation and interestingly internalizing problems had a "protective" effect for boys. Findings from this thesis improve our knowledge of how mental health (both positive and negative aspects) relate to early alcohol use, and how personality traits (i.e., temperament and character) function as important underlying factors in both mental health and alcohol use. Gender-specific considerations are suggested when developing and conducting preventative interventions targeting psychological risks and protective factors against early alcohol use among young adolescents.

Keywords: alcohol debut, alcohol inebriation, gender-specific patterns, mental health problems, mental well-being, personality, JTCI, young adolescents, LoRDIA

Svensk sammanfattning

Barn och ungdomars alkoholbruk, psykiska hälsa och personlighetsegenskaper är tre viktiga faktorer som får betydelse för deras utveckling genom ungdomsåren. Kungliga Vetenskapsakademien drog i en systematisk kunskapsöversikt från 2010 slutsatsen att barns och ungas psykiska hälsa var ofullständigt utforskad i Sverige. Med utgångspunkt i detta initierades flera större forskningsprojekt med syftet att ta reda på hur barn och unga har det idag och vad som påverkar deras livsvillkor. Ett av dessa projekt är det prospektiva longitudinella forskningsprogrammet LoRDIA (*Longitudinal Research on Development In Adolescence*) som studerar ungdomars utveckling genom tonåren. Forskningsprogrammet ligger också till grund för denna doktorsavhandling om ungdomars tidiga alkoholbruk. Hur den psykiska hälsan ser ut bland de yngsta ungdomarna och i relation till tidig alkoholdebut är lite studerat i Sverige. Likaså finns få studier som prospektivt undersökt hur de yngsta ungdomarnas psykiska hälsa, personlighet och välmående kan kopplas till senare berusningsdrickande. Syftet med denna doktorsavhandling var att undersöka de yngsta ungdomarnas (från ca 12 till 15 års ålder) erfarenheter av tidigt alkoholbruk och berusningsdrickande och hur det hänger samman med självrapporterad psykisk hälsa (specificerat i denna avhandling som psykiskt välmående och psykiska hälsoproblem) och personlighetegenskaper. Detta undersöktes genom tre studier.

I Studie I undersöktes 1383 ungdomar i åldern 12-13 år och deras individuella mönster av psykiska hälsoproblem, självrapporterade internaliserande (känslomässiga) och externaliserande (beteendemässiga) problem, samt psykiska välmående. Mönster av variabler inom individen analyserades, vilket skiljer sig från en mer traditionell beskrivning av variabler på gruppnivå. Hälsoprofilerna undersöktes både i den generella gruppen ungdomar, men också mer specifikt i den subgrupp av ungdomar som rapporterade tidiga erfarenheter av att dricka alkohol (druckit ett glas eller mer). Analyserna undersökte om vissa hälsoprofiler var mer vanliga (“typer”) eller mindre vanliga (”antityper”). Resultaten visade att en majoritet av ungdomarna, 70%, rapporterade högt välmående utan samtidiga internaliserade eller externaliserade problem. Detta kan jämföras med 45% i subgruppen med tidiga alkoholerfarenheter. Generellt sett var det fler pojkar än flickor hade druckit mer än ett glas alkohol någon gång. Majoriteten av pojkarna med en tidig alkoholdebut rapporterade högt välmående och låg grad av både externaliserade och internaliserade problem. Flickor med både internaliserade och externaliserade problem, samt låg grad av välmående var däremot fler än förväntat bland de ungdomar som hade tidiga al-

koholerfarenheter. Sammanfattningsvis visar studiens resultat att tidig alkoholdebut är mer vanligt förekommande om du är pojke, och upplever högt välmående, men möjligen också en del av en externaliserad problemstil. Det var mindre vanligt förekommande att flickor i 12-13årsåldern hade provat alkohol, men de flickor som hade druckit alkohol, mådde sämre och hade både inåtriktade och utåtagerande problem. Resultaten stöder också en medvetenhet kring att flickor och pojkars psykiska hälsa kan ta sig olika uttryck och att hänsyn till detta behöver tas i beskrivningar och förklaringar av psykisk hälsa bland ungdomar. Särskilt bland de ungdomarna som har tidiga alkoholerfarenheter.

Studie II är en normeringsstudie av den svenska versionen av personlighetsinstrumentet JTCI (*Junior Temperament and Character Inventory*). Instrumentet är avsett för barn och ungdomar och finns i en självskattningsversion, samt en version som kan fyllas i av vårdnadshavaren (vanligtvis föräldern eller motsvarande viktig närstående). Studien inkluderade 1046 ungdomar i åldern 12-14 år och 654 vårdnadshavare och de psykometriska egenskaperna hos JTCI undersöktes, samt överrensstämmelsen mellan ungdomarnas egen uppfattning och deras vårdnadshavares skattningar av deras barns temperament och karaktärsegenskaper. Instrumentet innehåller fyra temperamentsdimensioner och tre karaktärsdimensioner. Temperamentsdimensionerna är: 1) *Novelty Seeking* (nyhetssökande – aktivitetsnivå, impulsivitet och behov för att utforska), 2) *Harm Avoidance* (riskundvikande – emotionell, ångestnivå, rädsla och misstro för det okända), 3) *Reward Dependence* (belöningssökande – social bekräftelse, nivå av anknytning och socialt beroende) och 4) *Persistence* (uthållighet – ihärdighet i problemlösning, genomför uppgifter och når mål trots frustration och trötthet). Karaktärsdimensionerna är: 1) *Self-Directedness* (självstyrande – individens förmåga att styra sitt beteende, självförtroende och självacceptans), 2) *Cooperativeness* (samarbetsfunktioner – förmåga att samarbeta, acceptera och hjälpa andra) och 3) *Self-Transcendence* (självöverskridande – grad av spiritualitet och förmåga att uppleva världen i sin helhet). Den interna reliabiliteten för JTCI var inte fullt tillfredsställande. Temperamentsdimensionen för uthållighet i självskattningsversionen hade inte tillräckligt hög samstämmighet mellan frågorna som är inkluderade i skalan. Frågorna fångade därför inte samma underliggande egenskap som förväntat. Omarbetning och möjligtvis en utökning av den skalan är därför att rekommendera. Det fanns en måttlig överensstämmelse mellan ungdomarnas och föräldrarnas rapportering, något som är i enlighet med vad andra studier har funnit. Exempelvis beskrev vårdnadshavarna att döttrarna hade högre grad av självstyrande och lägre grad av riskundvikande jämfört med hur döttrarna beskrev sig själva. Vårdnadshavarna verkade också underskatta både döttrars och söners grad av självöverskridande. Information från både barnet och vårdnadshavaren bör därför in-

hämtas för att få en bättre förståelse av barnets personlighetsmässiga förutsättningar. Studiens resultat stödjer också ålders- och könsspecifika normer för JTCI.

Studie III kombinerar ungdomars personlighetsdrag (temperament och karaktär) och deras psykiska hälsa (både psykiska hälsoproblem och välmående) för att förklara berusningsdrickande. Information från den andra och tredje datainsamlingen inkluderades i analyserna (de var ca 13-15 år vid tredje tillfället). Totalt inkluderades 855 ungdomar i studien och självrapporterade personlighetsdrag länkades till självrapporterad psykisk hälsa ett år senare och erfarenheter av att ha varit berusad inom det senaste året. Resultaten bekräftar tidigare forskning om riskfyllda temperamentsdrag: högt grad av nyhetssökande och låg grad av riskundvikande var relaterade till berusningsdrickande för både flickor och pojkar. En *omogen* personlighet innebär låg grad av självstyrande färdigheter och samarbetsfunktioner. Detta var också relaterat till berusningsdrickande för bägge könen under det senaste året. Det visade sig också att externaliserande problem var den typen av psykisk ohälsa som mest relaterade till erfarenheter av berusningsdrickande. Internaliserande problem eller frånvaro av välmående var, i motsats till vad forskning tidigare har visat, inte tydligt kopplade till berusningsdrickande i den här studien. Internaliserande problem bland pojkar, inte bland flickor, verkade istället fungera som ett ”skydd” mot tidigt berusningsdrickande. Det kan tolkas som att pojkar med internaliserande problem inte uppsöker sammanhang där berusningsdrickande förekommer, eller också tyder det på att pojkar med internaliserande problem inte engagerar sig i normöverskridande beteenden i lika hög grad som pojkar med externaliserande problem. För flickor verkade temperamentsdimensionen riskundvikande ha en direkt skyddande effekt för berusningsdrickande, den var å andra sidan kopplad till lägre välmående och högre grad av internaliserande problem. Resultaten visar att personlighetsegenskaper som har betydelse för psykisk hälsa skiljer sig något mellan flickor och pojkar. Nyhetssökande var exempelvis kopplat till lägre grad av välmående för flickor, men samma mönster fanns inte för pojkarna.

Generellt sett är flickor och pojkar mer lika varandra än olika varandra personlighetsmässigt, däremot framkommer det tydligare skillnader mellan vårdnadshavarens och barnets förståelse av barnets personlighetsfungerande. Vårdnadshavare verkar ha svårare att upptäcka och bedöma sitt barns inre personlighetsmässiga förutsättningar relaterat till känslo- och tankeprocesser och lättare att bedöma observerbara beteenden. En internaliserad problematik (ex. oro och nedstämdhet) är sannolikt svårare att upptäcka och bedöma. Flickor med ängsliga personlighetsegenskaper, låg grad av välmående och internaliserade problem kan riskera att försummas och upplevas som mer mogna än vad de

egentligen är av vårdnadshavare. Detta är särskilt problematiskt om de samtidigt börjar dricka alkohol tidigt eftersom alkoholbruket på sikt kan förvärra den psykiska hälsan, deras personlighetsutveckling och riskera att fungera som en dysfunktionell copingstrategi.

Vidare antyder fynden i avhandlingen att pojkar sannolikt prövar alkohol tidigare än flickor och hälsomässigt verkar de också må bättre, även om externaliserande problem förekom bland både flickor och pojkar som hade druckit alkohol tidigt. Lågt välmående och en kombination av både internaliserande och externaliserande problem framkom som en potentiellt extra sårbar hälsoprofil kopplat till tidigt alkoholdrickande, speciellt bland flickorna. När det gäller berusningsdrickande så verkar kombinationen av ogynnsamma personlighetsegenskaper, exempelvis hög grad av nyhetssökande, låg grad av riskundvikande samt låg grad av självstyrande färdigheter och samarbetsfunktioner vara en riskprofil. Särskilt i kombination med uttalade externaliserade problem. Möjligen är berusningsdrickande i tidiga tonåren hos svenska ungdomar idag i högre grad del av en externaliserade problematik än del av deras normalutveckling.

Sammanfattningsvis pekar resultaten från den här doktorsavhandlingen på att det finns könsspecifika mönster av psykisk hälsa och personlighetsegenskaper som relaterar till tidigt alkoholbruk och berusningsdrickande hos ungdomar i tidiga tonår. Det är därför av betydelse att vuxna är medvetna om flickor och pojkars förutsättningar när det gäller deras psykiska mående och personlighet eftersom dessa psykologiska faktorer också är kopplade till tidigt alkoholbruk. Slutligen belyser avhandlingen också vikten av att inhämta ungdomarnas *egna* uppfattningar om vem de är och hur de mår, oavsett om du är förälder, lärare eller arbetar kliniskt med ungdomar och deras familjer. Först då är det möjligt att anpassa det förebyggande och behandlande arbetet efter ungdomens behov.

List of publications

This thesis is based on the following three studies, referred to in the text by their roman numerals:

I. Boson, K., Berglund, K., Wennberg, P., & Fahlke, C. (2016). Well-being, mental health problems, and alcohol experiences among young Swedish adolescents: a general population study. *Journal for Person-Oriented Research, 2*(3), 123–134. http://dx.doi.org/10.17505/jpor.2016.12

II. Boson, K., Brändström, S., & Sigvardsson, S. (2018). The Junior Temperament and Character Inventory (JTCI): psychometric properties of multi-informant ratings. *Psychological Assessment*, *30*(4), 550–555. http://dx.doi.org/10.1037/pas0000513

III. Boson, K., Berglund, K., Fahlke, C., & Wennberg, P. *Personality traits and mental health as predictors of alcohol inebriation among young adolescents: gender-specific patterns.* Manuscript submitted for publication.

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Acknowledgments

This doctoral thesis is not only the product of my individual hard work. It is also the product of great support, constructive feedback, and important guidance from significant others throughout the working process. For that, I am truly grateful.

To begin with, I would like to express my special appreciation and thanks to my supervisors, Associate Professor Kristina Berglund, Professor Claudia Fahlke and Professor Peter Wennberg. I would like to thank you for encouraging my research and for allowing me to grow as a researcher. I would also like to express my gratitude for inviting me to take part in projects and networks both within and outside of academia.

My appreciation also goes to my examiner Professor Malin Broberg and to Professor Ata Ghaderi for reviewing my manuscript. It is also important for me to recognize Sven Brändström and Sören Sigvardsson as co-authors of the second study in the thesis, thank you for such a successful work together.

As a researcher, I am fortunate to be a member of several collaborations and networks and I would like to highlight three of those.

The first is the multidisciplinary Longitudinal Research program on Development in Adolescence (LoRDIA). Thank you Arne Gerdner for initiating the program and thank you to all the children, caregivers and schools who participated and made the research possible. I would also like to send out a great thank you to all the assistants and colleagues who have been working together with me both in planning, coordinating and conducting the data collections in LoRDIA which this thesis is built upon. Thank you Johan Hagborg, it would not have been possible without you. Thank you Sabina Kapetanovic for your pronounced competence and thank you Russell Turner.

The second is the network for Addiction Psychology and Clinical Research (APEC) at the Department of Psychology. My appreciation to all members in APEC for your valuable advice to my project and all the fun we had when travelling both for business and for pleasure. An extra thanks to those of you who have read and given me feedback on my written work.

The third network consists of my completely invaluable colleagues at the Department of Psychology in Gothenburg. It also seems like working colleagues and social friends overlap more and more during the years and I found gold and diamonds to keep for a lifetime. Thank you Elin Alfredsson, Fanny Gyberg, Sara Ingevaldson and Karin Thorslund.

I would also like to mark my gratitude toward my dear parents, Maud and Tore, and my closest family and friends. You have contributed substantially to the psychological strength that I have felt (and needed!) during my Ph.D. education. Thank you for reading my texts and for your valuable support.

Lastly, thank you my beloved Eirik for walking beside me in good times and in challenging times. No more words needed.

Karin Boson
October 2018

INTRODUCTION

The present doctoral thesis builds upon the results of three studies (labelled I, II, and III) investigating early alcohol use and its relation to mental health and personality in a general population of young adolescents. All studies are part of a longitudinal research program and include the same study population at different ages from approximately 12 to 15 years.

The term adolescence derives from the Latin word *adolescere*, which means "to grow into adulthood," and the adolescent period begins somewhere around the age of 10 years and ends at approximately 20 years of age. A scientifically used categorization divides the adolescent years into three developmental subphases, referred to as the early (about ages 10–13), middle (about ages 14–17), and late adolescence (about ages 18–21) (Steinberg, 2014). The adolescents included in this thesis are in early to middle adolescence, but will mainly be referred to as young adolescents, adolescents, or children (in relation to their caregivers).

Adolescence is the period in which children mature and develop towards greater autonomy and adult bodies, minds, and behaviors, but still need support from their caregivers. Thus, daily guidance from caregivers requires adaptation to the changing maturity level of the child and includes both setting boundaries and continuing support (Collins, Madsen, & Susman-Stillman, 2002; Steinberg & Silk, 2002). However, the transformation from childhood to adolescence is a period when caregivers may feel unsure of how to act and how to relate to their child (Steinberg & Silk, 2002). Relational quality (i.e., attachment between child and caregiver) is linked to complex developmental systems and processes and described as the most important underlying factor in children's mental health and positive development (Sroufe, 2005). The child's identity also progresses during adolescence and findings indicate that positive identity development is connected to both maturation of personality and mental well-being (Meeus, 2011; Meeus, van de Schoot, Keijsers, & Branje, 2012). Physical, cognitive, emotional, and social skills take considerable developmental steps during this phase and changes can indeed be experienced by both the child and caregivers as dramatic and challenging (Steinberg & Silk, 2002). Symptoms of worry and sadness directed inward (internalizing behavior) as well as aggression directed outward (externalizing behavior) are common in adolescence and can be seen as part of a process towards maturation and autonomy. However, for some adolescents, these symptoms can develop into more serious mental health problems and even to personality disorders such as anti-social personality disorder later in life (Greenberg & Lippold, 2013; Steinberg, 2014).

The adolescent years are typically the period in which alcohol use is introduced and steadily increased (Behrendt, Wittchen, Hofler, Lieb, & Beesdo, 2009; Duncan, Duncan, & Strycker, 2006; Young et al., 2002). Many adolescents in the Western cultures will experiment with alcohol at some point in their adolescence and possibly engage in high-risk consumption for a time, but only a minority will develop an alcohol use disorder. Adolescents with an early initiation into alcohol use and inebriation, however, are exposed to a higher risk for later alcohol abuse/dependence and negative development (Behrendt et al., 2012; Behrendt et al., 2009; Lin, Jester, & Buu, 2016; Pampati, Buu, Hu, Mendes de Leon, & Lin, 2018; Pedersen & Skrondal, 1998; Wennberg & Andersson, 2013; Wennberg, Andersson, & Bohman, 2000). This is especially evident in adolescents with concurrent mental health problems (Kessler et al., 1996). Still, prospective studies on alcohol use in relation to mental health and personality remain insufficient. This could be because most studies use cross-sectional data and are conducted retrospectively with adult informants. The opportunities to claim causal explanations for alcohol abuse and mental health problems are therefore limited.

Different theoretical models have been used to describe causality processes between alcohol use and mental health problems (Mueser, Noordsy, Drake, & Fox, 2003): (1) mental health problems precede alcohol abuse, and alcohol is used as self-medication; (2) people with alcohol abuse develop psychological and social problems over time; (3) there is an interaction effect between initial mental health problems and problems developed due to alcohol use; (4) other important variables affect both increased mental health problems and alcohol abuse, and they develop separately. The presence or absence of mental well-being and high-risk personality traits are some examples of important variables in the latter model. The four models are theoretically founded hypotheses and are not mutually exclusive, as the effects and interactions of alcohol use and mental health problems probably vary between individuals and groups. They are difficult to study and preferably tested in research with a longitudinal prospective study design to allow developmental trajectories to be followed over time.

The individuals most vulnerable to the early onset of alcohol-related problems may be those with personality traits such as high impulsivity/novelty seeking and high neuroticism/negative emotionality (Mulder, 2002). This is potentially due to the association between these personality traits and behaviors/disorders with strong links to alcoholism, such as conduct disorder, antisocial behavior, and hyperactivity. However, negative emotionality might also be a secondary effect of alcohol problems, although some predictive value has been found among girls and women (Miettunen et al., 2014; Mulder, 2002).

It is clear that mental health among young people in Sweden has not improved over the last 20 to 30 years (Petersen et al., 2010). There are, however, contradictory reports on whether mental health problems have actually increased. The Royal Swedish Academy of Science (2010) concluded in a systematic review that children's and adolescents' mental health have not been adequately investigated. How to prevent, detect, and treat mental health problems and enhance mental well-being among children and adolescents is a major challenge for professionals, educators, lay people, and not least the adolescents themselves (Howell, Keyes, & Passmore, 2013).

The present thesis investigates young adolescents' self-reported alcohol use (i.e., early alcohol debut and inebriation) in relation to self-reported mental health and personality traits in three quantitative studies. Participants constitutes of a general sample from the Swedish multidisciplinary *Longitudinal Research program on Development In Adolescence* (LoRDIA). Study I investigated mental health profiles among young adolescents, aged 12 to 13, both in general and specifically among those with an early alcohol debut. The mental health profiles included two dimensions: mental well-being and mental health problems. Study II focused on personality traits in the same general sample one year later (ages 13–14), as well as the psychometric properties of a personality inventory for children and adolescents known as the *Junior Temperament and Character Inventory* (JTCI). This was conducted through children's self-reports and caregivers' ratings. The correspondence between the two perspectives on the child's personality was examined. Study III further explored personality as a predictor of mental health (both well-being and mental health problems) and alcohol inebriation another year later (at approximately age 14–15). More specifically, the study examined gender-specific patterns in mental health factors and personality traits and their association with alcohol inebriation.

The word *gender* in this thesis refers to the sexual category (i.e., binary sex) of the child (girl or boy). Gender differences (and similarities) and gender-specific patterns were analyzed through separate analyses of girls and boys to improve the applicability of the results to girls and boys separately as well as jointly to young adolescents in general.

Alcohol consumption in adolescence

One of the goals of both Swedish and international alcohol policies is to postpone the age of alcohol debut (Brand, Saisana, Rynn, Pennoni, & Lowenfels, 2007). This is reflected in legislation in Sweden and elsewhere restricting alcohol use for youths under 18 years (or up to 21 in other countries) due to the many risk factors associated with early debut and further developmental trajectories (biological, psychological, and social). To enforce the restrictive alcohol policy, Sweden has a government alcohol monopoly named "Systembolaget" for the sale of all beverages stronger than 3.5% by volume. Minimum purchase age at "Systembolaget" is 20 years, but at 18 years adolescents can order alcohol at restaurants and bars with proper permission.

Alcohol consumption among adolescents seems to have declined collectively among 15- to 16-year-olds (school year 9) and 17- to 18-year-olds (year 2 of upper secondary school) between the years 2004 and 2012 in Sweden and other Nordic countries (Englund, 2014; Hibell et al., 2012; Kraus, Guttormsson, Leifman, Arpa, & Molinaro, 2016; Norstrom & Svensson, 2014; Raninen, Livingston, & Leifman, 2014; Thor, 2017). See Figure 1 for an overview of the percentages of students in school year 9 and year 2 of upper secondary school who reported having consumed alcohol during the past 12 months. The prevalence numbers for 2015 to 2017 are the lowest since first measured in 1971 (Gripe, 2015; Thor, 2017). In 2017, about 43% of the girls and 37% of the boys aged 15 to 16 had drunk alcohol in the last 12 months; comparable numbers for 17- to18-year-olds were 76% and 73%, respectively (Gripe, 2015; Thor, 2017). Hence, a slightly higher proportion of girls than boys are categorized as alcohol consumers, but boys in late adolescence generally drink more alcohol than girls do (Gripe, 2015; Thor, 2017). Alcohol use in the early phase of adolescence is generally low. Approximately 11% of both girls and boys aged 15 to 16 years reported that they had tried alcohol (i.e., one glass or more) at age 13 or younger, and about 4% reported that they had been inebriated at age 13 or younger (Gripe, 2015; Thor, 2017). These figures also clearly declined in Sweden from 2012 to 2017. See Figure 2 for the percentage of students in school year 9 who reported having consumed alcohol or become inebriated at the age of 13 or younger.

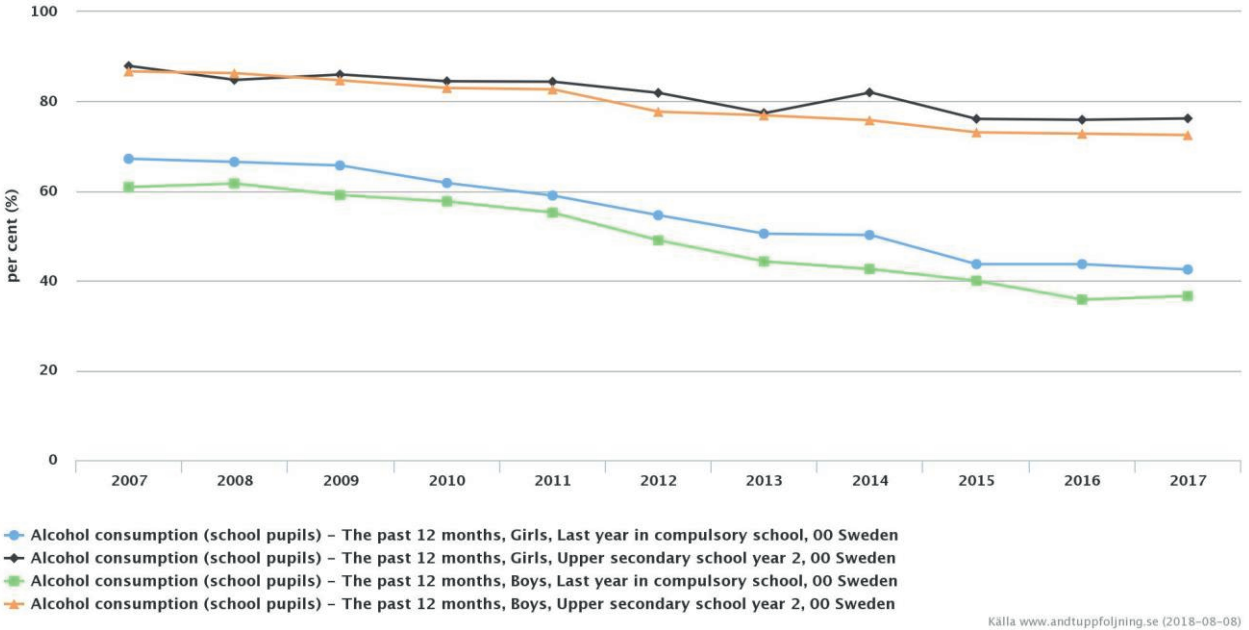

Figure 1. Alcohol consumption among school students, 2007–2017, reprinted with permission from the Swedish Council for Information on Alcohol and Other Drugs (CAN) via Public Health Agency of Sweden (2018).

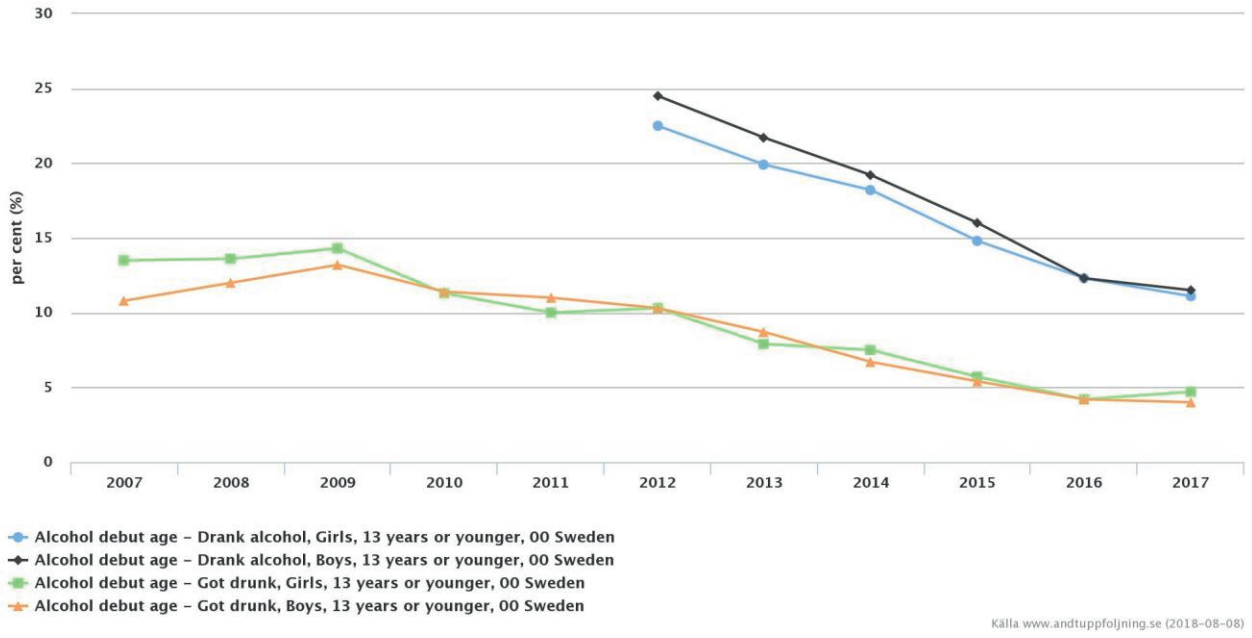

Figure 2. Alcohol debut age 13 years or younger, 2007–2017, reprinted with permission from the Swedish Council for Information on Alcohol and Other Drugs (CAN) via Public Health Agency of Sweden (2018).

Heavy drinking and alcohol inebriation

The recent report of ESPAD (European School Survey Project on Alcohol and Other Drugs) states that although alcohol consumption declines, "heavy episodic drinking" (five or more drinks on one occasion) commonly continues among alcohol-drinking adolescents (Kraus et al., 2016). International studies have shown that Swedish adolescents drink alcohol relatively less often than those in other European countries, but when they do, they more often drink to get inebriated (Kraus et al., 2016). Inebriation in the present thesis refers to the subjective experience of drunkenness (ranging from feeling relaxed and confident to becoming emotional, loud, and physically and psychologically impaired) and uses no objective measure such as quantity or blood alcohol content (BAC). BAC is commonly used in medical settings and/or for legal purposes, and the first effect of alcohol can be noticed at around 0.02%. The National Institute on Alcohol Abuse and Alcoholism (NIAAA) defines the term "binge drinking" as a pattern of drinking that brings a person's blood alcohol concentration (BAC) to 0.08% or above. This typically happens when men consume five or more drinks and women consume four or more drinks in about two hours. Hence, heavy episodic drinking or binge drinking implicitly involves inebriation, especially in growing young adolescents with immature biological systems. Heavy episodic drinking among European adolescents increased among girls from approximately 29% in 1995 to 38% in 2011. The same figures among boys are 41% and 43%, respectively, which implies that girls are adopting a drinking pattern more similar to the boys' (Hibell et al., 2012).

Alcohol consumption in early adolescence (12–14 years) does not usually differ between boys and girls (Young et al., 2002). Gender differences have instead been found to emerge later on, when the prevalence of alcohol abuse/dependence is substantially higher among boys and young men (Young et al., 2002). Nevertheless, girls' patterns of alcohol consumption continue to rise and to approach a pattern similar to the boys'. ESPAD states that gender convergence in drinking alcohol is much more visible in heavy episodic drinking than in regular drinking behaviors (Kraus et al., 2016).

Alcohol consumption—causes and consequences

Alcohol consumption (especially inebriation) in adolescence is related to risky sexual behavior, violence, and accidents as well as future mental health problems (Arata, Stafford, & Tims, 2003), although alcohol consumption per se is

neither necessary nor sufficient for developing heavy drinking or alcohol-related symptoms in adult age (Wennberg & Andersson, 2013; Wennberg et al., 2000). Nevertheless, an early alcohol debut (12–14 years of age) is a significant predictor for developing future heavy drinking, alcohol-related problems, and illicit drug use (Behrendt et al., 2012; Behrendt et al., 2009; Kessler et al., 1996; Lin et al., 2016; Pampati et al., 2018; Pedersen & Skrondal, 1998; Wennberg & Andersson, 2013; Wennberg et al., 2000), especially among adolescents with concurrent mental health problems (Kessler et al., 1996). A reciprocal relation between mental health problems and alcohol consumption in adolescence has been reported by the Public Health Agency in Sweden and internationally (Kessler et al., 1996; Malmgren, Ljungdahl, & Bremberg, 2008; Willoughby & Fortner, 2015). Retrospective results show that concurrent mental health problems and alcohol problems usually start at the age of 12 to 14 (Kessler et al., 1996). For example, alcohol use at a young age predicts depressive problems later in life and depressive problems at a young age predict an increased use of alcohol in adulthood (Malmgren et al., 2008). Willoughby and Fortner (2015) investigated concurrent depressive symptoms and alcohol consumption in adolescents aged 14 to 17 in Canada. The findings showed that 10% to 14% of the adolescents had high levels of both depressive symptoms and alcohol use; 14% to 15% reported high prevalence of depressive symptoms only, and 32% to 37% reported at-risk alcohol use only. Findings have shown that high levels of depressive symptoms are linked to alcohol problems initially among girls and to more destructive progress regarding alcohol use over time for boys (Marmorstein, 2009). Multiple, not single, adjustment problems, as well as psychopathology in early adolescence will significantly increase the risk for alcohol abuse (Andersson, Bergman, & Magnusson, 1989).

Studies have found that externalizing problems during childhood are associated with the use of tobacco, alcohol, cannabis, and other illicit substances at age 15 to 16 and in early adulthood for both males and females (Steele, Forehand, Armistead, & Brody, 1995; Young et al., 2002). However, externalizing problem behavior as a child did not predict how often girls aged 15 to 16 had been inebriated (Steele et al., 1995). On the contrary, higher scores on internalizing behavior problems as a child were related to less alcohol consumption in early adulthood among girls (Steele et al., 1995). More recent findings show that internalizing problems are not an individual risk factor for substance use, but rather a consequence, specifically among girls (Miettunen et al., 2014). Longitudinal studies among older age cohorts (i.e., college students) also show that girls and young women with higher emotional instability may tend to avoid heavy alcohol intake (Lac & Donaldson, 2016), and therefore that they may follow a different drinking trajectory than boys and men (Lac & Donaldson, 2016; Steele et al., 1995).

Most research on alcohol consumption has investigated adolescents aged 15 years and older (Bauman & Phongsavan, 1999; Gripe, 2015; Hibell et al., 2012; Kraus et al., 2016; Thor, 2017). Hence, there is a need for information and deeper understanding of alcohol experiences and alcohol habits among young adolescents aged 15 and younger. There are, however, a few published studies in this area. Van Der Vorst, Vermulst, Meeus, Dekovic, and Engels (2009), for example, investigated alcohol consumption in early adolescence (from age 13 to 16), primarily focusing on drinking trajectories for boys and girls through early and middle adolescence. The study did not include mental health profiles, but the authors concluded that being a boy and having a close friend or a father who drinks heavily and caregivers who are permissive towards alcohol use increases the risk of heavy drinking in adolescence. In addition, findings have also shown that low levels of life satisfaction among children/adolescents aged 11 to 14 are associated with early alcohol use (Proctor & Linley, 2014). A Swedish study by Salmi, Berlin, Björkenstam, and Ringbäck Weitoft (2013) identified a high-risk group of 15-year-olds who were primarily boys not thriving in life and consuming alcohol at an intense level (Salmi et al., 2013).

To summarize, although above-mentioned studies have found evidence for relationships between alcohol use and mental health variables among adolescents, there is still a need for studies that combine information on mental health, gender, and early alcohol use. Especially needed are investigations into how these patterns of variables relate to each other in the young population of girls and boys aged 12 to 15 years.

Mental health among adolescents

A psychopathological perspective focused on psychiatric diagnoses and mental health problems is frequently used to investigate mental health among children and adolescents. Screening for mental illness (e.g., emotional or behavioral problems) is often used to draw conclusions about a persons' mental health status (Gillham, Reivich, & Shatté, 2002) because poor mental health reduces school achievements, employment, social networks, and opportunities to build a family (Currie et al., 2012). However, good mental health is *more* than just the absence of mental health problems (Gillham et al., 2002). The World Health Organization clearly states that "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 2014).

Mental well-being

The field of positive psychology is concerned with individuals' experiences and perceptions of the past, present, and future (Seligman & Csikszentmihalyi, 2000). Mental well-being in the present thesis is defined as a multidimensional concept within the field of positive psychology. The concept of well-being can be defined from *subjective/emotional*, *psychological*, and *social* perspectives. Subjective/emotional well-being (Diener, 1984; Pavot & Diener, 2008) refers to positive feelings and satisfaction with life (hedonia). Psychological well-being and social well-being concern the individual's positive functioning in daily life and in relation to society (eudaimonia). Factors linked to psychological well-being are purpose in life, environmental mastery, autonomy, personal growth, positive relations, and self-acceptance (Ryff, 1989, 2014; Ryff & Keyes, 1995). Social well-being captures the individual's experiences of social acceptance, actualization, contribution, coherence, and integration (Keyes, 1998). Reports of hedonia and eudaimonia must be collected in parallel if we want to measure optimal well-being (Keyes, 2007), although positive feelings will automatically accompany psychological well-being (Ryff & Singer, 2008).

All of the previously mentioned constructs connect to a broader latent factor called *flourishing*, which includes high levels of all three dimensions of well-being: emotional, psychological, and social (Keyes, 2002, 2006, 2013; Keyes & Annas, 2009). The opposite of flourishing is *languishing*, the feeling that one's time and life have been wasted and purposeless. The experience of meaning in life is central to psychological well-being (Steger, Frazier, Oishi, & Kaler, 2006; Steger, Oishi, & Kashdan, 2009); however, the *search* for meaning in life in adolescence can be a sign of personal growth and high levels of meaning can counterbalance the effects of low subjective well-being and high negative affect (Steger et al., 2009).

Studies among Swedish young people have reported a high prevalence of mental well-being (Berlin, Modin, Gustafsson, Hjern, & Bergström, 2012; Petersen et al., 2010). Results from the World Health Organization in Europe also show that a majority of young people in Western countries, especially boys (11 and 15 years), are satisfied with life (Currie et al., 2012). Girls also report life satisfaction, but typically with significantly lower levels than boys at age 15 (Currie et al., 2012; Moksnes & Espnes, 2013). Findings suggest that self-reported life satisfaction among girls declines between the ages of 11 and 15 years (Currie et al., 2012).

Mental health problems

Mental health problems are defined in this thesis as emotional and behavioral problems experienced by the individual, which may influence their relationships and/or everyday functioning in life (Goodman & Goodman, 2009; Goodman, Lamping, & Ploubidis, 2010). The concept of mental health problem is qualitative and related to both subjective and objective evaluations.

Differences in time perspectives, informants (i.e., child vs. caregiver), study samples, and measures make it difficult to draw overall conclusions on international trends in mental health problems among youth in Western countries (Petersen et al., 2010). Although studies report a high prevalence of mental well-being, studies that specifically investigated mental health problems have shown that mental health problems, especially self-reported anxiety and depression, have increased among Swedish children and adolescents since the 1980s (Heimersson et al., 2013; Salmi et al., 2013). Some studies report increased internalizing problems and total problems, especially among young girls, although results for externalizing problems are more ambiguous (Petersen et al., 2010).

It seems that self-reported symptoms of anxiety and depression have increased, but we know too little about the causes of this escalation. One suggestion is that increased self-reported mental health problems are due to excessive demands on mental well-being in an extremely individualistic society and a decreased tolerance toward different psychological symptoms. Perfect health has perhaps become an internalized expectation among youths in Sweden (and possibly among adults as well). Disappointments can therefore potentially lead to stress and mental overload (Lindblad & Lindgren, 2010).

Data from the National Ambulatory Medical Care Survey in the U.S. indicate that there has been an expansion in mental health care for children and adolescents in office-based medical practice over the last years, and the use of mental health care has increased more rapidly among young people than adults (Olfson, Blanco, Wang, Laje, & Correll, 2014). Although mental health problems seem to have increased, the level of serious psychiatric cases (e.g., schizophrenia and bipolarity) among adolescents has not increased in Sweden or internationally (Bremberg, Hæggman, & Lager, 2006; Currie et al., 2012; Petersen et al., 2010). Although mental health problems commonly occur in adolescence, it is worth noting that most Swedish adolescents do not report severe mental health problems needing therapeutic treatment in psychiatric care (Salmi et al., 2013).

Consistent gender differences in mental health problems have been found among adolescents, both in Sweden and internationally. Boys continue to report higher levels of externalizing (behavioral) problems and girls report more

internalizing (emotional) problems (Berlin et al., 2012; Currie et al., 2012; Koskelainen, Sourander, & Vauras, 2001; Lundh, Wangby-Lundh, & Bjarehed, 2008; Ronning, Handegaard, Sourander, & Morch, 2004). Girls in their late teens report higher levels of internalized problems than boys at the same age, and the proportion of teenage girls with depressive symptoms has doubled, and in some cases tripled, in Swedish society over the last 20 to 30 years (Bremberg et al., 2006; Salmi et al., 2013). In Sweden, the need for in-patient care for depression and anxiety seems to have increased among 15- to 24-year-olds, more among girls than boys, and the proportion of both girls and boys seeking out-patient psychiatric care for anxiety/depression has increased (Petersen et al., 2010).

Despite the aforementioned gender differences in mental health problems, it is important to note that the total amount of reported symptoms, externalizing and internalizing added together, usually do not differ for girls and boys in early adolescence (Berlin et al., 2012; Koskelainen et al., 2001; Lundh et al., 2008; Ronning et al., 2004). Targeting young peoples' health from a gender perspective may therefore have considerable potential to reduce gender health differences in adulthood (Currie et al., 2012). However, it is valuable to attain greater understanding about which aspect of mental health might be particularly important to target. Should we focus on treating mental health problems and/or stimulating factors that improve well-being?

The two-continua model of mental health

The positive perspective on mental health has long been neglected in favor of psychopathological perspectives (Gillham et al., 2002; Seligman & Csikszentmihalyi, 2000). However, it is now emerging in the field of developmental psychology (Seligman & Csikszentmihalyi, 2000). Promotion of mental well-being can provide resilience in the face of risk (i.e., presence of mental health problems and/or psychiatric diagnoses). Research therefore suggests that today's society should be concerned not only with mental health problems and psychiatric diagnoses, but also with mental well-being (Keyes, 2007, 2013; Ryff, 1989, 2014).

Previous findings have suggested that mental health problems and mental well-being function on two related, but different, continua and both dimensions contribute to the complete understanding of a person's general mental health status (Greenspoon & Saklofske, 2001; Keyes, 2005). See Figure 3 for an overview of the two-continua model of mental health, which consists of one scale for flourishing vs. languishing (i.e., the presence or absence of emotional, psychological, and social well-being) and another for the presence or absence of mental health problems (Keyes, 2005, 2013). Findings have shown that the

risk of developing a mental illness is six times higher for adults in a languishing state of mind (Keyes, 2002). Further studies also suggest that anything except flourishing, despite concurrent mental health problems, in both adults and adolescents is associated with greater burdens both to self and to society (Keyes, 2013; Keyes & Annas, 2009). Languishing is related to depressive symptoms, conduct problems, school problems, and social dysfunction. It involves a general absence of positive feelings and life satisfaction, lack of psychological well-being (e.g., environmental mastery, purpose in life, and autonomy), and lack of social well-being (e.g., sense of belonging in and contributing to society) (Keyes, 2006). However, languishing is not equivalent to having mental health problems and might therefore need slightly different treatment, for example, a focus on improving emotional, psychological, and social experiences in everyday life instead of only on symptom reduction. The most unfortunate combination would be to both have high mental health problems and be languishing, as that would mean low resilience in the face of high risk (Keyes, 2007).

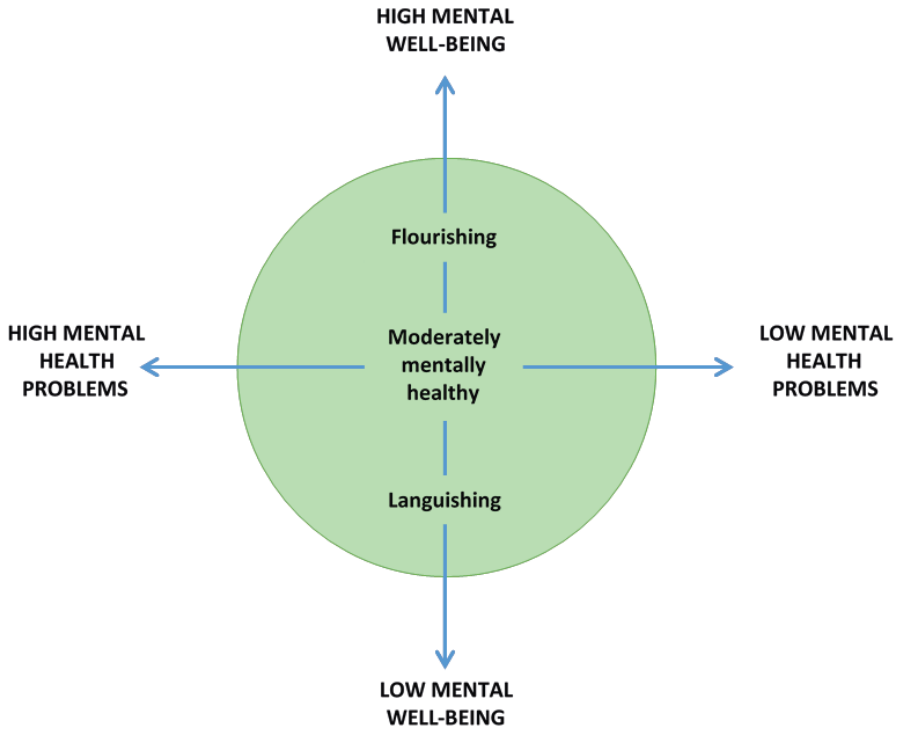

Figure 3. The two-continua model of mental health, modified with permission from Keyes (2013).

Mental health problems among children and adolescents are nevertheless a relevant political and social issue, but much of the research on mental health in general and well-being in particular has been carried out in adult populations. In addition, the concept of well-being is mostly lacking in analyses of mental health among children and adolescents. Hence, there is a need for studies on young populations that apply and evaluate the two-continua model across broader, and younger, age samples (Proctor, Linley, & Maltby, 2008).

To sum up, knowledge about the relationship between mental health problems and mental well-being among young adolescents is still needed. The most common practice is to investigate these two dimensions separately, but the results are then often contradictory and difficult to draw conclusions from, especially when targeting mental health and alcohol use from a gender perspective. Furthermore, knowledge about other important variables that affect both increased mental health problems and alcohol use, such as personality traits, are etiologically valuable.

Personality

Personality refers, in contrast to mental health, to a normative and relatively stable set of behaviors (including thinking, perceiving, and feeling) (Caspi, Roberts, & Shiner, 2005). The origin of the word comes from the Latin word *persona,* which was the name of the facial mask used by actors in theaters in ancient Greece. Currently, however, personality is considered the opposite of a mask and instead as the expression of the true person (Karterud, Wihlberg, & Urnes, 2014). The concept of personality can be defined in multiple ways, and the psychological literature contains a range of models. Many definitions focus on individual differences. Developmental studies of personality have suggested that personality is quite consistent over time and apparent in early childhood, but not stable until early adulthood, although it continues to develop throughout the life course (Brändström, Sigvardsson, Nylander, & Richter, 2008; Caspi et al., 2005). Personality *traits* have been shown to be useful predictors of functioning in diverse situations in a person's life (Caspi et al., 2005).

The biopsychosocial model

The biopsychosocial model of personality, developed in the early 1990s, describes personality as dynamic, non-linear, and separated into heredity (temperament) and socially learned (character) dimensions (Cloninger, Svrakic, & Przybeck, 1993). Psychological traits of personality are assumed to mature as

the individual's genetic predispositions interact with the surrounding environment (Cloninger, 1994). The definition of personality in this model, influenced by Allport (1961) is the dynamic organization of psychobiological systems within the individual by which the person both shapes and adapts uniquely to an ever-changing internal and external environment (Cloninger et al., 1993). The aim of this model was first to create a clinical personality questionnaire to capture the genetic foundations of a person's personality. These theoretical foundations were drawn from the two personality dimensions defined by Eysenck (1967) as biologically derived: (1) introversion versus extraversion and (2) neuroticism/emotional instability versus emotional stability. These dimensions were later replaced by dimensions based on how the individual responds to pleasure and pain (Gray, 1975), which were further conceptualized as three dimensions of temperament: Harm Avoidance, Novelty Seeking, and Reward Dependence (Cloninger, 1987).

Early temperament traits (i.e., basic reactive behaviors with a presumed biological basis) have long been the focus of child psychologists. Practitioners and researchers working with adults have instead focused on more sophisticated personality characteristics. The contemporary science of personality developmental now concludes that "[…] childhood temperament should be conceptualized with an eye toward adult personality structure, and adult personality should be understood in light of its childhood antecedents" (Caspi et al., 2005, p. 454). Temperament plays an important role in children's developmental toward greater maturation and responsibility, and the adult personality is in turn founded on early temperament traits. For example, the interaction and attachment between child and caregiver depends on the caregiver's ability to tune in to the child's activity level and emotional needs, both of which are part of basic reactive behaviors.

Temperament dimensions in the biopsychosocial model of personality have their origin in the individual's biological (i.e., genetic) disposition to activation, endurance, and inhibition. Hence, temperament is linked to the person's automatic response to stimuli (Cloninger et al., 1993). Character dimensions in the model are best described as people's thoughts, feelings, and behaviors towards themselves, other people, and their own life situations. All these experiences and capabilities are said to develop epigenetically through complex social learning processes during childhood (Cloninger et al., 1993). Thus, temperament dimensions are biological and genetically derived and not seen as changeable, whereas character dimensions can develop and change through interactions with the environment (Cloninger et al., 1993).

The adolescent personality plays an important role in mental health and positive functioning. Mental health has been described as: "[…] a state of well-being in which a person realizes and uses his or her own abilities, can cope

with the normal stresses of life, can work productively and fruitfully, and is able to contribute to his or her community." (WHO, 2014). This definition is very similar to the description of the character dimensions of Self-Directedness, Cooperativeness, and Self-Transcendence, all of which are included in Cloninger's personality model (Cloninger et al., 1993).

Temperament and character

The *Temperament and Character Inventory* (TCI) is a widespread inventory for assessing personality traits. The inventory is founded on the seven-dimensional biopsychosocial model of personality (Cloninger, 1994; Cloninger et al., 1993). Today the inventory consists of four temperament dimensions and three character dimensions to describe the underlying structure of a personality (see Figure 4). The inventory was originally known as the *Tridimensional Personality Questionnaire* (TPQ) and was based only on genetic predispositions (i.e., a biopsychological model). The TPQ was created to assess temperament traits and included the three temperament dimensions (Cloninger, Przybeck, & Švrakić, 1991). Unfortunately, the questionnaire could not help clinicians to differentiate individuals with personality disorders or social problems from well-functioning individuals with an extreme temperament profile. As a result, the TPQ underwent revisions and was extended with questions measuring character dimensions and one additional temperament dimension: Persistence. This "new" subscale was initially a part of Reward Dependence, but factor analyses showed evidence for a separate construct, which motivated further modification of the model (Cloninger et al., 1993).

The temperament dimensions in TCI are (1) Novelty Seeking: activity level, impulsivity, need for exploration, (2) Harm Avoidance: emotionality, level of anxiety, fear, and lack of trust in the unknown, (3) Reward Dependence: reward seeking behavior, level of attachment, and social dependence, and (4) Persistence: endurance in problem solving, commitment to tasks and goals despite frustration and fatigue (Cloninger, 1994). Support for the personality model consisting of four independent, but inter-correlated temperament dimensions, was found in a recent meta-analysis by Miettunen, Lauronen, Kantojarvi, Veijola, and Joukamaa (2008). The results showed a negative correlation with medium effect between Novelty Seeking and Harm Avoidance (Miettunen et al., 2008), which implies that these two dimensions are each other's antagonists.

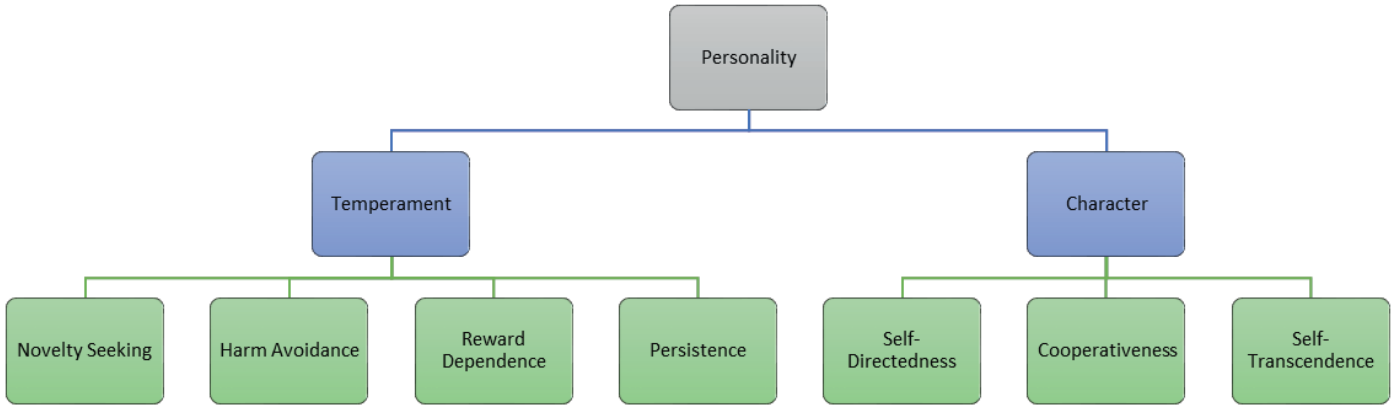

Figure 4. The biopsychosocial model of personality, modified with permission from Cloninger et al. (1993).

The character scales in TCI are (1) Self-Directedness: ability to steer and maneuver behavior, self-acceptance, and self-efficacy, (2) Cooperativeness: ability to cooperate, accept and help others, and (3) Self-Transcendence: level of spiritualism and ability to experience a larger universal perspective (Cloninger, 1994). Conclusions about a person's maturity can be drawn from the first two character dimensions, Self-Directedness and Cooperativeness. High scores on these two character dimensions imply a mature personality and the capacity to regulate behavior despite a challenging temperament (Cloninger, 1994; Cloninger et al., 1993).

TCI is theoretically founded in biological, psychological, and sociological perspectives and developed through clinical experiences (Cloninger, 1994). The inventory can enhance understanding of individual predispositions in treatment and relapse prevention. In psychotherapy, within-individual change is in focus when patients are encouraged to develop their characters and understand their inner processes and behavior patterns through attaining insight into their problems (Cloninger & Cloninger, 2011).

Previous research on TCI has shown that spouses are able to rate their partner's personality with an average correlation of 0.58 (Brändström, Przybeck, & Sigvardsson, 2011). However, spouses have the tendency to rate their partner's character (0.53) slightly less accurately than their temperaments (0.64). The findings gave little support for the idea that one member of a spousal pair would be a better rater than the other.

Personality assessment in childhood and adolescence

Several different personality measures have been adapted to assess personality in childhood and adolescence. These are mainly based on trait theories (e.g., the "Big Five" and three-factor models), and caregivers or school teachers are usually the ones asked about the child's personality (Shiner & Caspi, 2003). The *Junior Temperament and Character Inventory* (JTCI) is an adapted version of TCI made for children and adolescents (Luby, Svrakic, McCallum, Przybeck, & Cloninger, 1999). The JTCI has two versions to capture the child's personality structure: one self-report version for the child/adolescent to fill in and one caregiver version for the caregiver (i.e., parent or parental figure) rate the child's temperament and character.

Research on the JTCI is increasing, and the instrument has been investigated psychometrically in different countries among children and adolescents in clinical samples (Cho et al., 2008; Cho et al., 2009; Copeland, Landry, Stanger, & Hudziak, 2004; Hemphälä, Gustavsson, & Tengström, 2012), general samples (Andriola et al., 2012; Asch et al., 2009; Luby et al., 1999; Lyoo et al., 2004; Moreira et al., 2012; Vangberg et al., 2013), and twin samples

(Isen, Baker, Raine, & Bezdjian, 2009; Kerekes et al., 2010). However, only one Korean study has investigated the self-report and caregiver versions (JTCI 108 items) in parallel in a general sample (Lyoo et al., 2004). The results confirmed that the JTCI had satisfactory psychometric properties for use in child and adolescent populations. The children's self-reports showed that children gave themselves higher scores on Novelty Seeking, Reward Dependence, Persistence, and Self-Transcendence than the caregivers did. No substantial differences were found on Harm Avoidance, Self-Directedness, and Cooperativeness between the children's and the caregivers' perspectives (Lyoo et al., 2004). The Korean study concluded that children had a more "assertive" view of themselves than their parents.

In Cloninger's original personality model, temperament dimensions were hypothesized as heritable and stable and the character was expected to mature through socialization (Cloninger et al., 1993). Both temperament and character domains were nevertheless seen as part of a repetitive epigenetic process in which each interacts with the other to motivate behavior (Cloninger et al., 1993). Later findings from twin studies in children aged 9 to 10 years (Luby et al., 1999) and adults (Gillespie, Cloninger, Heath, & Martin, 2003) have shown that both temperament and character dimensions can be heritable. Moreover, the results also showed that a shared environment did not contribute significantly to comparable character development in adults (Gillespie et al., 2003).

The JTCI/TCI is a helpful instrument to enhance our understanding and to describe development and change in personality over time, both *within individuals*, as in psychotherapy (Cloninger & Cloninger, 2011), and *between individuals*, as in age, gender, and norm comparisons (Cloninger, 1994). The JTCI can also function as a screening instrument to identify children and adolescents at risk for developing mental health problems, personality disorders, or other problem behaviors.

Personality, mental health, and alcohol use among adolescents

Temperament and character dimensions are associated with both positive aspects (e.g., prosocial behavior and well-being) and negative aspects (e.g., attention-deficit hyperactivity disorder and emotional problems) of adolescent mental health (Andriola et al., 2012; Cho et al., 2008; Cho et al., 2009; Garcia, 2011; Garcia, Kerekes, Andersson Arnten, & Archer, 2012; Garcia & Moradi, 2011). Character dimensions also add valuable information about the mature or immature personality and possible personality disorders (Cloninger et al., 1993; Richter & Brandstrom, 2009). Low scores on the character dimensions have been linked to symptoms of personality disorders, while the temperament

profile may help to discriminate between different types of personality disorder (Svrakic et al., 2002).

The temperament and character dimensions in adolescence can also provide predictive information about the possible development of alcohol and substance abuse disorders (Mulder, 2002; Wennberg & Bohman, 2002). Namely, personality variables such as Impulsivity, Novelty Seeking, and low levels of Harm Avoidance at age 11 have been identified as early individual risk factors for alcohol abuse at age 27 (Cloninger, Sigvardsson, & Bohman, 1988). Specific alcoholic subtypes among adults (Type I, Type II) have previously been defined based on debut of alcohol problems and personality profile (Cloninger, Bohman, & Sigvardsson, 1981; Cloninger, Sigvardsson, & Bohman, 1996); however, the homogeneity of these subtypes has been criticized (Mulder, 2002; Wennberg, Berglund, Berggren, Balldin, & Fahlke, 2014). Type I has a relatively late onset, low Novelty Seeking, high Harm Avoidance, and high Reward Dependence, while Type II has early onset and the opposite combination: high Novelty Seeking, low Harm Avoidance, and low Reward Dependence (Cloninger et al., 1996). The effectiveness of these temperament dimensions as predictors of alcohol use have been confirmed in prospective longitudinal studies from childhood to early adulthood (Cloninger et al., 1988) and in studies of young adolescents (Adan, Forero, & Navarro, 2017; Nees et al., 2011; Whelan et al., 2014).

Gender differences on the group level have been found on the temperament dimensions of Novelty Seeking and Harm Avoidance. Girls report higher mean levels on Harm Avoidance whereas boys report higher mean levels on the Novelty Seeking scale (Andriola et al., 2012). Findings from the same study also showed associations between Harm Avoidance and internalizing (emotional) problems. Moreover, studies of the biopsychosocial model and mental health problems among adolescents show that high Harm Avoidance and low Reward Dependence (temperament) as well as low Self-Directedness and high Self-Transcendence (character dimensions) are related to internalizing problems (Kim et al., 2006). Externalizing problems are related to high Novelty Seeking, high Harm Avoidance, low Self-Directedness, low Cooperativeness. and high Self-Transcendence (Kim et al., 2006). Further, high Self-Directedness is related to more positive and fewer negative feelings among adolescents, especially when combined with high Cooperativeness (Schütz, Archer, & Garcia, 2013). Hence, a mature character combination relates to a positive health outcome.

Personality assessments using the JTCI may facilitate the identification of adolescents at risk of developing personality disorders, mental health problems, or other behavioral problems such as early alcohol inebriation. New Swedish norms were established for the TCI 10 years ago (Brändström et al., 2008),

and the important creation of separate gender and age specific norms was urged. The norm study also concluded that the TCI is poorly suited for children and adolescents under the age of 17. Instead, the JTCI (Luby et al., 1999) was recommended. However, norms and psychometric validation of the Swedish self-report and caregiver versions of JTCI are still lacking for young adolescents.

Self versus other evaluations

Substantial research indicates discrepancies between observer (e.g., caregiver) ratings and adolescents' self-reports on personality (Brändström et al., 2011; Lyoo et al., 2004; McAbee & Connelly, 2016), mental health problems (De Los Reyes et al., 2015; Goodman et al., 2010), and relational phenomenon (e.g., parental knowledge and family behavior; Ohannessian, Lerner, Lerner, & von Eye, 2000; Reidler & Swenson, 2012; Reynolds, MacPherson, Matusiewicz, Schreiber, & Lejuez, 2011). Discrepancies in perceptions of family functioning are related to lower levels of adolescent self-competence for both genders (Ohannessian et al., 2000). However, such discrepancies also seem to affect girls' and boys' mental health somewhat differently. For example, discrepancies between fathers' and childrens' reports are related to higher levels of self-competence in boys, but not in girls. The ability of a child to report similarly to a caregiver might therefore be due to reciprocal associations between the child's self-rated level of self-competence and level of discrepancy on reports of family function (Ohannessian et al., 2000).

Discrepancies are quite common between caregivers' and adolescents' reports and seem to change through different developmental phases (De Los Reyes, Ohannessian, & Laird, 2016). The developmental period of adolescence is characterized by the child's growing autonomy and caregivers' reduced knowledge of their child's everyday life (e.g., their whereabouts as well as their thoughts, feelings, and behaviors) (Collins et al., 2002; Steinberg & Silk, 2002). However, *too* large a discrepancy between caregiver and child perspectives might indicate relational or communicational problems and might be related to risk behaviors and mental health problems (De Los Reyes, Goodman, Kliewer, & Reid-Quiñones, 2010; Reidler & Swenson, 2012; Reynolds et al., 2011).

How the caregiver seeks information about the child is also relevant when considering the caregiver's insight in their child's life. Different sources of knowledge (e.g., parental solicitation, parental control, and child disclosure) have been defined (Kerr & Stattin, 2000). The findings suggest that caregiv-

ers' monitoring skills are related to different styles of parenting and may explain the child's adjustment (i.e., a parenting style promotes the child's voluntary disclosure is preferable) (Kerr & Stattin, 2000).

Previous research in personality assessment has shown that discrepancies between self and others' ratings is normal (i.e., an exact overlap is impossible when evaluating subjective experiences). Discrepancies in personality ratings have been explained as one person's projection of their own self in their ratings of the other (Brändström et al., 2011), their idealization of the rated subject, and as a reflection of cultural stereotypes (Löckenhoff et al., 2014). Self versus other ratings of internal properties have shown larger discrepancies than observable personality traits and behavior (McAbee & Connelly, 2016). Hence, observer ratings of character traits (i.e., thoughts, feelings and behaviors towards one-self) tend to be less accurately rated and more affected by the subjectivity of the observer than temperament traits (i.e., automatic responses to stimuli) (Brändström et al., 2011).

Disagreements between the child's own experiences and the experiences of the observer (e.g., teacher or caregiver) have also been found in ratings of mental health problems (De Los Reyes et al., 2015; Goodman et al., 2010). The tendency for the observer is to rate internalizing problems (e.g., anxiety and sadness) less accurately than externalizing problems (e.g., aggression and hyperactivity). Internalizing problems seem more difficult for an adult to detect rather than externalizing problems (De Los Reyes et al., 2015; Goodman et al., 2010).

The famous *Johari window* (Luft & Ingham, 1955) can be used conceptually to illustrate potential differences in self–other knowledge of a person's personality (see Figure 5). The Johari window consist of four fields: (1) personality traits known to both self and others (*arena*), (2) personality traits known only to self, not to others (*façade*), (3) personality traits unknown to the self, but known to others (*blind spot*), and (4) personality traits unknown both to the self and to others (*unknown*). The more recently developed Self–Other Knowledge Asymmetry (SOKA) model (Vazire, 2010) expands the Johari window by adding accuracy in judgment/knowledge as an element. The SOKA model proposes, "that others know more than the self about observable traits and the self knows more than others about traits low in observability" (Vazire, 2010, p. 284).

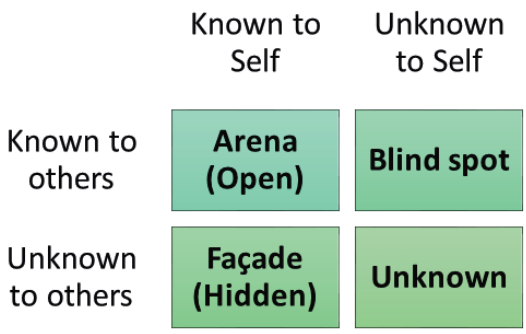

Figure 5. The Johari window, modified from Luft and Ingham (1955).

Hence, for knowledge about children's and adolescents' experiences of themselves (e.g., personality function or mental health status) caregivers, practitioners, and researchers need to ask them directly. Observer ratings are helpful, however, although insufficient as the sole source of knowledge, when gathering information about a child. Discrepancies are more than just a sign of measurement variance (error) and can instead function as a source of knowledge about the child from different perspectives and settings (e.g., caregiver at home or teacher at school) (De Los Reyes et al., 2015).

Studying gender differences and similarities

The World Health Organization defines *gender* as the "[…] socially constructed characteristics of women and men – such as norms, roles and relationships of and between groups of women and men. It varies from society to society and can be changed." (WHO, 2011, p. 134) Non-binary gender models that acknowledge additional gender categories to the conventional male/female dichotomy are more frequently accepted and used in other areas, but remain less common in epidemiological research. WHO describes gender norms, roles, and relations as important factors in people's vulnerability to different health conditions (e.g., physical and mental health and well-being). They also affect the accessibility and assimilation of health services for people throughout their lives (WHO, 2011). For example, girls might be more vulnerable to internalizing problems and boys to externalizing problems, and prevention and interventions targeting these issues might be more or less developed. Whether girls and women differ from or share similarities with boys and men has been

of great interest throughout history. Several theories, from biological/evolutionary to social cultural, have been developed to explain and describe the origins (e.g., in reviews by Hyde, 2014; Zahn-Waxler, Shirtcliff, & Marceau, 2008) of different gender roles. Biological/evolutionary theories emphasize gender expression as part of evolutionary selection (i.e., different behaviors are more or less adaptive for women and men, respectively). Sociocultural theories, on the other hand, argue that gender differences are strongly influenced by power inequality (e.g., in the labor force) (Hyde, 2014).

Gender as a variable in psychological research can be included in numerous analytical methods (e.g., Field, 2013), a few of which are highlighted here. The most common strategy is to focus on gender differences and treat gender as a group indicator with the aim of finding potential group effects (e.g., significant differences in mental health or personality traits) (Hyde, 2014). Studying differences is important to provide scientifically underpinned knowledge about the potential accuracy of gender stereotypes (Hyde, 2014; Löckenhoff et al., 2014). Understanding gender differences can also guide policy makers and professionals when developing strategies, for example, to support mental health among adolescents (Currie et al., 2012). However, reviews indicate that the sexes are similar on most, but not all, psychological variables (Hyde, 2014). Hence, not *all* boys can be characterized as having externalizing problems and not *all* girls can be characterized as having internalizing problems based on significant group differences in these types of mental health problems. Gender is also frequently considered an independent variable used to model effects on outcomes (e.g., gender as a predictor of alcohol use or deviance). Treating gender simply as a covariate and conducting analyses controlled for gender are other frequent research practices. Effects adjusted without regard to gender show the overall effect of predictive variables on the outcome measure, but important information about possible gender-specific patterns and effects of gender-specific life conditions are unfortunately lost.

Separate analyses of each gender might instead be a better way to emphasize gender-specific conditions relevant to harm prevention and interventions (e.g., mental health problems or alcohol use, see Miettunen et al., 2014; Pedersen & Skrondal, 1998; Zahn-Waxler et al., 2008). However, similarities between genders are also important. Future research is recommended to balance the search for differences with the search for similarities because comparable patterns between genders are as important as the divergences (Hyde, 2014).

The transactional model of substance use

The transactional model aims to explain how children's temperament (individual characteristics) interact with the family and peer environment (contextual influences) through socialization processes in the development of self-control abilities related to problematic substance use and mental health problems (Wills & Dishion, 2004). This model defines temperament similarly to the biopsychosocial model (Cloninger et al., 1993) as basic characteristics that can be identified early in life and progress into more complex personality traits through childhood and adolescence (Wills & Dishion, 2004). Hence, temperament dimensions are simple manifestations upon which more advanced personality manifestations are founded. Development is explained by social learning as more mature cognitions are modified through socialization (e.g., with caregivers, teachers, and friends) and in turn influence self-control.

This model builds on research that supports both risk and resilience dimensions in the temperament related to substance use (Ashby Wills & Yaeger, 2003; Cloninger et al., 1988; Wills & Dishion, 2004; Wills, Sandy, & Shinar, 1999; Wills, Vaccaro, & McNamara, 1994; Wills, Windle, & Cleary, 1998). *Physical activity level* and *negative emotionality* are temperament predictors for later problematic substance use, while *task orientation*, *attentional control*, and *positive emotionality* are temperament predictors for a lower likelihood of substance use later in life (Wills & Dishion, 2004). These temperament dimensions can make the child either more vulnerable or more resilient to family risk factors (Ashby Wills & Yaeger, 2003).

Self-control is a generic term used in the model to conceptualize an individual's ability to regulate cognition, affects/emotions, and behavior. Parallels can easily be drawn to the character dimension of Self-Directedness, which describes and quantifies individuals' abilities to steer and maneuver their own behavior (Cloninger et al., 1993). Good self-control can be defined as individuals' well-developed ability to steer themselves in a plausible direction, plan, focus on the future, focus on long-term rewards instead of short-term, and regulate their affects and emotions. Poor self-control is marked by restlessness, impulsivity, short-term orientation, difficulty postponing rewards, and increased anger when coping with problems (Wills & Dishion, 2004). Self-control is an essential competence that develops later in childhood and therefore differs from temperament dimensions that are recognized earlier.

The transactional model emphasizes the importance of both nature and nurture as temperament influences the behavior of the caregiver (e.g., parental style, parent–child relationship) and the caregiver's behavior influences the child's personality maturation (i.e., good or poor self-control and risk-taking).

The model proposes no or few direct effects of temperament on behavior outcomes, but rather suggests the indirect effects of self-control. The level of self-control interacts with factors in the environment, for example, exposure to stressors, social relations, life events, and academic competence, and these interactions shape other factors more proximal to substance use (Wills & Dishion, 2004). One can therefore conclude that interactions and transactions between temperament factors and socialization processes impact the development of self-control and contribute to increased (or decreased) vulnerability to mental health problems and problematic substance use later in life (Wills & Dishion, 2004).

To summarize, mental health (i.e., well-being and mental health problems) and personality (i.e., temperament and character) are multidimensional concepts and are related both separately and together, on both individual and environmental levels, to alcohol consumption in adolescence. However, these relations are less studied among the youngest adolescents aged 12 to 15 years than in older people and hence less is known about these developmental processes from a prospective viewpoint.

MAIN AIM

The main aim of the present doctoral thesis was to investigate how mental health and personality traits are related to alcohol use and inebriation in early adolescence. The studies applied a gender perspective to enhance understanding of factors contributing to alcohol use in girls and boys. Participants in all three studies constitute a general population sample recruited through the Swedish multidisciplinary LoRDIA.

Specific aims

In **Study I**, the relation between mental health problems (i.e., patterns of self-reported internalizing and externalizing problems), mental well-being, and alcohol experience was investigated among girls and boys aged 12 to 13 years. Using a person-oriented approach, this study explored the presence of specific configurations that were more frequent ("types") or less frequent ("antitypes") than expected by chance. Patterns of variables *within* the individual were analyzed instead of group characteristics (Bergman & Lundh, 2015). Based on previous research, four configurations of mental well-being and mental health problems were hypothesized to emerge as more frequent than expected by chance in the general sample: (1) girls with high well-being and no internalizing or externalizing problems; (2) boys with high well-being and no internalizing or externalizing problems; (3) girls with low well-being and internalizing problems, but no externalizing problems; and (4) boys with high well-being and no internalizing problems, but with an externalizing problem style. Previous findings have indicated a higher prevalence of mental health problems and lower well-being among adolescents with an early debut of alcohol consumption. Therefore, it was also hypothesized that girls and boys with both low mental well-being and either internalizing and/or externalizing problems would be more frequent types.

The aim of **Study II** was three-fold: (1) to establish norms for the Swedish self-reported and caregiver versions of the JTCI among adolescents aged 12 to 14 years; (2) to investigate the psychometric properties of both versions of the Swedish JTCI; and (3) to investigate the congruence between the children's self-reports and caregivers' ratings on the JTCI. Questions such as whether caregivers could rate their child's personality and how well the children's and caregivers' perspectives overlapped were also investigated. Gender analyses (i.e., different analyses of girls' and boys' data) were conducted throughout the study. It was hypothesized that children's self-reports and their caregiver's rat-

ings would overlap moderately. Gender analyses have not previously been conducted on the congruence between self-reports and caregiver ratings. Hence, no hypotheses were articulated regarding potential differences between caregivers' ratings of sons versus daughters.

Study III aimed to predict alcohol inebriation among young adolescents (aged 13–15 years) through the biopsychosocial model of personality (temperament and character dimensions) and the two-continua model of mental health (internalizing and externalizing problems plus mental well-being). The dimensions of mental health (lack of well-being or emotional/behavioral problems) were analyzed to find which were most strongly related to early alcohol inebriation. The study also examined whether and how temperament and character potentially influenced alcohol inebriation, either directly or indirectly through mental health status. All analyses were separated by gender to improve the ecological validity.

SUMMARY OF THE STUDIES

Description of the research program

The three studies included in this thesis are all part of the ongoing prospective longitudinal program, LoRDIA. The program's overall aim is to study the transition from childhood to adolescence in relation to peer and family factors, mental health, and personality factors and to follow the intertwined relations of risk and resilience factors to alcohol and drug abuse. Data are collected from adolescents, their caregivers, and their teachers in the general population through repeated surveys.

The program follows adolescents from age 12 to 18 years from four municipalities with 9000 to 36 000 residents in the south-west and south-central regions of Sweden. Data collection started in 2013 with two cohorts in the 6th and 7th grades and the program's intention is to continue with annual surveys up to their 11th school year. So far, data have been collected annually from baseline (Time 1 = T1) 2013 to 2017 (T5). Statistics from T1 to T3 are investigated in the present thesis. A total number of 2108 adolescents were invited to participate in the program at baseline. Of these, 1520 (72%) participated and returned their questionnaires, see Figure 6. External omission was due to absence from school (9%) and/or declined consents from the caregiver (10%) or the child (6%). The total number of participants invited for T2 in 2014 was 2127, see Figure 7. The higher number of participants invited for T2 reflected immigration to the municipalities and the participating schools. No further participants were invited after T2. General attrition analyses showed that the study samples at T1 and T2 in LoRDIA are representative of the regional demography (gender and ethnicity) and school performance (grades and attendance) in the general age-matched population. However, boys with alcohol experiences, lower school grades, absenteeism, and immigrant background tended to opt out over time (T1–T3). A descriptive overview of alcohol experiences from T1 to T3 is presented in Table 1.

The surveys were group administrated to the students in classroom settings; absent participants on the day of the survey were rescheduled to a recap occasion or received their surveys to their home by regular mail. Caregivers received a survey by regular mail during T1 and T2 and teachers participated with short reports on the pupils' school year. The research program and data collection details for the first data collection were approved by the Regional Research Ethics Board in Gothenburg, Sweden (No. T362-13; 2013-09-25). Approval was confirmed for the second (No. T446-14; 2014-05-20) and third (No. T553-15; 2015-07-31) waves of data collection.

This thesis investigates how mental health and personality traits are related to alcohol use and inebriation in early to middle adolescence in two cohorts, aged approximately 12 to 15 years. In Study I, participants were in 6th and 7th grades, in Study II, they were in the 7th and 8th grades, and in Study III, and they were in the 8th and 9th grades.

Table 1 *Participant characteristics: alcohol use*

	Girls		Boys		Total	
	n (total)	(% Yes)	n (total	(% Yes)	n (total	(% Yes)
Alcohol consumption one time or more						
Grade 6-7 ever tried	80 (731)	10.9	132 (704)	18.8	212 (1435)	14.8
Grade 7-8	106 (748)	14.2	138 (701)	19.7	245 (1449)	16.9
Grade 8-9	181 (666)	17.2	160 (641)	25	342 (1307)	26.1
Alcohol inebriation one time or more						
Grade 6-7 ever been	21 (729)	2.9	17 (690)	2.5	38 (1419)	2.7
Grade 7-8	42 (748)	5.6	42 (702)	6	85 (1450)	5.8
Grade 8-9	95 (667)	14.2	88 (643)	13.7	184 (1310)	14

Study I

Method

Participants

For the present study, participants (i.e., children aged 12–13) from 26 schools were recruited from the first data collection wave (Figure 6). Children with intellectual disability following a special school plan and those who filled out the simplified version of the questionnaire due to reduced reading and/or concentration abilities were excluded from the present study. Thus, the remaining respondents in this study were 1383 individuals evenly distributed between girls and boys and between the 6th and 7th grades. Mean ages (standard deviations) were 12.6 years (0.64), equal for both sexes, for the entire sample and 12.1 years (0.4) for 6th graders and 13.1 (0.4) for 7th graders.

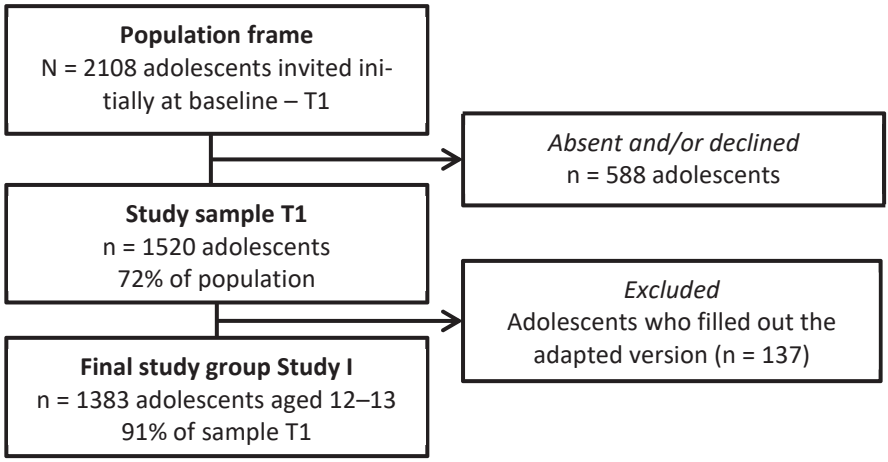

Figure 6. Recruitment flow chart for Study I.

Procedure

Data for the first wave were collected in 2013 (from November 2013 to March 2014). All caregivers and children received an information letter that briefly explained the purpose of the study. Passive consent for children to participate was requested from the caregivers (i.e., not actively responding "no" when asked), and consent from the child was collected on the day of the survey. It was emphasized that participation was voluntary, that collected information would remain confidential, and that participants were free to withdraw from the study at any time.

The survey was group administered at schools in classrooms and each questionnaire was introduced by a member of the research team and filled out individually by the student using paper and pen. The students answered a structured questionnaire assessing background variables as well as their relations to family and peers, school adjustment and teachers, mental health and psychological problems. At least one member of the research team monitored the students and was available to answer questions. Approximate time for completing the survey was 1.5 to 2h including a short break in the middle.

Measures

Mental health problems

The Swedish self-report version of Strengths and Difficulties Questionnaire (SDQ-S) is a broadly used and validated instrument aimed to detect emotional and behavioral problems (Goodman, 1997; Goodman, Meltzer, & Bailey, 1998). The questionnaire consists of 25 items which constitute five subscales; all but the prosocial scale were used for this study.

For this study, only the SDQ difficulties subscales were used and grouped into two overarching measures which are preferred for use in low-risk community samples (Goodman & Goodman, 2009; Goodman et al., 2010). The measures were internalizing problems and externalizing problems. Previous studies have used a 90th percentile cut-off point for the five-factor model to define high-risk groups (Goodman et al., 1998; Koskelainen et al., 2001; Lundh et al., 2008; Ronning et al., 2004; Van Roy, Grøholt, Heyerdahl, & Clench-Aas, 2006; Van Roy, Veenstra, & Clench-Aas, 2008). For this study, cut-offs indicating externalizing and/or internalizing *problem styles* were set at one standard deviation above mean score (i.e., 9 out of 20 for externalizing problems and 8 out of 20 for internalizing problems).

Mental well-being

A mental well-being scale was created by using two questions about satisfaction with life and purpose and meaning in life (Berlin et al., 2012). For the purpose of the present study, we reverse-coded and summed each participant's responses. The mental well-being scores ranged from 2 to 8 and the consistency of the scale was controlled by a split-half analysis with an obtained alpha value of 0.77 indicating satisfactory internal reliability. The cut-off indicating high mental well-being was set at 6 or more out of a maximum 8 points.

Alcohol experiences

Two questions about alcohol experiences (Englund, 2014) were included: *"How old were you when (if ever) you drank at least one glass of alcohol?"* and *"How old were you when (if ever) you were drunk due to alcohol?"* The responses were coded "Yes, have tried alcohol (at least one glass)" and/or "Yes, have been drunk" if they answered "11 years or younger," "12 years," "13 years," or "14 years." Otherwise, the items were coded "Never tried alcohol" or "Never been inebriated" respectively if they answered "never."

Statistical analyses

Independent *t*-tests using SPSS (version 22.0, 2013) were conducted to compare the means between girls and boys on the self-rated SDQ total difficulties score, the SDQ externalizing and internalizing scores, and the SDQ mental well-being scores. For Cohen's *d* an effect size of 0.2 to 0.3 can be interpreted as "small", around 0.5 "medium," and 0.8 to infinity, "large" (Cohen, 1988). Configural frequency analyses (CFAs) (von Eye, 2001; von Eye & Wood, 1996) were conducted in the computer program SLEIPNER vs. 1.0 (Bergman & El-Khouri, 1995) to finding specific configurations of mental health variables that were more frequent than expected by chance ("types") or less frequent ("antitypes").

Results and Discussion

The results showed, as predicted, that a majority of the general sample of young adolescents had no internalizing or externalizing problems and reported a high degree of mental well-being. These configurations emerged as more frequent types than expected by chance (girls $p = 0.001$ and boys $p = 0.015$). The results were in line with other studies on adolescents' mental health (Currie et al., 2012; Keyes, 2006) where *flourishing* (high well-being and low mental illness) was the most prevalent "diagnosis" among youth aged 12 to 14 (Keyes, 2006).

However, girls with low well-being and internalizing problems were also more frequent than expected by chance ($p = 0.000$). Notably, this configuration was four times larger than what we expected from the prevalence numbers in the sample; the same pattern was less frequent among boys. These results support previous findings on mental health problems among girls, showing that adolescent girls report both more internalizing problems and lower life-satisfaction than boys of the same age (Moksnes & Espnes, 2013). In addition, our results revealed that this health profile is more common than expected even among adolescents as young as 12 to 13 years old.

The results also support the prediction that more boys than girls would report a pattern of externalizing problems combined with high well-being. Girls with high well-being and externalizing problems, on the other hand, were only half as common as expected by chance. Both girls and boys reporting high well-being combined with internalizing problems were "antitypes" in the general sample (i.e., less frequent than expected by chance). These results suggest that having only an externalizing problem style (more common among boys)

might be more resistant to the risk of low well-being than having an internalizing problem style (more common among girls).

The findings also showed that a majority of young adolescents in our sample were alcohol naïve and had not tried alcohol. The prevalence numbers of alcohol use (tried alcohol or been inebriated) were less than previously reported epidemiological numbers (Young et al., 2002). Few 12- to 13-year-olds had been inebriated (3.1%) or tried alcohol (12.4%) in our sample population. These numbers are lower than retrospective reports from 9th graders in another study, where approximately 8% of both boys and girls reported that they had been inebriated and 20% reported that they had tried alcohol (one glass or more) by the age of 13 (Gripe, 2015). Different interpretations of these results are possible: adolescents in LoRDIA might underreport their alcohol experiences or older adolescents might exaggerate retrospectively. It is also possible that many young adolescents in LoRDIA might have had their alcohol debut after the data collection (i.e., between the ages of 12 and when they turned 14). Moreover, and in line with the previous mentioned study by Young et al. (2002), a higher number of boys than girls had tried alcohol (7.5% and 4.9% respectively). Early alcohol experiences can potentially be understood as part of an externalizing problem style, more common among boys than girls at this age (Berlin et al., 2012; Currie et al., 2012; Koskelainen et al., 2001; Lundh et al., 2008; Ronning et al., 2004). However, 28% of the girls with early alcohol experiences had been inebriated compared with 13% of the boys.

Health profiles of the adolescents who had tried alcohol showed that most reported a high level of mental well-being (114 out of 150, 76%). However, the proportion of high well-being differed between the sexes (58% of girls vs. 86% of boys). Three configurations came out as significant types in this alcohol-using subsample. The first type was girls with low mental well-being and both internalizing problems and externalizing problems ($p = 0.043$). The second and third types were both girls and boys with high mental well-being, no internalizing but concurrent externalizing problems ($p = 0.007$ and $p = 0.000$ respectively). One configuration came out as significant antitype and less frequent than expected by chance in this alcohol-using subsample. Namely, girls reporting high mental well-being and no internalizing or externalizing problems ($p = 0.000$).

The alcohol subgroup, contrary to our prediction, consisted mainly of boys reporting high mental well-being and no co-occurring internalizing or externalizing problem styles. However, girls with a similar mental health profile were less frequent than expected by chance; implying that this health profile is more associated with alcohol abstention in early adolescence for girls than for boys. Girls with low mental well-being, internalizing problems, and co-occurring externalizing problems may use alcohol for other reasons than boys and

might profit from early intervention. These girls represent a vulnerable group with multi-health problems who may use alcohol for other reasons than boys and might profit from early intervention.

However, both girls and boys with high mental well-being and solely an externalizing, but no internalizing, problem styles were overrepresented in the alcohol subgroup. This might imply that an externalizing problem style in combination with high mental well-being could be key features among 12- to 13-year-olds with early alcohol experiences. Alcohol use at early age seems to relate both to an externalizing problem style and might be part of young boys' experimentation with their masculinities, and/or a part of a norm-breaking/delinquent behavior setting more easily accessible to boys than to girls.

Study II

Method

Participants

For this study, young adolescents (aged 12–14) and their caregivers who answered the JTCI were included from the second data collection wave (T2) in LoRDIA.

The original study sample at T2 comprised 1449 children (see Figure 7). However, 403 participants were excluded from the study due to missing information about the child's age and gender and/or more than 5% of items missing or incorrect answers on validity items in the JTCI. Thus, the effective study sample included 1046 adolescents (girls: n = 582 [56%]; boys: n = 464 [44%]), mean ages (standard deviations) were 13.40 years (0.603) for girls and 13.32 (0.601) for boys. The sample also included ratings from 654 caregivers (originally 709, but 55 were excluded due to the exclusion criteria). Furthermore, 481 adolescents (girls: n = 275 [57%]; boys: n = 206 [43%]), mean ages (standard deviations) = 13.38 years [0.612] for girls and 13.35 [0.579] for boys) and 481 caregivers with matching rating were selected for the comparison analyses (313 mothers, 63 fathers, 87 joint caregivers, 1 "other caregiver," and 17 unclassified caregivers).

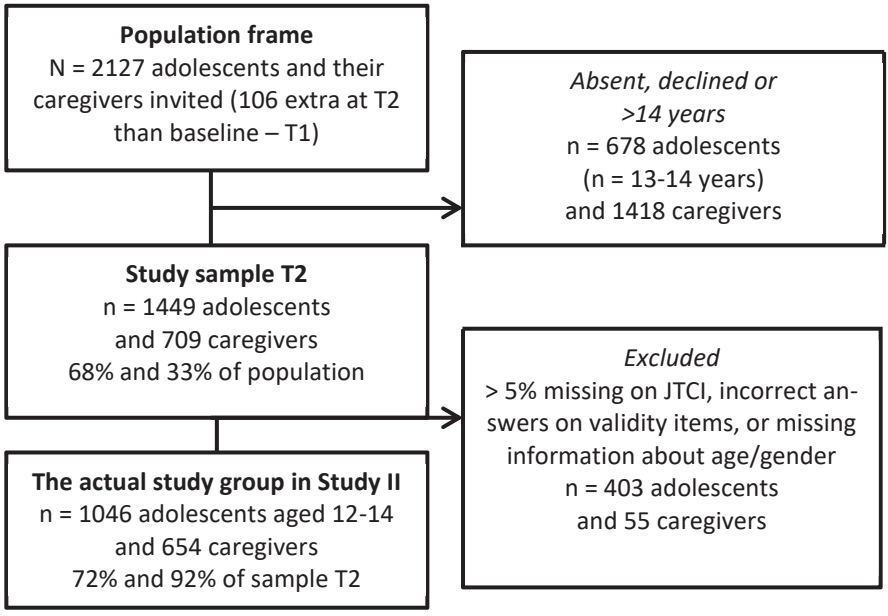

Figure 7. Recruitment flow chart for Study II.

Procedure

Data were collected over a 4-week period in October and November 2014 and followed the same procedure described in Study I. Approximate time for completing the survey was 1 to 1.5h including a short break in the middle.

The caregivers also received a paper survey (including the personality scale, see below) by regular mail parallel to the data collection in their children's schools. Caregivers could choose to their child with together with their partner or fill in the questionnaire separately. The questionnaire included questions about their child's psychological strengths and difficulties as well as questions about their child's personality. Active, written consent was requested for their participation at the first data collection wave in LoRDIA, but was not requested again since all questions in the second data collection wave were about their child, not themselves.

Junior Temperament and Character Inventory (JTCI)

Both the self-reported and caregiver versions of the JTCI consist of 108 "true" or "false" items. The two versions are almost identical except for modification of the pronouns. The Swedish version of JTCI consists of the following items: Novelty Seeking = 18, Harm Avoidance = 22, Reward Dependence = 9, Persistence = 6, Self-Directedness = 20, Cooperativeness = 20, and Self-Transcendence = 10.

Statistical analyses

Internal consistency, factor correlations, and convergent validity for the JTCI (i.e., both the self-reported and the caregiver version) were analyzed. Descriptive terms for temperament and character dimensions are presented as means and standard deviations. Age and gender effects were analyzed using multivariate correlation analyses. The internal consistency of the JTCI dimensions was evaluated using Cronbach's alpha coefficients. Paired-sample *t*-tests were conducted to compare the children's self-reports with their caregivers' ratings on the JTCI. All analyses were conducted with SPSS (version 22.0, 2013).

Results and Discussion

This study provides norms for the Swedish JTCI child self-report version and the caregiver rating version for adolescents aged 12 to 14 years. The JTCI dimensions in both versions showed poor to good internal consistency with Cronbach's alphas from 0.52 (Reward Dependence) to 0.82 (Harm Avoidance). Persistence in the self-report version was, however, unacceptable (α = 0.28). The results were similar to a Korean study which also reported the lowest Cronbach's alpha value for the Persistence dimension (Lyoo et al., 2004). The low internal consistency on Persistence was potentially due to the low number of items included (i.e., six for Persistence compared with 22 for Harm Avoidance). The questions on Persistence might also be difficult for adolescents aged 12 to 14 years in Sweden to understand, although internal consistency was questionable in the caregiver version as well.

The multivariate analyses of age and gender effects showed that boys had significantly higher scores on Novelty Seeking than girls and girls reported higher scores in Harm Avoidance, Reward Dependence, and Cooperativeness. These results were consistent with findings in the adult version (Brändström,

Richter, & Przybeck, 2001). Consistent gender differences have also been reported for mental health problems, with boys having more externalizing (hyperactivity, aggression) problems and girls having more internalizing (anxiety, depression) problems (Berlin et al., 2012; Currie et al., 2012; Koskelainen et al., 2001; Lundh et al., 2008; Ronning et al., 2004). The analyses also showed an interaction effect for gender and age on Novelty Seeking, which indicates increasing Novelty Seeking behavior with age, especially in boys. These results highlight the importance of age- and gender-specific norms of the JTCI, as previously recommended (Brändström et al., 2008).

Correlations between the seven dimensions in the JTCI were very weak to moderate, with Pearson correlation coefficients ranging from 0.00 to −0.51. However, moderately strong negative correlations between temperament/Harm avoidance and character/Self-Directedness indicate that these dimensions of personality are intertwined and might be difficult to discriminate as two separate constructs for both the child and the caregiver. Similar results reported in a Norwegian sample (Vangberg et al., 2013). The moderately positive relations between Self-Directedness and Persistence and Self-Directedness and Cooperativeness indicate that these constructs are also related. Still, we were likely to find correlations between the dimensions due to the interaction of behavior with the development of personality over time. In fact, Self-Directedness and Cooperativeness correlated significantly, but at most moderately, to almost all the other temperament and character dimensions. The exception was the pair Cooperativeness and Self-Transcendence, which had zero correlation on both the children's self-reports and the caregivers' ratings. Congruent findings were reported in the Korean study (Lyoo et al., 2004).

Although the true origin of spirituality is said to begin in childhood and adolescence (Brändström et al., 2008), no other personality inventory measures childhood spirituality with good reliability. Self-Transcendence did not, however, correlate substantially (zero to weak) with any other dimensions in the JTCI except for Harm Avoidance in both self-reports and caregiver ratings. This implies that Self-Transcendence is well-differentiated from the other six dimensions in JTCI, thus adding a unique perspective on personality. Our results on the children's self-reports also correspond well with Lyoo et al. (2004) on each of the dimensions but Harm Avoidance and Self-Transcendence, which showed a stronger (but still weak) correlation among Swedish adolescents than Koreans of the same age. These findings imply that Swedish adolescents with spiritual experiences/abilities statistically also report higher levels of anxiety and emotional problems. Approximately the same relation between Harm Avoidance and Self-Transcendence was found in the caregiver ratings and observed in other studies from Italy and Norway (Andriola et al., 2012; Vangberg et al., 2013). An association between Harm Avoidance and

emotional problems on the SDQ (Goodman, 1997) have also been reported in convergent validity analyses (Andriola et al., 2012). Personality traits have shown to be useful predictors of functioning across diverse situations and mental health in a person's life (Andriola et al., 2012; Caspi et al., 2005; Vangberg et al., 2013). Thus, a combination of high Self-Transcendence and high Harm Avoidance might be interpreted as a profile that could predict a risk of mental health problems.

Concordance between children's self-reports and caregivers' ratings on the child's personality was modest and similar to previous research in spouses (Brändström et al., 2008). Our findings showed differences with very small to large effect sizes (d = 0.17–0.99) between children's own reports of their temperament and character and their caregivers' ratings.

A general pattern emerged in the comparison analyses. Caregivers tended to overestimate their child's Self-Directedness (i.e., ability to maneuver behavior, self-acceptance, and self-efficacy) and to underestimate the child's Harm Avoidance (i.e., anxiousness and fear for the unknown). These results were especially noticeable in caregivers' rating of daughters. Caregivers also seemed to underestimate their sons' Persistence (i.e., endurance in problem solving and commitment to tasks and goals despite frustration and fatigue). The same dissonance between the caregivers' and their daughters' did not exist, even though girls and boys reported similar mean scores on Persistence. These results also imply that caregivers tend to rate their children as slightly more active, impulsive, and explorative (Novelty Seeking) than do the children themselves. Caregivers also rate their children as more reward seeking, with higher levels of attachment and social dependence (Reward Dependence) than the children do. The children were also rated has having a higher ability (although with a small effect) to cooperate, accept, and help others (Cooperativeness) and a significantly lower level of spiritualism and ability to experience a larger universal perspective (Self-Transcendence) than they self-reported. This latter result was surprising, and although the mean scores on Self-Transcendence were relatively low, large effect sizes were found on the differences between child and caregiver rating. These results might indicate that caregivers lack full insight into their child's spiritual life.

These findings agree with the literature, in which relatively low congruence between children's and caregivers' reports of the child's mental health problems (worry, anxiety, and depressive symptoms) has been found (Duhig, Renk, Epstein, & Phares, 2000; Myers & Winters, 2002; Waaktaar, Borge, Christie, & Torgersen, 2005). Hence, self-reports from child are therefore recommended to complement caregivers' information.

Study III

Method

Participants

Study III included 855 adolescents (aged 13–15) and data from T1 – T3 data collection waves in LoRDIA. Inclusion criteria were complete responses on target variables at T2 and T3 and correct answers on validity items. Mean ages (standard deviations) at T3 were 14.36 years (0.65) for girls and 14.32 (0.61) for boys. Of these, 95% were born in Sweden; 77% had caregivers who lived together; and 79% perceived their family to have about the same amount of money as other families in their neighborhood, while 5% reported having less and 16% reported having more money. The total study sample at T3 comprised 1307 participants (i.e., 86% of the study sample at T1), see Figure 8. Analyses of attrition indicated that boys with alcohol experiences, lower school grades, absenteeism, and immigrant background, seem especially likely to opt out over time. The internal loss (excluded participants) at T3 was 452 subjects (41% girls) and analyses revealed a higher prevalence of both alcohol drinking (32% vs. 22.2%) and alcohol inebriation within the last year (16.8% vs. 12%) in the excluded group than in the final study group at T3.

Procedure

Initially, all caregivers and children received an information letter that briefly explained the purpose of the study. Passive consent was requested from the caregiver (i.e., no active "no" response when asked) for the children's participation, as well as written consent from the adolescent on the day of the survey. We emphasized that participation was voluntary, that information collected would remain confidential, and that participants were free to withdraw from the study at any time. The questionnaire was group administered at schools in classrooms and absent students' questionnaires were posted to their homes by regular mail. Each survey was introduced by a member in the research team and filled out individually by the student using paper and pen. Approximate time for completing the survey was 1 to 1.5h.

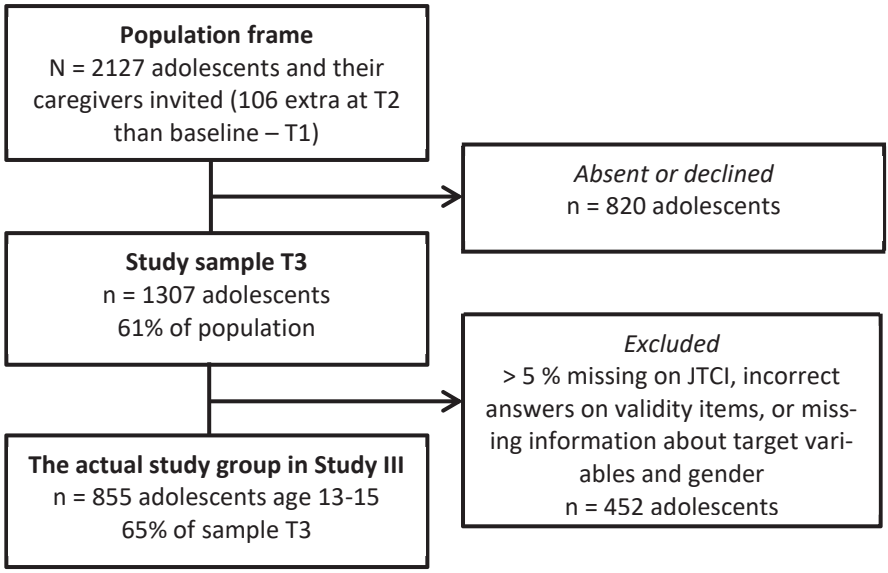

Figure 8. Recruitment flow chart for study III.

Measures

Alcohol use: T1, T2, & T3

Alcohol use was mapped from T1 to T3 with the time perspective of items at baseline (T1: "ever tried" or "ever been") modified to "Have you drunk any alcohol, more than just a sip, within the last year? (Not light beer or light cider)" and "Have you been inebriated within the last year?" The second question on inebriation is specifically set as an outcome variable in the analyses. Answers were given on an ordinal scale from "No" to "Once in the last year," "Several times in the last year," "Once a month," "A couple of times a month," and "Every week." Due to limited variability, responses were binary coded to "Yes, have drunk more than just a sip within the last year" and "Yes, have been inebriated within the last year" for all answers reporting anything else than "No". All questions were modified versions of items previously used in annual reports of the Swedish Council for Information on Alcohol and Other Drugs (Englund, 2014).

Junior Temperament and Character Inventory (JTCI): T2

The Swedish self-report version of the JTCI (Boson, Brandstrom, & Sigvardsson, 2018) was used to assess the child's personality. The JTCI is a modified version of the adult Temperament and Character Inventory (TCI) validated and adapted for children and adolescents (Boson et al., 2018; Luby et al., 1999). JTCI builds on Cloninger's seven-dimensional biopsychosocial model of personality (Cloninger, 1994; Cloninger et al., 1993) and consists of four dimensions of temperament and three of character to describe the underlying structure of an individual's personality. The self-reported version of the JTCI has 108 items to be answered as "true" or "false." The four temperament dimensions are: Novelty Seeking (NS = 18 items on activity level, impulsivity, and need for exploration), Harm Avoidance (HA = 22 items on emotionality, level of anxiety, fear, and distrust of the unknown), Reward Dependence (RD = 9 items on reward-seeking behavior, level of attachment, and social dependence), and Persistence (P = 6 items on endurance in problem-solving and commitment to tasks and goals despite frustration and fatigue) (Cloninger, 1994).

The character scales are Self-Directedness (SD = 20 items on ability to steer and maneuver behavior, self-acceptance, and self-efficacy), Cooperativeness (CO = 20 items on ability to cooperate with, accept, and help others), and Self-Transcendence (ST = 10 items on level of spiritualism and ability to experience a larger universal perspective) (Cloninger et al., 1993). According to standard practice, no more than 5% missing items in total were acceptable to retain reliable scores on each dimension. Cronbach's alpha ranged from 0.28 (P) to 0.82 (HA) for the temperament dimensions and from 0.63 (CO) to 0.72 (SD) for the character dimensions (Boson et al., 2018).

Mental health problems: T3

The Swedish self-report version of Strengths and Difficulties Questionnaire (SDQ-S) consists of 25 items and is a broadly used and validated instrument aimed to detect emotional and behavioral problems (Goodman, 1997, 2001; Goodman et al., 1998). The SDQ was translated into Swedish by Smedje, Broman, Hetta, and von Knorring (1999), and the psychometric properties of the self-reported version have been validated for use in Sweden (Lundh et al., 2008) and other countries (Essau et al., 2012; Koskelainen et al., 2001; Ronning et al., 2004; Van Roy et al., 2008). The SDQ contains four problem subscales with five items each: hyperactivity/inattention (e.g., I am easily distracted, I find it difficult to concentrate), emotional symptoms (e.g., I am often unhappy, down-hearted, or tearful), conduct problems (e.g., I fight a lot, I can make other people do what I want), and peer problems (e.g., other children or young people pick on me or bully me). Answers are given on a 3-point Likert scale from 0 = not true, 1 = somewhat true, to 2 = certainly true. We used the

two-factor model consisting of internalizing (emotional symptoms and peer problems) and externalizing (conduct problems and hyperactivity/inattention) preferred for use in low-risk community samples (Goodman & Goodman, 2009; Goodman et al., 2010). Cronbach's alpha was 0.73 for internalizing problems and 0.75 for externalizing problems. Cut-offs were set at 8 out of 20 for internalizing problems and 9 out of 20 for externalizing problems (Boson, Berglund, Wennberg, & Fahlke, 2016).

Mental well-being: T3

The Mental Health Continuum-Short Form (MHC-SF) is an increasingly used questionnaire intended to measure three components of well-being: emotional, social, and psychological (Keyes, 2009). The MHC-SF consists of 14 items about the frequency of various experiences during the last month. There are three items on emotional well-being (feeling happy, interested in life, and satisfied), five items on social well-being (acceptance, actualization, contribution, coherence, and integration) and six items on psychological well-being (purpose in life, environmental mastery, autonomy, personal growth, positive relations, and self-acceptance). Answers are given on a 6-point Likert scale from 0 = never, 1 = once or twice, 2 = about once a week, 3 = about 2 or 3 times a week, 4 = almost every day, 5 = every day. Cronbach's alpha was 0.92 for emotional well-being, 0.88 for social well-being, and 0.92 for psychological well-being. Scores on each well-being component were totaled and categorized as Flourishing, Moderately healthy, or Languishing according to official MHC-SF guidelines (Keyes, 2009).

Statistical analyses

Chi-square test of independence was carried out to compare frequencies between girls' and boys' reports of having or not having experiences of drinking alcohol and being inebriated and categorical levels of mental health (internalizing and externalizing problems plus well-being) among those with or without alcohol inebriation experiences. Cramér's V was reported for the effect-size. Levels of mental health linked to inebriation were labelled as high-risk mental health profiles.

Logistic regression analyses were performed to ascertain the effects of current mental health (T3) and the effects of personality (i.e., temperament and character dimensions; T2) on alcohol inebriation (at least once) in the last 12 months (T3). Path analyses by means of generalized structural equation modeling were conducted with alcohol inebriation as an endogenous variable. All exogenous variables (personality and mental health) were initially included and non-significant ($p > .05$) paths were removed. Modification indices and

model fit estimates are not available for binary endogenous variable and paths were interpreted by their level of significance. Both the logistic analyses and path analyses were adjusted (as appropriate) for subjective socioeconomic status and school grade. Separate gender analyses were performed throughout the study to reveal gender-specific relations between mental health variables, personality dimensions, and alcohol use. Chi-square test of independence and logistic regression analyses were conducted using SPSS (version 25.0, 2017). Generalized structural equation modeling (GSEM) was conducted in STATA (version 15.1, 2017).

Results and Discussion

The results of this study indicate that personality factors and their relations to high-risk mental health profiles and early alcohol inebriation show both similarities and differences in girls' and boys' patterns of behavior. Temperament and character dimensions predicted alcohol inebriation independently within the next year regardless of mental health status. High Novelty Seeking, low Harm Avoidance, and low Cooperativeness all emerged as significant predictors of early alcohol inebriation among girls, as did high Novelty Seeking and low Cooperativeness among boys. These results continue to support high Novelty Seeking as the key temperament component in problematic alcohol use among young adolescents. These findings are in line with previous studies (Cloninger et al., 1981; Cloninger et al., 1988, 1996; Mulder, 2002; Oreland et al., 2018). However, the independent effect of Novelty Seeking on inebriation was potentially stronger among girls than among boys. One possible interpretation is that social and contextualized risk factors might be more common for boys. Further, a personality characterized by a lack of interpersonal skills (low Cooperativeness) had a consistent effect on alcohol inebriation across gender. The abilities to cooperate with, accept, and help others are important competencies that adults (e.g., caregivers, teachers, and significant others) ought to promote and encourage in children's and adolescents' everyday life. Interpersonal skills are also part of the *mature* personality (Cloninger, 1994; Cloninger et al., 1993).

Regarding mental health, externalizing problems (conduct problems and hyperactivity/inattention) had the strongest link to alcohol inebriation within the last year for both genders. This result supports previous findings on early alcohol use and its associations with externalizing problems (Adan et al., 2017; Boson et al., 2016; Mulder, 2002; Steele et al., 1995; Young et al., 2002). High Novelty Seeking and low Self-Directedness combined with externalizing problems emerged as a risk profile among boys, as did low Self-Directedness combined with externalizing problems among girls.

Internalizing problems were neither more nor less common among those with experiences of alcohol inebriation. Our findings did not support concurrent internalizing problems as a risk factor for inebriation as previously reported for depressive symptoms (Marmorstein, 2009, 2010). Instead, internalizing problems decreased the risk of inebriation among boys and had no effect among girls. This implies that boys with internalizing problems in early adolescence tend to avoid heavy alcohol use and possibly alcohol drinking in general. The reduced probability of early alcohol consumption associated with increased internalizing problems in boys was not found among girls. Internalizing problems may not be a significant mental health factor related to alcohol inebriation among girls in early adolescence, as previously reported on alcohol drinking (Boson et al., 2016; Kessler et al., 1996; Malmgren et al., 2008; Marmorstein, 2009). This was evident even when concurrent externalizing problems, (i.e., conduct/delinquent behavior) were accounted for (Boson et al., 2016; Marmorstein, 2010).

Low well-being (i.e., Languishing: the feeling of time and life wasted thoughts of life's purposeless) was only related to inebriation when unadjusted for subjective socioeconomic status (i.e., experience of the family economy as poorer, comparable to, or wealthier than other families), school year (8th or 9th grade), and mental health problems, but not otherwise. This contrasts with research on the negative outcomes of everything except Flourishing (Keyes, 2013; Keyes & Annas, 2009).

The combination of a high Novelty Seeking and low Cooperativeness were related to concurrent externalizing problems in the present study and potentially to negative outcomes in the future such as further delinquent behavior, school problems, drop-out, and psychosocial problems (antisocial behavior). Among girls, a personality described as optimistic, confident, outgoing, and vigorous (low Harm Avoidance) was also related to inebriation. This suggests that assertive and extroverted behaviors are part of early alcohol inebriation among girls; however, the combination of low Harm Avoidance with high Novelty Seeking and low Cooperativeness might be especially challenging.

The results of the present study indicate that personality factors and their relations to high-risk mental health profiles are both similar across gender, but also require some gender-specific knowledge about the etiology of high-risk mental health related to early alcohol inebriation.

An immature character (low Self-Directedness and low Cooperativeness) with an extreme temperament profile (high Novelty Seeking and low Harm Avoidance) might be a predictor of inebriation within the next year among young adolescents, both directly and indirectly through mental health. This study also provides professionals with important information about gender-

specific considerations when developing and conducting preventive interventions targeting psychological risk and resilience factors for early alcohol inebriation among young adolescents. Further studies on interventions targeting personality maturation among adolescents are recommended.

GENERAL DISCUSSION

The main aim of the present doctoral thesis was to investigate how mental health and personality traits are related to alcohol use and inebriation in early adolescence. The studies apply a gender perspective to enhance understanding of various factors' contributions to alcohol use in girls and boys. The study sample in all three studies was a community population recruited through the Swedish multidisciplinary LoRDIA project. Roughly the same adolescents were followed from early to middle adolescence (from approximately age 12 to 15).

Health profiles, consisting of a dimension of mental well-being and a dimension of mental health problems (i.e., internalizing and externalizing problems), were analyzed when the adolescents were approximately 12 to 13 years old. The purpose was to explore the *complete* mental health (both positive and negative dimensions) of today's youngest adolescents and further to link them to early alcohol use to be able to draw conclusions about how mental health and alcohol use might be related in early adolescence. The results were optimistic and showed that young adolescents aged 12 to13 years are generally "doing just fine," as the majority reported high mental well-being, few had current mental health problems, and most had no alcohol consumption. In the general sample, 70% reported high well-being and no mental health problems compared with 45% of those with early alcohol experiences. Taking only well-being into consideration, 89% of the adolescents in the general sample reported high mental well-being compared with 76% of those with early alcohol experiences. More boys than girls had tried one glass of alcohol or more by the age of 12 to 13 years and they commonly reported both thriving in life and having a feeling of purpose and meaning in life (i.e., high well-being). Early alcohol initiation seem related to being a boy and experiencing high well-being, but was perhaps also part of an externalizing problem style (hyperactivity/inattention and conduct problems).

Furthermore, girls with both internalizing problems and low mental well-being appear to be a vulnerable subgroup and were statistically overrepresented among young adolescents in general, but also among those with alcohol experiences. This indicates a dimensional identity (von Eye & Bergman, 2003), as the configuration remained unchanged across all levels and categories in the sample (e.g., in both the general sample and the subsample with early alcohol experiences). Using the framework of the two-continua model of mental health (Keyes, 2005), girls with low mental well-being and concurrent internalizing problems showed the most unfortunate combination of mental health: both languishing and mental health problems. The absence of positive

feelings, along with reduced psychological and social function, makes girls less resilient to the impact of individual and family risk factors (Keyes, 2007). In contrast, boys with high mental well-being and no current internalizing or externalizing problems were overrepresented among those with early alcohol experiences.

More boys than girls had early alcohol experiences; however, 28% of the girls with an early alcohol debut (i.e., before age 12– 13) had been inebriated compared with 13% of the boys in that group. The results might also reflect gender differences in how alcohol is consumed among the youngest adolescents. Girls might use alcohol for other purposes and in other settings than boys. Boys may be more interested in and thrilled by the idea of trying alcohol early, or perhaps boys are more likely to ask for and be given the opportunity to taste alcohol more often at home than girls. Gender stereotypes might also play a role, and alcohol use among young boys may be part of a gender-specific socialization process. However, girls who have tried alcohol early might participate in riskier settings where alcohol inebriation is more common. Girls with early alcohol experiences may be thriving less in life than boys do and engaging in more advanced drinking patterns (i.e., alcohol inebriation). Further potential implications are that subgroups of girls as young as 12 to 13 years old who consume alcohol (especially heavily and to the point of inebriation) might also be vulnerable to early and unwanted sexual experiences, abuse, and illicit drug use. Further studies are recommended to investigate the experiences and trajectories of specific subgroups of adolescents with early alcohol.

The applicability of a personality measure for children and adolescents were tested. The children's own reports and their caregivers' understandings of their children's personality were studied to obtain Swedish norms for the personality measure JTCI, but also to explore the coherence (or discoherence) between the childrens' and caregivers' perspectives. Dimensions in the JTCI, showed unacceptable to good internal consistency for both the self-report and caregiver rating version. Hence, not all dimensions were found to be reliable, the dimension Persistence in the self-report version was particularly unreliable. Thus, it is possible that adolescents aged 12 to 14 years have more trouble than their caregivers' in discerning the questions measuring Persistence as a separate construct. This unreliability might also be due to poor consistency among the included items. Additional questions and re-formulations might frame the dimension more properly and revision is recommended. It is also possible that the need for endurance in problem solving and commitment to tasks and goals despite frustration and fatigue (Persistence) are less obligatory in early adolescence than in adulthood. Answers to these questions may therefore be expected to be less reliable. Young adolescents' experiences of everyday-life are different to those of adults. Formal responsibilities and obligations, both at work and

in the household, are (and *should* be) greater and more frequent in adulthood than in childhood. The need to make a living is also an important external motivator for adults to commit to tasks. Hence, the Persistence dimension in Cloninger's biopsychosocial personality model (Cloninger, 1994) might be more contextually bound and more related to character than previously expected.

Age and gender effects were found on both temperament and character dimensions. However, larger age effects might be assumed in a sample with wider age range (e.g., from 12 to 18 years). Gender differences in personality might be related to differences in mental health (both mental well-being and mental health problems) among young adolescents. For example, higher levels of internalizing problems were reported among girls than boys, as were levels of Harm Avoidance. Conversely, higher levels of externalizing problems were reported among boys than girls, as were levels Novelty Seeking. As the transactional model suggests (Wills & Dishion, 2004), temperament dimensions seem to be important building blocks in further personality development, mental health problems, and alcohol use. The need for further studies to investigate the biopsychosocial model of personality in early adolescence and its implications for mental health and alcohol use was identified and motivated the aim and design of Study III.

In tests of congruence between self and other personality ratings, we found that caregivers rated their child's personality more mature (higher scores on Self-Directedness and Cooperativeness) than the children themselves. Daughters' capabilities for self-acceptance and self-efficacy (Self-Directedness) were especially rated higher by caregivers than by themselves. Their levels of anxiety and fear of new situations (Harm Avoidance), however, were rated lower by the caregiver. This pattern might result in an underestimation of daughters' need for emotional support by their caregivers. A similar pattern did not emerge for boys, which implies that caregivers and their sons agree to a higher extent than caregivers and daughters on the children's levels of Self-Directedness and Harm Avoidance. One explanation might be linked to physical maturation, which typically appears earlier for girls than for boys (Steinberg, 2014). Caregivers also rated their sons' items on Persistence lower (or what is said to measure Persistence) compared to the sons. Persistence ratings for daughters were congruent. Caregivers' ratings of their child's temperament on the Novelty Seeking items with the children's own reports more than any other dimension in JTCI. These results imply that caregivers have limited insight into their children's internal feelings and thoughts, but a greater capacity to detect and assess external behaviors. Caregivers' strong underestimation of their children's (both daughters and sons) ability to experience a larger universal perspective (Self-Transcendence) is another indicator of the difficulty caregivers have in rating their child's internal properties (McAbee & Connelly, 2016;

Vazire, 2010). However, the discongruence might also reflect caregivers' mental representations of gender stereotypes about Swedish boys' and girls' behavior (Löckenhoff et al., 2014). Girls may be presumed to be well-functioning, healthy, and mature and boys to be less patient and less persistent. Further, the discrepancies may also be caused by the caregivers' projection of idealized or desired behavior onto the child or a tendency to rate the child's character as similar to their own, as seen in previous studies on spouses (Brändström et al., 2011).

Disagreements between the children's own experiences and ratings by an observer (e.g., teacher or caregiver) have also been shown on assessments of mental health problems. The tendency is to rate internalizing problems (e.g., anxiety and sadness) less accurately than externalizing problems (e.g., aggression and hyperactivity). Internalizing problems seem more difficult than externalizing problems for an adult rater to detect (Goodman et al., 2010; McAbee & Connelly, 2016). The tendency is similar for personality traits. An observer more easily rates observable traits and behaviors than less visible traits (McAbee & Connelly, 2016). The results of the present thesis suggest, in the light of the Self-Other Knowledge Asymmetry model (SOKA-model) Vazire (2010), that: (1) self–other reports agree to a greater extent on observable traits and behaviors than on unobserved and internal properties, and (2) the internal properties of the child's personality (e.g., Harm Avoidance and Self-Directedness) might be rated more accurately by the child than the caregiver (McAbee & Connelly, 2016; Vazire, 2010). However, the question "Who knows best about a person?" is difficult to answer because the child's *façade* (knowledge known to oneself but not to others) is in tension with the *blind spot* (known to others but not to oneself) in the Johari window (Luft & Ingham, 1955). The best answer is probably "it depends," as it depends both on which type of quality of the person is studied or assessed and on the relationship between the self and the other. A joint perspective, plausibly explored through dialogue and voluntary disclosure by the child, can hopefully enhance both the child's insight into possible blind spots and the caregiver's understanding of the child's inner thoughts and feelings.

Findings in the present thesis regarding experiences of alcohol inebriation at age 14 to 15 years indicate both direct and indirect effects of temperament and character dimensions on alcohol inebriation. High Novelty Seeking for both girls and boys, and low Harm Avoidance among girls were directly associated with alcohol inebriation within the next year. High Novelty Seeking for boys and low Self-Directedness for both genders were also indirectly linked to alcohol inebriation through externalizing problems. Thus, the findings suggest that a personality profile characterized by impulsivity, curiosity, enthusiasm,

and disorderliness (high Novelty Seeking) especially among boys, and immaturity, unreliability, purposelessness, and self-blaming (low Self-Directedness) among both genders relate both to externalizing problems and to inebriation. The effectiveness of the temperament dimensions as predictors of alcohol use have been previously confirmed in prospective longitudinal studies from childhood to early adulthood (Cloninger et al., 1988) and in studies of young adolescents (Adan et al., 2017; Nees et al., 2011; Whelan et al., 2014). However, the transactional model of substance use (Wills & Dishion, 2004) states that temperament should show no or few direct effects on substance use (e.g., alcohol inebriation), but indirect effects through self-control abilities. Self-control abilities emerge through transactions between the individual characteristics (i.e., temperament) and socialization processes (e.g., in the family, at school, or during free time with peers). Further, self-control is held to influence proximal factors associated with substance use in adolescence (e.g., life-events, stressors, peer networks, and academic achievement). Similar to the transactional model, the results presented in this thesis suggest that not only biologically derived temperament dimensions, but also socially learned character dimensions, are important factors related to alcohol inebriation. Self-Directedness is conceptually related to self-control and partly quantifies the level of personality maturation. In addition, lower Cooperativeness (e.g., the ability to cooperate with, accept, and help others) had direct effects on alcohol inebriation for both girls and boys.

Temperament dimensions reported at age 13 to 14, such as Harm Avoidance were associated with lower well-being and more internalizing problems one year later among both girls and boys aged 14 to 15 years. Findings also support the character dimension of Self-Directedness as a suitable predictor of well-being. Low Self-Directedness predicted both mental health problems and well-being one year later for boys and girls. Cooperativeness also emerged as a positive predictor of well-being one year later for both genders. The present thesis found that girls generally report more internalizing and less externalizing problems and lower levels of mental well-being than boys do. Gender-specific patterns also emerged for temperament and character dimensions, with girls reporting higher levels of Harm Avoidance and Cooperativeness than boys and boys reporting higher levels of Novelty Seeking. Hence, gender differences in mental health and personality dimensions are already visible in early adolescence, but unfortunately, not easily detectable by adults.

The present thesis further indicates potential heterogeneity among early alcohol consumers. Girls with early experiences of alcohol inebriation might lack everyday experiences of emotional, psychological, and social well-being (i.e., categorized as languishing) more than boys do. However, this effect vanished when the model was controlled for socioeconomic status and school year.

Early alcohol problems have been related to the Type II alcoholic subtype among adults (Cloninger et al., 1981; Cloninger et al., 1996). The studies on alcoholic subtypes (i.e., Type I and Type II) have been criticized because few females participated in the study samples (Mulder, 2002; Wennberg et al., 2014). Hence, the Types might be biased towards a typical male drinking trajectory and lack ecological validity for both genders. Modifications of the alcoholic subtypes may be relevant, but the present thesis only followed young adolescents over a short period. Thus, follow-up studies of future alcohol consumption and mental health problems are recommended.

The findings also support the relation of high Self-Directedness to more positive and less negative feelings among adolescents, especially when combined with high Cooperativeness (Schütz et al., 2013). Hence, a *mature* character relates to positive health outcomes and is less associated with alcohol inebriation among young adolescents. These results are in line with previous findings and emphasize the importance of building both self-control abilities and pro-social competencies in children and adolescents. However, further research is needed to fully understand the overlap between the biopsychosocial model of personality and the concept of self-control in the transactional model of substance use, especially among young adolescents. Additional data collections in LoRDIA using the JTCI are also desirable to follow temperament and character developmental trajectories and their relation over time.

Methodological and ethical considerations

When interpreting the findings, some limitations need to be considered. First, although valid measures were used, the data for all three studies are based on self-reported information that should be treated with caution. However, participation was voluntary and consistent emphasis was put on the importance of filling out the surveys accurately and honestly. Respect for each other in the classroom (e.g., not talking, showing your own survey, or glancing at anyone else's answers) was also stressed to create an environment of trust, confidentiality, and quiet for participants.

For Study I, it is also worth noting that the analyses included no volume or frequency measures of alcohol consumption other than a lifetime minimum of at least one glass of alcohol. How much alcohol and how often participants drank could therefore vary extensively within this group. Still, one glass of alcohol or more can effectively differentiate alcohol naïve children from those who have crossed society's clear prohibition against alcohol usage in early ages. It is also important to recognize that results from the study cannot be taken to imply causality. At this time point, developmental trajectories are not

yet detectable. Alcohol experiences at a young age could precede potential internalizing and/or externalizing problems or vice versa.

In Study II, only adolescents and caregivers with a valid self-report were included in the analyses. There are several potential ways to explain the causes of more than 5% missing items and wrong answer on the validity items. Children with reduced reading and/or concentration capabilities might have missed items and/or misinterpreted the validity items "*Answer false on this question*" and "*Answer true on this question.*" Missing items and incorrect answers on the validity items might also be an indication of defiance. Further studies on how conduct problems and hyperactivity/inattention problems might be related to JTCI answering style are needed. Finally, a vast majority of caregiver ratings came from mothers only. Further studies on how mothers, fathers, and other parental figures might rate the child differently are therefore warranted.

Study III had quite a large internal loss (approximately 35%) due to required measurements at several time points, in correct answers on validity items, and JTCI surveys with more than 5% missing items. Analyses showed that alcohol experiences in the selected sample were slightly lower than in the excluded cases, particularly among boys. However, the total prevalence of alcohol experiences (drinking and inebriation) in the selected versus total study sample were similar (23% vs. 26% for drinking and 12% vs. 14% for inebriation). Not filling out the questionnaire properly might also be interpreted as part of a larger structure of problem behaviors including concentration problems, conduct problems, and misbehavior (e.g., early alcohol, nicotine, and/or drug use) more common among boys. The findings should therefore be interpreted with caution due to the potential underrepresentation of externalizing problems. One might argue that a higher acceptance of missing data would be suitable to avoid sample attrition, but this would remove the opportunity to compare this study with other studies using the JTCI. One must therefore accept that our study suffers from an in ability to generalize to *all* young adolescents in 8th and 9th grades. On the other hand, boys not filling in the questionnaire thoroughly might have had a higher tendency to answer: "Yes, I have been drunk one time or more in the last year," even if it were untrue. Hence, the selected sample might have answers that are more reliable. Mental health and alcohol inebriation experiences during the last year were measured simultaneously and no causal effect on inebriation can be drawn. However, the results may indicate that inebriation in past year and reported levels of well-being for both genders were weakly related at age 13 to 15. Similar patterns were found for alcohol inebriation and internalizing problems among girls. Externalizing problems and inebriation might work reciprocally as both heavy alcohol drinking and the social context in which young adolescents drink alcohol might increase the level of externalizing problems and vice versa.

In general, the methodology in this thesis also recognizes the problem of recruit adolescents to participate voluntarily in longitudinal studies. Adolescents with norm-breaking behavior (e.g., early alcohol experiences), low levels of persistence, and reduced concentration abilities necessary to fill in extensive questionnaire will opt out over time. The studies included in this thesis are all drawn from the same cross-disciplinary longitudinal research program (LoRDIA) that follows a selected group of individuals through adolescence. An ethical committee approves the program continuously. However, general ethical considerations are important when conducting and analyzing the data, especially when intra-psychological processes are under evaluation.

Epistemologically, this thesis builds on the overlap between the beliefs and truths of the individual. The biopsychosocial perspective relies on the assumption of personality as a mainly biologically derived phenomenon affected by environmental forces (e.g., social learning, interaction, motives, and beliefs). When asking adolescents and their caregivers about their experiences of mental health and personality, one must also acknowledge the phenomenological viewpoint: observer ratings and self-reports are always influenced by the participant's subjective viewpoint. It has been an active decision to recognize the child's voice (i.e., self-report) throughout these studies despite the risk of bias.

Clinical and prevention implications

Clinical interventions should target and stimulate the development of personality maturation (i.e., increased Self-Directedness and Cooperativeness) among young adolescents. The biopsychosocial model of personality describes temperament as the core of an individual's personality (Cloninger, 1994) and temperament can metaphorically be compared with an engine in a car. Character, on the other hand, refers to the personality maturation, similar to an advanced control system or the car's driver. Hence, a strong or difficult engine needs a good driver; a weak driver with have to practice to develop better skills. The same applies to the biopsychosocial model of personality: an extreme temperament profile requires a well-developed character or guidance and practice to change and cope with everyday life-challenges. The JTCI may be a useful instrument in clinical practice with children and adolescents. It can provide valuable information about their predispositions, with implications for treatment as well as information about treatment effectiveness and positive change. However, the self-report and caregiver versions should be used in parallel to provide the best knowledge of the child's personality strengths and difficulties. A similar recommendation is made for screening for mental health problems. Additionally, measures of and dialogue about the child's positive experiences

and function in everyday life should be included in treatment planning to gain a better understanding of the child's complete mental health.

A large number of prevention programs targeting children's and adolescents' mental health problems and substance use have been developed (e.g., in review by Smedler, Hjern, Wiklund, Anttila, & Pettersson, 2015). The main goals of prevention programs are to enhance knowledge, improve skills (such as parenting style), and to promote resilience *before* problems have developed or elevated too far. It is especially common for schools and municipal services to implement and deliver prevention programs for teachers and caregivers in group settings. The programs then assume indirect positive effects on children's and adolescents' development through the direct improvement effects on teachers' and caregivers' abilities and relational qualities. Prevention can be delivered on different levels depending on the strategy: indicative, selective, or universal. *Indicative prevention* is motivated when there is concern about an identified child and/or family (e.g., substance use or high-risk mental health problems). For example, particular programs on the indicative level are specifically developed and tailored to prevent binge drinking (i.e., ≥ 4/5 drinks in a row). A brief personality-targeted intervention for adolescents named "Prevention" has been recommended in a systematic review on personality traits related to binge drinking (Adan et al., 2017). The program has shown effects in preventing binge drinking among both girls and boys with personality traits such as high sensation seeking and impulsivity in early adolescence and girls with high anxiety sensitivity (Conrod et al., 2013; Lammers et al., 2017; Newton et al., 2016). *Selective prevention* targets certain at-risk subgroups, for example, caregivers with mental health problems or adolescents living in disadvantaged areas. *Universal prevention* targets the whole population and is developed to "fit all sizes," for example, caregivers of adolescents in general.

Studies on parental supports in Sweden indicate that caregivers in general express a need for community-based parental support (Thorslund, Hanse, & Axberg, 2014). They also express a need for support not only when children are younger (i.e., 0–13 years), but also during their adolescence (i.e., 13–17 years) (Thorslund, Johansson Hanse, & Axberg, 2017). Actually, about 82% of caregivers with adolescent children report that universal parental support is most important during this developmental phase (Thorslund et al., 2017). Evaluations of universal prevention programs for caregivers of adolescents show that a majority of caregivers participating mention general reasons for participating. Nevertheless, caregivers with more specific problems (i.e., on the selective or indicative level) also seek to participate in universal programs. This indicates that universal prevention reaches both caregivers with a general interest in parenting during adolescence and those with actual problems

(Alfredsson & Broberg, 2016). Both universal and selective parenting programs have shown moderate effects on parenting style, caregiver's mental health, family climate, and adolescent mental health (Alfredsson, Thorvaldsson, Axberg, & Broberg, 2018).

One way to reach parents and adolescents to provide help and support is through school. In Sweden, attending school is mandatory up until the 9th grade, when the adolescent is approximately 15 to 16 years old. Hence, teachers and professionals working in schools can reach out to a large number of early and middle adolescent children and their caregivers. Constructive support and guidance from adults are important factors in improving adolescents' psychosocial skills and self-regulation. Participation in well-arranged school activities and experiences of mastery in school settings are especially valuable to prevent negative development (Ekberg, Fonseca, Anderberg, & Dahlberg, 2016; Smedler et al., 2015). The school setting is therefore an important arena with the potential to provide preventive programs and strategies at all levels: indicative, selective, and universal.

Conclusions

This thesis provides psychological perspectives on alcohol use among our youngest adolescents. This is important as the results add greater knowledge of the high-risk mental health and personality factors that relate to alcohol initiation and alcohol inebriation in early adolescence. The thesis also complements the existing picture of adolescents' mental health status in today's society as it combine both positive (mental well-being) and negative dimensions (mental health problems). Most young adolescents are flourishing in life and report both positive experiences and factors in life and few negative experiences. Still, about one third report low well-being and/or co-existing mental health problems, especially adolescents with early alcohol experiences. Early alcohol initiation is more common among young boys and is related to high mental well-being and externalizing problems. Vulnerable subgroups with concurrent low mental well-being, mental health problems, and early alcohol initiation were especially evident among girls.

The thesis also evaluated the internal structure of the Swedish version of the personality measure JTCI. The inventory is adapted for children and adolescents, but its psychometric properties are not fully satisfactory. The temperament dimension Persistence did not form a reliable construct in the Swedish self-report version. Revision and expansion of this dimension is therefore suggested, as questions about the manifestations of this trait might be more contextual among young adolescents. Discrepancies between the children's own perspectives and the caregivers' understandings of the children indicate that

both should be requested to participate in any assessments to provide a thorough understanding of the child's personality. The results also support the importance of defining age- and gender-specific norms for the JTCI. It is also important to recognize that personality dimensions, though apparent in early childhood, are not assumed to be stable until adulthood and have the potential to continue to develop across the life course (Brändström et al., 2008; Caspi et al., 2005). Hence, the levels of temperament and character dimensions in adolescence should be seen as part of an ongoing process of development rather than a collection of static personality traits.

The combination of an immature character (low Self-Directedness and Cooperativeness) with an extreme temperament profile (high Novelty Seeking and low Harm Avoidance) might be a psychological predictor of inebriation among young adolescents, both directly and indirectly through mental health. This provides professionals with deeper knowledge about gender-specific considerations when developing and conducting interventions targeting psychological risk and protective factors in early alcohol inebriation among young adolescents. However, further studies on interventions targeting personality maturation are recommended.

Both Self-Directedness and Cooperativeness are important competencies that adults need to teach and improve in their adolescents. These character dimensions seem especially relevant to improving mental well-being and preventing mental health problems and negative behavioral outcomes, such as early alcohol use and inebriation. However, caregivers might be less aware of the child's need for guidance and support in early adolescence due to a tendency to overestimate their child's personality maturation (i.e., character). For example, girls with anxious personality behaviors, low mental well-being, and internalizing problems might easily be neglected and perceived as more mature and healthy than they feel themselves.

This thesis contributes knowledge of the intra-psychological dimensions linked to early alcohol use and inebriation among our youngest adolescents. This knowledge will be beneficial in designing preventive interventions on universal, selective, and indicative levels.

The findings imply that:

- Research and practice should incorporate both gender and well-being perspectives when describing and explaining mental health among adolescents, especially adolescents with early alcohol consumption.
- Personality traits and their relation to high-risk mental health factors are similar across genders in many ways, but also require some gender-specific knowledge about the etiology related to early alcohol inebriation.
- Young adolescents' relations with, and acceptance of, both themselves and others are important personality competencies to target in clinical and preventive interventions against early alcohol consumption.
- Caregivers, teachers, and other significant adults are also encouraged to search actively for information to get a better understanding of young adolescents' inner thoughts and feelings.

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APPENDIX

I

Journal for Person-Oriented Research

2016, 2(3), 123-134
Published by the *Scandinavian Society for Person-Oriented Research*
Freely available at http://www.person-research.org
DOI: 10.17505/jpor.2016.12

Well-being, Mental Health Problems, and Alcohol Experiences Among Young Swedish Adolescents: a General Population Study

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To cite this article:
Boson, K., Berglund, K., Wennberg, P., & Fahlke, C. (2016), Well-being, mental health problems, and alcohol experiences among young Swedish adolescents: a general population study. *Journal for Person-Oriented Research, 2*(3), 123-134. DOI: 10.17505/jpor.2016.12.

Abstract

The aim of this study was to investigate patterns of self-reported emotional and behavioral problems and self-rated well-being in relation to alcohol experiences among Swedish girls and boys in early adolescence. A general sample of 1383 young people aged 12 to 13 years reported their internalizing and externalizing problem styles, and their well-being and alcohol experiences were measured. Person-oriented analyses were applied to the data to determine specific mental health configurations ("types") that occurred more frequently than expected by chance. Externalizing problems, in contrast to internalizing problems, occurred more commonly in adolescents who reported a high degree of well-being. Girls with low well-being and mental health problems were overrepresented among those with alcohol experiences. Findings suggest that gender and positive psychology perspectives should be taken into account when describing and explaining mental health among adolescents, especially adolescents with an early alcohol debut.

Keywords: alcohol debut, alcohol experiences, externalizing problems, internalizing problems, gender differences, mental well-being, person-oriented analyses, young adolescents

Introduction

A positive perspective on mental health has long been neglected in favor of psychopathological perspectives (Gillham, Reivich, & Shatté, 2002) and mental health is often defined as the presence or absence of mental health problems and/or psychiatric diagnoses. Screening for mental illness is often the focus of researchers and clinicians trying to describe and explain mental health among children and adolescents (Gillham et al., 2002), but the absence of mental health problems does not necessarily imply a state of well-being (Keyes, 2005, 2006). According to the World Health Organization, "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 2014).

The concept of well-being is multidimensional within the field of positive psychology (Seligman & Csikszentmihalyi, 2000) and can be understood from at least three perspectives: the *subjective* (Diener, 1984; Pavot & Diener, 2008), the *psychological* (Ryff, 1989, 2014; Ryff & Keyes, 1995) and the *social* (Keyes, 1998). The concept of mental

well-being in the present study is inspired by research on both *satisfaction* with life (subjective well-being) and *purpose* in life (one sub-dimension of psychological well-being). Both of these constructs connect to a broader concept of *flourishing*, which includes subjective, psychological, and social perspectives on well-being (Keyes, 2002, 2006, 2013; Keyes & Annas, 2009). The opposite of flourishing is *languishing*, defined as the perception of time and life being wasted to no purpose (Keyes, 2002, 2005). According to Keyes (2002), the risk of developing a major depressive episode is six times higher for languishing people and "anything less than flourishing in adolescents and adults is associated with greater burden both to self and society" (Keyes & Annas, 2009, p. 199).

The two-dimensional model of mental health has been developed to provide a "complete state" model of health (Keyes, 2005). The presence (flourishing) or absence (languishing) of mental well-being works on the y-axis and the presence or absence of mental illness on the x-axis (Keyes, 2005). Studies of this model show that mental illness and mental well-being function on these two related but different continua and that these dimensions should be measured in parallel for a thorough understanding of a person's general mental health status and functioning (Greenspoon & Saklofske, 2001; Keyes, 2005, 2006). There is, however, a need for studies investigating adolescent populations to assess the applicability of the two-dimensional model across a younger age sample (Proctor, Linley, & Maltby, 2008).

Results from studies investigating subjective well-being conclude that a majority of young people in Western countries, especially boys (11- and 15-year-olds), are satisfied with their lives (Currie et al., 2012). Girls' scores tend to be lower than boys', but they do report overall satisfaction with their lives (Currie et al., 2012; Moksnes & Espnes, 2013). The prevalence of life satisfaction has nevertheless been shown to decline for girls from age 11 to 15 (Currie et al., 2012). Studies in Swedish children and adolescents report a high prevalence of well-being, although studies investigating mental health problems have shown that self-reported anxiety and depression have increased in Swedish children and adolescents since the 1980s (Heimersson et al., 2013; Salmi, Berlin, Björkenstam, & Ringbäck Weitoft, 2013). Although many mental health problems have increased in Sweden, serious psychiatric diagnoses (e.g., schizophrenia and bipolarity) among adolescents have not (Bremberg, Hæggman, & Lager, 2006; Petersen et al., 2010).

Consistent gender differences in mental health problems have been reported among adolescents both in Sweden and internationally, with boys having more externalizing (behavioral) problems and girls having more internalizing (emotional) problems (Berlin, Modin, Gustafsson, Hjern, & Bergström, 2012; Currie et al., 2012; Koskelainen, Sourander, & Vauras, 2001; Lundh, Wångby-Lundh, & Bjärehed, 2008; Ronning, Handegaard, Sourander, & Morch, 2004). However, the total of reported symptoms of mental health problems (both externalizing and internalizing), does not usually differ between the sexes in early adolescence (Berlin et al., 2012; Koskelainen et al., 2001; Lundh et al., 2008; Ronning et al., 2004). Studies investigating the relationship between mental health problems and well-being among young adolescents are still lacking, however. The most common practice is to investigate these two dimensions separately, but the results are then often contradictory and difficult to understand.

Adolescence is the time when alcohol consumption is typically initiated and sharply increases (Duncan, Duncan, & Strycker, 2006; Young et al., 2002). An early debut of alcohol consumption is a well-known risk-factor for later alcohol abuse/dependence, especially among adolescents with mental health problems (Kessler et al., 1996). Reduced satisfaction with life has also been associated with alcohol use among children and adolescents as young as 11 to 14 years old (Proctor & Linley, 2014).

It is known that there is a reciprocal relationship between mental health problems and alcohol consumption in adolescence (Kessler et al., 1996; Malmgren, Ljungdahl, & Bremberg, 2008). For example, alcohol use at a young age predicts depressive problems later in life, and depressive problems at a young age predict an increased use of alcohol in adulthood (Malmgren et al., 2008).

Externalizing problems in 8-year-olds are associated with the use of substances (tobacco, alcohol, cannabis, and others) in both boys and girls at the age of 15 to 16 (Young et al., 2002). However, externalizing behavior has not been shown to predict how often girls have been inebriated.

The difference between girls and boys in prevalence of alcohol consumption in early adolescence (ages 12–14) is not substantial, but tends to emerge later, with males showing significantly higher rates of alcohol abuse/dependence (Young et al., 2002). Van Der Vorst, Vermulst, Meeus, Dekovic, and Engels (2009) also investigated alcohol consumption and drinking trajectories for boys and girls in early through middle adolescence. That study did not include mental health profiles, but concluded that being a boy, having a close friend or a father who drinks heavily, and parents who are permissive toward alcohol use increases the risk of a trajectory toward heavy drinking in adolescence.

Another longitudinal study by Willoughby and Fortner (2015) explored the co-occurrence of depression symptoms and alcohol use in adolescents aged 14 to 17. They found that 10% to 14% exhibited a high co-occurrence of depressive symptoms and alcohol use; 14% to 15% reported a high prevalence of depressive symptoms only, and 32% to 37% reported at-risk alcohol use only.

Despite those studies, there remains a lack of research *combining* the variables of well-being, mental health problems, gender, and alcohol initiation among adolescents, and

especially on how these variables are related to each other in girls and boys as young as 12 to 13 years.

Aim and purposes

The aim of this study was to investigate the relationships between mental health problems (patterns of self-reported internalizing and externalizing problems), mental well-being, and alcohol experience among Swedish girls and boys aged 12 to 13 years. Using a person-oriented approach, this study explored the presence of specific configurations that were more frequent ("types") or less frequent ("anti-types") than expected by chance.

Four configurations of the combinations of mental well-being and mental health problems (absence and/or presence of internalizing and/or externalizing problems) were hypothesized to emerge as more frequent than expected by chance in the general sample: (1) girls with high well-being and no internalizing or externalizing problems; (2) boys with high well-being and no internalizing or externalizing problems; (3) girls with low well-being and internalizing (emotional), but no externalizing (behavioral), problems; and (4) boys with high well-being and externalizing, but no internalizing, problems.

We hypothesized that girls and boys with low mental well-being and internalizing or externalizing problems would be more common in the subgroup of young adolescents with an early alcohol debut.

Method

General description of the longitudinal research program

This study investigates baseline data from the first wave of the longitudinal program *Longitudinal Research on Development in Adolescence* (LoRDIA). The program's overall aim is to study transitions from childhood to adolescence in relation to peers and family, mental health, and personality factors and to follow the intertwined processes of risk behavior and resilience in connection to substance abuse. Data were collected from the general population (adolescents, their parents, and their teachers) through repeated surveys.

The program aims to follow adolescents from the age of 12 to 17 years from four municipalities with 9,000 to 36,000 residents in the south-west and south-central regions of Sweden. Data collection began in 2013 with two cohorts in the 6th and 7th grades and will continue with annual surveys to the 8th and 9th grade. The final data collection will end with a diagnostic interview to discover psychiatric disorders and/or substance use disorders when the participating adolescents are 17. A total of 2021 adolescents were invited to participate in the program, and 1520 (75%) submitted responses on questionnaires. Reasons for exclusion were absence from school (9%) or lack of consent from parents (10%) or the child (6%). General exclusion analyses have shown that the study sample in LoRDIA is representative of the entire group of invited participants in terms of demography (gender and ethnicity) and school performance (grades and attendance).

The surveys were (and continue to be) administrated in classroom settings for students in the first three collection waves. In addition, caregivers received a survey by regular mail during waves 1 and 2 and teachers participated by sharing short reports on the pupils' school performance in each wave. The research program was approved by the regional Research Ethics Board in Gothenburg, Sweden (No. 362-13).

Participants

For the present study, children aged 12 to 13 were identified from the first data collection wave (Figure 1) and recruited to participate. Children following a school plan for the intellectually disabled were excluded from the study, as were those who filled out the simplified version of the questionnaire because of their limited abilities in reading and/or concentration. Specific exclusion analyses showed no substantial differences in selected variables between the included and excluded groups. Due to internal drop out, the effective sample in in the main analyses comprised 1278 individuals, evenly distributed between the genders (girls: n=658 [51.5 %]; boys: n=620 [48.5 %]) and across the grades (6th-graders: n = 642 [50.2 %]; 7th-graders: 636 [49.8 %]). Mean ages (standard deviations) were 12.6 years (0.64), equal for both sexes, and mean age was 12.1 years (0.4) for 6th graders and 13.1 (0.4) for 7th graders.

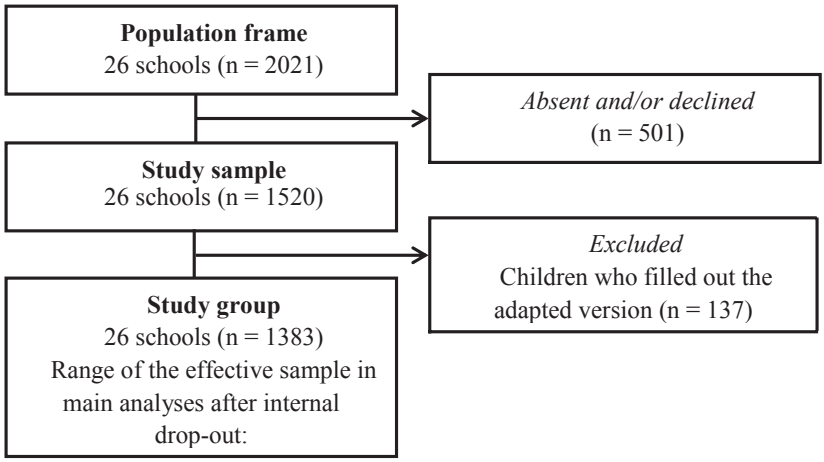

Figure 1. Study recruitment flow chart.

Procedure

Data for the first wave were collected from November 2013 to March 2014). All parents and children received an information letter that briefly explained the purpose of the study. Passive consent was requested from the parents (i.e. not actively responding "no" when asked to let their child participate in the study) and explicit written consent was requested from the child on the day of the survey. We emphasized that participation was voluntary, that collected information would remain confidential, and that participants were free to withdraw from the study at any time. The surveys were administered in the classrooms and absent students were sent their surveys at their home by regular mail. Each questionnaire was introduced by a member of the research team and filled out individually by students using paper and pen. The students answered a structured questionnaire assessing background variables as well as relations with family and peers, adjustment to school and teachers, mental health, and psychological problems. At least one member of the research team monitored the students and was available to answer questions. Approximate time for completing the survey was 1.5 to 2 hours including a short break midway through.

Instruments

For the purpose of this study, the following instruments and questions were included:

Mental health problems. The questionnaires included the Swedish self-report version of Strengths and Difficulties Questionnaire (SDQ-S) (R. Goodman, 1997; R. Goodman, Meltzer, & Bailey, 1998). This questionnaire consists of 25 items and is a broadly used and validated instrument with the aim to detect emotional and behavioral problems (R. Goodman, 1997, 2001; R. Goodman et al., 1998). The SDQ was translated into Swedish by Smedje, Broman, Hetta, and von Knorring (1999), and the psychometric properties of the self-reported version have been validated for use in Sweden (Lundh et al., 2008) as well as other countries (Essau et al., 2012; Koskelainen et al., 2001; Ronning et al., 2004; Van Roy, Veenstra, & Clench-Aas, 2008).

The 25 SDQ items are divided into five subscales of five items each: hyperactivity/inattention (e.g. *I am easily distracted, I find it difficult to concentrate*), emotional symptoms (e.g. *I am often unhappy, down-hearted, or tearful*), conduct problems (e.g. *I fight a lot, I can make other people do what I want*), peer problems (e.g. *Other children or young people pick on me or bully me*), and prosocial behavior (e.g. *I try to be nice to other people*). Answers are given on a 3-point Likert scale of 0 = not true, 1 = somewhat true, or 2 = certainly true, for totals ranging from 0 to 10 for each 5-question scale. All but the prosocial scale can be summed to generate a total difficulties score of 0 to 40, with higher scores indicating more severe general problems.

In this study, the 25 SDQ items were grouped into three subscales used preferably in low-risk community samples (A. Goodman & Goodman, 2009; A. Goodman, Lamping, & Ploubidis, 2010): internalizing problems, externalizing problems, and prosocial behavior. The externalizing score

ranges from 0 to 20 and is the sum of the conduct and hyperactivity/inattention scales. The internalizing score ranges from 0 to 20 and is the sum of emotional symptoms and peer problems scales. Previous studies have used a 90th percentile cut-off point for the 5-factor model to define high risk groups (R. Goodman et al., 1998; Koskelainen et al., 2001; Lundh et al., 2008; Ronning et al., 2004; Van Roy, Grøholt, Heyerdahl, & Clench-Aas, 2006; Van Roy et al., 2008). For this study, the SDQ difficulties subscales was used and cut-offs indicating externalizing and/or internalizing problem styles were set at one standard deviation above mean score (i.e., 9 out of 20 for externalizing problems and 8 out of 20 for internalizing problems).

Mental well-being. A mental well-being measure was created by using two items concerning satisfaction with life and purpose and meaning in life, both previously used in a large population screening among Swedish 6th and 9th graders (Berlin et al., 2012) and similar to items measuring subjective and psychological well-being in the Mental Health Continuum Short Form (MHC-SF) (Keyes, 2009). The following two questions were used:

(1) *In general, how happy are you with life at the moment?* The item is scored 1 for "very happy," 2 for "quite happy," 3 for "quite unhappy," and 4 for "very unhappy." Earlier qualitative research with youth aged 11 to 15 years has shown that children and adolescents evaluated both their feelings toward life in general and the quality of their social relationships when answering this question (Jensen, 1999).

(2) *I think that my life has purpose and meaning.* The item is scored 1 for "completely agree," 2 for "partly agree," 3 for "partly disagree," and 4 for "completely disagree." Lower values on both questions indicate a higher level of mental well-being.

For the purpose of the present study, we reverse-coded and summed each participant's responses. The mental well-being score ranged from 2 to 8 and the consistency of the scale was controlled by a split-half analysis with an alpha value of 0.77 indicating satisfactory internal reliability. The cut-off indicating high mental well-being was set at 6 or more of a maximum 8 points.

Alcohol experiences. Two questions about alcohol experience were asked; (1) "*How old were you when (if ever) you first drank at least one glass of alcohol?*" and (2) "*How old were you when (if ever) you first drank enough alcohol to become inebriated?*" The responses were coded "Yes, have tried alcohol (at least one glass)" and/or "Yes, have been inebriated" for all answers reporting a debut at 14 years or younger. Otherwise, the items were coded "No, never tried alcohol" or "No, never been inebriated." Both questions were previously used in annual reports from the Swedish Council for Information on Alcohol and Other Drugs (Englund (2014). See Table 1.

Statistical methods

Independent *t*-tests using SPSS (version 22.0, 2013) were conducted to compare the mean scores of girls and boys on the self-rated SDQ–total difficulties score, SDQ–externalizing and internalizing scores, and mental well-being scores. Differences between girls and boys were presented as effect sizes (Cohen's *d*). A person-oriented approach was applied to the data (Bergman & Lundh, 2015) and a Configural Frequency Analysis (CFA) (von Eye, 2001; von Eye & Wood, 1996) was conducted to find more frequent ("types") or less frequent ("antitypes") specific health configurations than expected by chance. In order to link specific configurations of gender, mental well-being, internalizing problems, and externalizing problems to alcohol use, an additional analysis was conducted using a procedure called EXACON, describing types and antitypes in a cross-table. *P*-levels were adjusted using Bonferroni in the CFA to reduce the risk of mass significance. Both CFA and EXACON were performed in SLEIPNER version 1.0 (Bergman & El-Khouri, 1995). Although the children were in two different grades (6th and 7th), the variable "grade" did not contribute substantially to a deeper understanding of the sample configurations and was therefore excluded from the analyses.

Results

The first analysis tested gender differences in responses on the SDQ-total problems scale: externalizing and internalizing problems and self-rated mental well-being. This was done to substantiate the relevance of using externalizing and internalizing problems as separate problem styles in the CFA instead of only the Total Difficulties Scale as a measure of mental health problems.

As seen in Table 2, there was no statistically significant difference between girls and boys on the SDQ–total problem scale ($t(1,354) = 1.05$, $p = .294$ *ns*). Gender differences with small effect sizes were found between girls and boys in externalizing and internalizing problems. Boys reported significantly higher scores on the externalizing problems scale—estimated mean difference = 0.88, 95% CI [0.54, 1.21], $t(1,309) = 5.10$, $p = .001$. Girls reported significantly higher scores on the internalizing problems scale—estimated mean difference 0.58, 95% CI [0.24, 0.91], $t(1,355) = 3.40$, $p = .001$. Boys also reported significantly higher levels of mental well-being than girls—mean difference 0.40, 95% CI [0.26, 0.53], $t(1,270) = 5.80$, $p = .000$.

Table 1. *Participant characteristics: alcohol experiences among 12- to 13-year-old girls and boys*

	Girls		Boys		Total	
Alcohol experiences	*n*	%	*n*	%	*n*	%
Tried alcohol (had one glass or more) n = 1295						
Yes	63	4.9	97	7.5	160	12.4
No	609	47.0	526	40.6	1135	87.6
Been inebriated (one time or more) n = 1289						
Yes	25	1.9	15	1.2	40	3.1
No	645	50.0	604	46.9	1249	96.9

Table 2. *Girls' and boys' self-ratings on the Strengths and Difficulties Questionnaire and mental well-being*

	Girls		Boys		Total		*t*-test (2-tailed)	Effect size Cohen´s *d*
Measure	n	M (SD)	n	M (SD)	n	M (SD)	*p*	
Mental well-being (2-8)	666	6.73 (1.34)	623	7.13 (1.11)	1289	6.92 (1.25)	0.000	0.325
Strengths and Difficulties Questionnaire (SDQ)								
Total difficulties scale (0-40)	702	10.03 (5.13)	654	10.33 (5.30)	1356	10.18 (5.21)	0.294 *ns*	0.057
Internalizing problems (0-20)	703	4.82 (3.17)	654	4.25 (3.06)	1357	4.54 (3.13)	0.001	0.183
Externalizing problems (0-20)	703	5.20 (2.96)	655	6.08 (3.34)	1358	5.62 (3.18)	0.000	0.278
	n	%	*n*	%	*n*	%		
Dichotomized variables	658	51.5	620	48.5	1278	100		
Mental well-being (cut-off = 6)								
Low	99	15.0	48	7.7	147	11.5		
High	559	85.0	572	92.3	1131	88.5		
Internalizing problems style (cut-off = 8)								
Yes	117	17.8	90	14.5	207	16.2		
No	541	82.2	530	85.5	1071	83.8		
Externalizing problem style (cut-off = 9)								
Yes	93	14.0	139	22.4	232	18.2		
No	565	86.0	481	77.6	1046	81.8		

Table 3. *Prevalence of configurations and relative probability among 12- to 13-year-olds (n = 1278)*

	Configuration						
Sex	Mental well-being	Internalizing problems	Externalizing problems	Observed frequency	Expected frequency	*p* (adjusted probability)	Significant type/antitype
Girl	Low	No	No	24	51.91	.000	Antitype
Boy	Low	No	No	11	48.91	.000	Antitype
Girl	Low	Yes	No	41	10.03	.000	Type
Boy	Low	Yes	No	7	9.45	*ns*	
Girl	Low	No	Yes	11	11.51	*ns*	
Boy	Low	No	Yes	12	10.85	*ns*	
Girl	Low	Yes	Yes	23	2.23	.000	Type
Boy	Low	Yes	Yes	18	2.10	.000	Type
Girl	High	No	No	464	399.41	.001	Type
Boy	High	No	No	428	376.34	.015	Type
Girl	High	Yes	No	36	77.20	.000	Antitype
Boy	High	Yes	No	35	72.74	.000	Antitype
Girl	High	No	Yes	42	88.59	.000	Antitype
Boy	High	No	Yes	79	83.47	*ns*	
Girl	High	Yes	Yes	17	17.12	*ns*	
Boy	High	Yes	Yes	30	16.13	.019	Type

The variables gender, mental well-being, and internalizing and externalizing problems were included into a CFA to explore health profiles among the general group of young adolescents (Table 3). The expected configurations of 1 to 3 were found to be significant as proposed "types". Girls (p = 0.001) and boys (p = 0.015) with high levels of well-being and no internalizing or externalizing problems were predominant in the group of 12- to 13-year-olds. Somewhat surprisingly, girls and boys reporting low mental well-being and both internalizing and externalizing problems were also found to be more frequent types than expected by chance (p < .001). The third expected configuration was also significant in the sample (p < .001); girls with low mental well-being and internalizing problems were four times more frequent than expected by chance. The last expected configuration of boys with high mental well-being and externalizing problems was not a statistically significant "type". An unexpected group, however, did emerge as a "type": boys reporting high mental well-being and both externalizing and internalizing problems (p = .019). It should be noted that several "antitypes" also emerged in the group. Girls reporting high mental well-being, externalizing problems, but no internalizing problems were less frequent than expected by chance (p < .001). The same configuration was not an "antitype" among boys. The combination of high mental well-being, internalizing problems, but no externalizing problems was found as a significant "antitype" among both genders (p < .001). Low well-being and absence of internalizing and externalizing problems was also an antitype for both girls and boys (p < .001). The two last configurations were both infrequent patterns among the 12- to 13-year-olds.

Table 4. *Alcohol experience contingent on health configurations among 12- to 13-year-olds (n = 1215)*

Configuration				Tried alcohol				
Sex	Mental well-being	Internalizing problems	Externalizing problems	Yes	No	Total	*p*	Significant type/antitype
Girl	Low	No	No	4	20	24	*ns*	
Boy	Low	No	No	3	7	10	*ns*	
Girl	Low	Yes	No	8	30	38	*ns*	
Boy	Low	Yes	No	0	5	5	*ns*	
Girl	Low	No	Yes	3	7	10	*ns*	
Boy	Low	No	Yes	4	7	11	*ns*	
Girl	Low	Yes	Yes	8	15	23	0.043	Type
Boy	Low	Yes	Yes	6	12	18	*ns*	
Girl	High	No	No	17	421	438	0.000	Antitype
Boy	High	No	No	51	355	406	*ns*	
Girl	High	Yes	No	3	32	35	*ns*	
Boy	High	Yes	No	3	32	35	*ns*	
Girl	High	No	Yes	11	30	41	0.008	Type
Boy	High	No	Yes	22	54	76	0.000	Type
Girl	High	Yes	Yes	1	15	16	*ns*	
Boy	High	Yes	Yes	6	22	28	*ns*	

The majority of children who had ever tried alcohol reported high mental well-being (114 out of 150 = 76%; see Table 4). The proportion of high well-being differed between the sexes: 58% among girls and 86% among boys. Three health configurations were more frequent than expected by chance (i.e. "types") in the EXACON analysis: girls with low mental well-being and co-occurring internalizing and externalizing problems and both girls and boys with high mental well-being and no internalizing problems, but with an externalizing problem style. The results showed that these groups had earlier alcohol experiences than other health configurations. However, one group, that of girls with high mental well-being and no self-reported mental health problems, emerged less frequently than expected by chance, and was considered an antitype.

Discussion

This study aimed to examine patterns of self-reported mental health problems (i.e. internalizing and externalizing problems) and mental well-being in relation to alcohol experience among a representative sample of Swedish girls and boys aged 12 to 13 years. Our findings suggest that mental well-being, mental health problems, and gender perspectives all need to be taken into account when describing and explaining adolescents with early alcohol debut.

Our results revealed no gender difference in total self-reported mental health problems (internalizing and externalizing problems), and this finding is in line with

previous research (Berlin et al., 2012; Koskelainen et al., 2001; Lundh et al., 2008; Ronning et al., 2004). On the other hand, significant gender differences were found on the externalizing and internalizing sub-dimensions, with girls reporting more internalizing problems and boys reporting more externalizing problems. The effect sizes can be interpreted as small, implying a careful interpretation of gender differences on the group level. However, these findings are also supported by previous research (Berlin et al., 2012; Currie et al., 2012; Koskelainen et al., 2001; Lundh et al., 2008; Ronning et al., 2004), supporting the use of separate SDQ subscales in further analyses. Different coping strategies and problem styles might be adapted by girls and boys because of gender expectations perceived before and during adolescence. Larger differences in problem styles might therefore emerge in later adolescence.

Notably, gender differences in the positive aspects of mental health (well-being) were already visible in our study in early adolescence. The effect was moderate and similar to that found by Moksnes and Espnes (2013). Boys, more often and more strongly than girls, reported feeling happy about life in general and having a sense of purpose and meaning in their lives. There are several potential interpretations to these findings. Boys and girls might experience life and challenges in life differently, or expectations about life satisfaction and purpose in life might differ between genders. It is also possible that capabilities to reflect upon life differ between boys and girls due to emotional and/or cognitive maturity. Our results are in line with previous research on adolescents' life satisfaction, which report declining satisfaction between the ages of 11 and 15, and a more rapid decline among girls (Currie et al., 2012; Moksnes & Espnes, 2013). Declining mental health through adolescence (increased mental illness and decreased well-being) have also been reported by Keyes (2006). It is therefore reasonable to expect increased gender differences in this sample later in the LoRDIA-research program.

While the gender differences had only a small to medium effect, the CFA shifted focus from group level statistics toward combinations of variables *within* the individual. Our results showed, as predicted, that a majority of young adolescents reported a high degree of mental well-being and no internalizing or externalizing problem styles. These results are in line with other studies on adolescents' mental health (Currie et al., 2012; Keyes, 2006) where *flourishing* (high well-being and low mental illness) was the most prevalent "diagnosis" among youth ages 12 to 14 (Keyes, 2006). As predicted, girls with low well-being and internalizing problems were significantly more frequent than expected by chance even in a sample so young as 12- to 13-year-olds. Notably, this configuration was four times larger than what we would expect from the prevalence numbers in the sample; the same pattern was less frequent among boys. These results support previous findings on mental illness among girls, showing that adolescent girls report a higher degree of internalizing problems as well as lower life satisfaction than boys of the same age (Moksnes & Espnes, 2013). The results also support the prediction that more boys than girls were expected to report a pattern of externalizing problems combined with high well-being. Girls with high well-being and externalizing problems were only half as common as expected by chance in the material. Both girls and boys reporting high well-being combined with internalizing problems were antitypes in the general sample, i.e. less frequent than expected by chance. These results suggest that having only an externalizing problem style (more common among boys) might be more robust against the risk of low well-being than an internalizing problem style (more common among girls).

The majority of adolescents in our sample were alcohol naïve (had neither tried alcohol nor been inebriated). Our prevalence numbers of alcohol use (tried alcohol or been inebriated) are less than previously reported epidemiological numbers (Young et al., 2002). Few 12- to 13-year-olds reported having been inebriated or even tried alcohol in our sample population. Moreover, and in line with the study by Young et al. (2002), more boys than girls reported early alcohol experiences. Early alcohol experiences can potentially be understood as part of an externalizing problem style, more common among boys than girls at this age (Berlin et al., 2012; Currie et al., 2012; Koskelainen et al., 2001; Lundh et al., 2008; Ronning et al., 2004).

We explored how early alcohol experiences (i.e. tried alcohol once or more) related to health configurations and tested whether individuals with early alcohol experiences were more or less frequent in each health profile than expected by chance. The independent variable "Yes, I have tried alcohol (one glass or more)" can seem harmless compared to "Yes, I have been inebriated (one time or more)." but we still expected that young adolescents with a low degree of mental well-being and internalizing and/or externalizing problems would be overrepresented in this subgroup. Interestingly, the predicted configuration was not dominant among young adolescents with early alcohol experiences.

The alcohol subgroup, contrary to our prediction, consisted mainly of boys reporting high mental well-being and no co-occurring internalizing or externalizing problem styles. However, girls with a similar mental health profile were less frequent than expected by chance (i.e. an antitype); implying that this health profile is more associated with alcohol abstention in early adolescence for girls than for boys. Another overrepresented configuration which differed between the genders was that of girls with low mental well-being, internalizing problems, and co-occurring externalizing problems. These girls represent a vulnerable group with multi-health problems who may use alcohol for other reasons than boys and might profit from early intervention.

However, both girls and boys with high mental well-being and solely an externalizing, but no internalizing, problem styles were overrepresented in the alcohol subgroup. This might imply that an externalizing problem style in combination with high mental well-being could be key features among 12- to 13-year-olds with early alcohol experiences. Alcohol use at early age seems to be both related to an externalizing problem style and part of young boys' experimentation with their masculinities, and/or a part of a norm-breaking/delinquent behavior setting more easily accessible to boys than to girls.

Limitations

When interpreting our findings, some limitations need to be considered. Although validated measures were used, the data for this study were drawn from self-reports, which should be interpreted with caution. On the other hand, the SDQ self-report version has shown good ability to detect and discriminate between different psychiatric problems and to map internal and external problems among children and adolescents (A. Goodman et al., 2010; R. Goodman et al., 1998). It is also notable that no volume or frequency measure, except a lifetime minimum of at least one glass of alcohol, was included in the analyses. How much alcohol and how often they drank could therefore vary extensively within the group. Still, one glass of alcohol or more can effectively differentiate the alcohol naïve children from those who have crossed society's clear boundaries about no alcohol usage in early ages. It is important, though, to recognize that results from this study cannot be taken to imply causality. At this time in children's lives, developmental trajectories are not yet detectable. Alcohol experiences at young age might precede internalizing and/or externalizing problems and vice versa.

An additional limitation of the present study is the small number of participants in some health profiles in the EXACON-analysis and further health profiles might have come out as "types" or "antitypes" with a larger sample. Missing data is always a limitation and might skew the results, although general exclusion analyses showed that the study sample in LoRDIA was representative of the entire group of invited participants in terms of demography (gender and ethnicity) and school performance (grades and attendance). However, information about the excluded group's alcohol experiences was not available. Finally, we wanted to test *a priori* defined hypotheses and found it convenient and relevant to do that using CFA rather than cluster analysis or other methods. The decision to dichotomize the variables was practical rather than theoretical and we are aware of the loss of information that this decision creates.

Conclusions

This is the first published study of data from the premiere data collection wave in the prospective LoRDIA-project. We found that young adolescents are generally "doing just fine". Externalizing problems are, however, more common than internalizing problems among adolescents reporting high mental well-being. Girls with both mental health problems and low well-being are a vulnerable risk group in general and overrepresented among those with alcohol experiences. We believe that this study is relevant and provides a novel approach for understanding mental health among young adolescents. These results can contribute to knowledge about mental health in the youngest adolescents. We suggest that further research and practice should take both gender perspectives and positive psychology perspectives into account when describing and explaining mental health among adolescents, especially adolescents with an early alcohol debut.

Authors' contributions

Karin Boson designed the study, organized the data collection, and drafted the first version of the manuscript. Karin Boson, Kristina Berglund, and Claudia Fahlke participated in the data collection and were actively involved in revising the manuscript. Peter Wennberg and Karin Boson carried out the statistical analyses. All authors have read and approved the final manuscript.

Acknowledgments

A major financial contribution was granted in a combined decision (No. 259-2012-25) from four Swedish research foundations: Swedish Research Council (VR); Swedish Research Council for Health, Working Life and Welfare (FORTE); Sweden's Innovation Agency (VINNOVA); and The Swedish Research Council Formas. Additional contributions were granted from Säfstaholm Foundation (No. ST-2014-023), Sunnerdahl Disability Foundation (No. 40-14), and Futurum, Jönköping County (No. 2014/3821-271).

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Psychological Assessment
2018, Vol. 30, No. 4, 550–555

1040-3590/18/$12.00 http://dx.doi.org/10.1037/pas0000513

BRIEF REPORT

The Junior Temperament and Character Inventory (JTCI): Psychometric Properties of Multi-Informant Ratings

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The aims of the study were (a) to establish norms for the Swedish child self-report and caregiver rating versions of the Junior and Temperament Character Inventory (JTCI) among young adolescents, (b) to investigate its psychometric properties, and (c) to investigate congruence between children's self-reports and caregivers' ratings of a child's personality. The sample was a general population of 1,046 children ages 12–14 years and 654 caregivers. The JTCI was found to be reliable on all dimensions except Persistence in the child self-report version. Caregivers rated their own children's personalities as more mature than did the children themselves. Caregivers especially overestimated their daughters' self-reported capabilities for self-acceptance and self-efficacy and might have underestimated their daughters' need for emotional support. This highlights the importance of including the child's self-report on personality in both research and clinical assessments. The results also support the importance of age- and gender-separated norms.

Public Significance Statement
This study found that the Swedish version of the Junior Temperament and Character Inventory is a reliable assessment of young adolescents' personality on most dimensions. However, caregivers tended to overestimate their daughters' capabilities for self-acceptance and self-efficacy and might have underestimated their daughters' need for emotional support.

Keywords: adolescence, multi-informant, Junior Temperament and Character Inventory (JTCI), psychometric properties, Longitudinal Research on Development in Adolescence (LoRDIA) program

The Junior Temperament and Character Inventory (JTCI; Luby, Svrakic, McCallum, Przybeck, & Cloninger, 1999) is an adapted children and adolescents version of the Temperament and Character Inventory (TCI; Cloninger, Przybeck, Švrakić, & Richard, 1994; Cloninger, Švrakić, & Przybeck, 1993). The inventory consists of four dimensions of temperament (Novelty Seeking [NS], Harm Avoidance [HA], Reward Dependence [RD], and Persistence [P]) and three dimensions of character (Self-Directedness [SD], Cooperativeness [CO], and Self-Transcendence [ST]) to describe the underlying structure of an individual's personality.

The JTCI comes in a self-report version and a caregiver rating version. Research on the JTCI has been emerging, and the instrument has been investigated psychometrically among children and adolescents in clinical samples (e.g., Hemphälä, Gustavsson, & Tengström, 2013), general samples (Andriola et al., 2012; Asch et al., 2009; Luby et al., 1999; Lyoo et al., 2004; Vangberg et al., 2013), and twin samples (e.g., Kerekes et al., 2010). However, norms and psychometric validation for the Swedish self-report version of the JTCI are still lacking, as are norms for caregiver ratings of adolescents ages 12–14 years. Regarding the congruence between children's and caregivers' ratings, to our knowledge, only one study has investigated the 108-item self-report version and the caregiver version parallel in a general sample. The results showed that children's scores were higher on the NS, RD, P, and ST in

This article was published Online First August 7, 2017.

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A major financial contribution was granted in a combined decision (259-2012-25) from four Swedish research foundations: Swedish Research Council (VR); Swedish Research Council for Health, Working Life and Welfare (FORTE); Sweden's Innovation Agency (VINNOVA); and The Swedish Research Council Formas. Additional contributions were granted from Säfstaholm Foundation (ST-2014-023), Sunnerdahl Disability Foundation (40-14), and Futurum, Jönköping County (2014/3821-271).

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comparison to their caregivers' (Lyoo et al., 2004). Comparison analyses conducted in France using a slightly different version of JTCI (Asch et al., 2009) showed moderate correlations between children's self-reports and caregivers' ratings. Gender differences in JTCI test scores have been found on the HA and NS, with girls reporting higher levels on HA and boys reporting higher levels on the NS scale (Andriola et al., 2012).

The aim of present study was threefold: (a) to establish norms for the Swedish self-report and caregiver versions of the JTCI among adolescents ages 12–14 years, (b) to investigate the psychometric properties of both the self-report and caregiver versions of the JTCI, and (c) to investigate the congruence between children's self-reports and caregiver ratings of the JTCI. Gender analyses were conducted throughout the study. We hypothesized that children's self-reports and their caregivers' ratings would overlap moderately but articulated no hypotheses regarding potential differences between caregivers' ratings of sons and caregivers' ratings of daughters.

Method

This study is a part of the ongoing prospective longitudinal program Longitudinal Research on Development in Adolescence (LoRDIA). The program is carried out in four small- to middle-sized municipalities in Sweden (for details see Boson, Berglund, Wennberg, & Fahlke, 2016). The Regional Research Ethics Board in Gothenburg, Sweden, approved the study (No. 362–13; 2014–05-20). Young adolescents ages 12–14 are an understudied age group due to ethical considerations and caregivers' consent. The majority of studies have therefore included adolescents ages 15 and older when they are allowed to participate without their caregivers' permission. The ability to study personality in young adolescents is exclusive and can provide knowledge about the importance of personality dimensions in development.

For the present study, originally 1,449 adolescents (ages 12–14) who had taken the JTCI were included. However, for 403 of these, information about the child's age and gender were missing and/or more than 5% of answers were either missing or incorrect on control items. Thus, the study group included 1,046 adolescents: 582 girls (56%; mean age = 13.4, *SD* = .6) and 464 boys (44%; mean age = 13.3, *SD* = .6). Approximately 74% had caregivers (parental figures) who lived together.

The sample also included 654 caregiver ratings (originally the caregiver sample was 709, but 56 were excluded due to missing information about the child's age and gender and/or more than 5% of answers were either missing or incorrect on control items). All participants with a valid self-report and a valid and overlapping caregiver rating were included in the comparison analyses. Double ratings on one child led to systematic exclusion of one of the parent ratings. Father ratings were systematically saved due to underrepresentation of fathers in the sample. However, this was the situation in only approximately 10 cases. We believe that the sample size is large enough to correct any problematic dependencies caused by caregivers' having more than one child in these age groups. The final subsample for comparison analyses consisted of 481 adolescents (275 girls [57%] and 206 boys [43%]) and 481 caregivers (313 mothers, 63 fathers, 87 joint caregivers, one "other caregiver," and 17 unclassified caregivers).

Data were collected over 4 weeks in October and November 2014. Initially, all caregivers and children received an information letter that briefly explained the purpose of the study. Passive consent from the caregiver was requested for the children's participation, as well as written consent from the adolescent on the day of the survey. The JTCI was completed at schools in classrooms. Absent students were posted the survey to their homes by regular mail (see Boson et al., 2016, for a more detailed description of the procedure).

The caregivers also received a paper survey by regular mail parallel to the data collection in their children's schools. Joint caregivers could choose to answer the survey about their child together or fill in the questionnaire separately.

The Swedish JTCI is a translation of the original American version (Luby et al., 1999) and was developed in several steps, including translation, back-translation, and population testing according to Brislin's (1976) recommendations and best practice. There are no earlier Swedish versions of the JTCI self-report, and already exciting versions in Sweden are caregiver-rating versions. It is therefore well justified to use these norms for this translation of the JTCI in Sweden.

The self-reported and caregiver versions of the JTCI each consist of 108 items to be answered as true or false (see Table 1 for the number of items in each dimension). The two versions are almost identical except for the modification of pronouns.

For investigating psychometric properties, we analyzed internal consistency, correlation patterns, and convergent validity. Approximately .6 or more was used for adequate internal consistency. The JTCI does not include subdimensions compared to the 240-item adult TCI; thus, the JTCI subscales aim to capture a broader breadth of the construct with the selected items. It was therefore suitable to accept a lower Cronbach's alpha than .7, which is often the cutoff for acceptable internal consistency. Multivariate analyses of variance (MANOVAs) were used to investigate age and gender distributions and their impact on JTCI dimensions. Paired-samples *t* tests were conducted to compare children's self-reports with their caregivers' ratings on the JTCI. All analyses were conducted with SPSS (Version 22.0, 2013).

Results

Sample descriptors (means and standard deviations) and internal consistency of the self-report and caregiver versions of the JTCI are presented in Table 1. Cronbach's alpha scores of the JTCI dimensions for the child self-report version ranged from .28 (P) to .82 (HA) for the temperament dimensions and from .63 (CO) to .72 (SD) for the character dimensions, as shown in Table 1. The average interitem correlations ranged from .06 (P) to .19 (ST) for children. Norms for caregiver ratings were higher in the NS, RD, SD, and CO and lower in the HA, P, and ST than were the norms on the children's self-reports. For the sample of caregivers, the alpha scores ranged from .52 (RD) to .82 (HA) for the temperament dimensions and .65 (ST) to .80 (SD) for the character dimensions. Cronbach's alpha values are dependent on both the number of items within the scale and the correlation strength between the items included in the scale. The average interitem correlations for caregivers ranged from .11 (RD) to .19 (P). The lowest alpha coefficient in the results of the child version was on the P (.28), which included fewer items than did the other scales. Removal of single items did not affect the alpha value on the P dimension, and thus, revisions of single items would not increase the internal consistency. For the caregivers, these results improved on the

Table 1
Sample Descriptors for the JTCI for the Child Self-Report and Adult Caregiver Versions

Personality dimension	No. items	α	AIC	Girls Age 12	Girls *M* (*SD*)	Girls Age 13	Girls *M* (*SD*)	Girls Age 14	Girls *M* (*SD*)	Boys Age 12	Boys *M* (*SD*)	Boys Age 13	Boys *M* (*SD*)	Boys Age 14	Boys *M* (*SD*)
Child self-report (n = 1,046)															
n				36		280		266		33		249		182	
Novelty seeking	18	.68	.11		5.6 (3.2)		7.0 (3.4)		7.0 (3.3)		7.0 (3.7)		7.9 (3.2)		7.8 (3.1)
Harm avoidance	22	.82	.17		7.7 (3.7)		7.9 (4.6)		7.9 (4.6)		5.0 (4.0)		5.7 (4.0)		6.4 (4.2)
Reward dependence	9	.53	.11		4.6 (2.2)		5.1 (2.0)		5.0 (1.9)		3.6 (1.6)		3.9 (1.9)		3.7 (1.8)
Persistence	6	.28	.06		3.3 (1.5)		3.6 (1.4)		3.5 (1.3)		3.9 (1.1)		3.5 (1.4)		3.6 (1.3)
Self-directedness	20	.72	.12		13.9 (3.2)		14.3 (3.6)		13.7 (3.5)		14.5 (3.0)		14.1 (3.4)		14.0 (3.4)
Cooperativeness	20	.63	.08		15.8 (2.9)		15.5 (2.6)		15.5 (2.7)		14.7 (2.8)		14.3 (3.0)		14.6 (3.1)
Self-transcendence	10	.69	.19		3.9 (2.1)		3.9 (2.4)		4.1 (2.4)		3.8 (2.5)		3.7 (2.3)		3.8 (2.3)
Caregiver rating (n = 652)															
n				26		178		144		18		164		122	
Novelty seeking	18	.72	.12		7.8 (4.0)		7.9 (3.1)		7.6 (3.3)		6.6 (3.1)		8.5 (3.4)		8.3 (3.9)
Harm avoidance	22	.82	.17		4.7 (3.5)		5.4 (3.8)		5.2 (4.0)		4.4 (2.7)		5.0 (3.9)		5.2 (3.7)
Reward dependence	9	.52	.11		5.3 (1.8)		5.3 (1.7)		5.2 (1.9)		4.1 (1.4)		4.3 (1.8)		4.3 (1.8)
Persistence	6	.58	.19		3.0 (1.4)		3.2 (1.6)		3.4 (1.7)		2.2 (1.7)		2.5 (1.6)		2.7 (1.6)
Self-directedness	20	.80	.18		16.0 (3.4)		16.1 (3.4)		16.2 (3.5)		15.3 (3.4)		14.9 (3.8)		15.3 (3.7)
Cooperativeness	20	.70	.12		16.8 (2.7)		16.7 (.4)		16.7 (2.5)		16.4 (3.6)		15.8 (3.1)		15.2 (3.0)
Self-transcendence	10	.65	.17		1.8 (1.6)		2.1 (1.9)		1.9 (1.9)		1.4 (1.8)		1.8 (1.8)		1.4 (1.6)

Note. JTCI = Junior Temperament and Character Inventory; AIC = average interitem correlation.

P from .50 to .52, which was one of the lower alpha coefficients in all dimensions. Hence, the internal consistency could be increased by removing or revising some of the items in the caregiver rating version.

We used MANOVA to investigate personality differences using the personality dimensions as dependent variables and age cohort and gender as independent variables (see Table 2). Significant main effects of gender were found on the NS, HA, RD, and CO, where girls rated themselves as lower than did boys on the NS and higher on the HA, RD, and CO. A main effect of age was also found as the NS increased with age. One significant interaction effect was also found between age and gender on the NS. A significant interaction effect on gender and age was found on the NS. The between-subjects effect on age was mainly for the girls on the NS, where the mean results on this dimension increased from 5.6 (12 years) to 7.8 (14 years), as seen in Table 1.

According to the correlation pattern, significant relationships with $r > .30$ consistently emerged for both children's and caregivers' results between the SD and the HA, RD, P, and CO and between the CO and the NS, RD, and SD (see Table 3). However, the inconsistency in the correlation pattern between children and caregivers was mainly on the magnitude level and not on the overall pattern of correlations.

Comparisons and evaluations of the similarities between children's self-reports and their caregiver's ratings are seen in Table 4. The results showed that caregivers of daughters perceived their child to be higher in the NS, RD, SD, and CO and lower in the HA and ST compared to caregivers of sons. Caregivers of sons rated their child higher on the RD, SD, and CO and lower on the HA, P, and ST compared to caregivers of daughters. The differences were significant, and the effects ranged from very small to large.

Discussion

This study provides norms for the Swedish JTCI child self-report version and the caregiver rating version for adolescents ages 12–14 years. The JTCI dimensions showed fair to good internal consistency, except that Persistence in children's self-reports showed low internal consistency. These results are similar to those

Table 2
Multivariate and Between-Subjects Effects of the JTCI Dimensions for Children Ages 12 to 14 Years

Source	Multivariate: Pillai's trace	*F*	*df*s[a]	η^2	Between-subjects effects (*F* scores): NS	HA	RD	P	*SD*	CO	ST
Gender[b]	.10	16.92***	(7,1034)	.103	6.60**	28.88***	42.85***	3.06	.52	17.64***	.94
Age[c]	.03	2.20**	(14,2070)	.015	6.37**	1.34	1.82	.00	1.34	.47	.68
Gender × Age[c]	.01	.94	(14,2070)	.006	3.04*	.84	.16	2.13	.61	.43	.09

Note. N = 1,046. Multivariate F ratios were generated using the Pillai's statistic. JTCI = Junior Temperament and Character Inventory; NS = Novelty Seeking; HA = Harm Avoidance; RD = Reward Dependence; P = Persistence; SD = Self-Directedness; CO = Cooperativeness; ST = Self-Transcendence.
[a] For multivariate tests. [b] Between-subject effects: $df = 1$. [c] Between-subject effects: $df = 2$.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3
Pearson Correlations Between JTCI Dimensions for Children (n = 1,046) and Their Caregivers (n = 652)

Dimension	1	2	3	4	5	6	7
1. Novelty seeking	—	−.24**	−.07	**−.33****	−.25**	**−.30****	−.01
2. Harm avoidance	−.07*	—	−.27**	−.11**	**−.46****	−.24**	.21**
3. Reward dependence	−.17**	−.21**	—	.19**	**.39****	**.37****	−.07
4. Persistence	−.27**	−.26**	.11**	—	**.48****	**.33****	−.02
5. Self-directedness	**−.31****	**−.51****	**.30****	**.39****	—	**.50****	−.23**
6. Cooperativeness	**−.38****	−.17**	**.30****	.25**	**.46****	—	.00
7. Self-transcendence	.07*	.24**	−.11**	−.07*	−.23**	−.06	—

Note. Data for children appear below the diagonal, and data for caregivers above the diagonal. Bold font indicates correlations of 30 or greater. JTCI = Junior Temperament and Character Inventory.
* $p < .05$. ** $p < .01$.

in the Korean study, which also reported the lowest Cronbach's alpha value for the Persistence dimension (Lyoo et al., 2004). The low internal consistency is potentially due to the low number of items included (i.e., six for Persistence compared with 22 for Harm Avoidance). The questions concerning persistence might be difficult for adolescents ages 12–14 years to understand, although the internal consistency was questionable in the caregiver version as well. We conclude that the internal structure of the JTCI as a whole is satisfactory, but the temperament dimension Persistence does not form a reliable construct in the Swedish self-report version in these age groups. Furthermore, low levels on the average interitem correlations might reflect that items in the JTCI dimensions are based on different constructs (subscales) according to the biopsychosocial model of personality (Cloninger et al., 1994). A sample consisting of a wider range of age groups is needed before revision and/or expansion of the Persistence dimension can be performed.

The multivariate analyses of variance on age and gender effects showed that boys had significantly higher scores on the NS than did girls, and girls reported higher scores on the HA, RD, and C, which is consistent with findings in the adult version (Brändström, Richter, & Przybeck, 2001). These findings are comparable to observations on mental health problems. Consistent gender differences have been reported, with boys having a higher degree of externalizing (hyperactivity, aggression) problems and girls having more internalizing (anxiety, depression) problems (Berlin, Modin, Gustafsson, Hjern, & Bergström, 2012; Boson et al., 2016). The analyses also showed large age and interaction effects, with the Gender × Age interaction on Novelty Seeking indicating higher levels of novelty-seeking behavior by age, especially for girls. The differences that have been mentioned highlight the importance of age- and gender-specific norms of the JTCI, as recommended previously (Brändström, Sigvardsson, Nylander, & Richter, 2008).

The correlation structure corresponds well with previously reported observations on Cloninger's biopsychosocial model of personality among children and adolescents in community samples (Andriola et al., 2012; Asch et al., 2009; Luby et al., 1999; Lyoo et al., 2004; Vangberg et al., 2013). The correlations between the seven dimensions were weak to moderate. However, the moderately strong negative correlations between the temperament dimension of the HA and the character dimension of the SD indicate that these dimensions were intertwined and might be difficult for both the child and the caregiver to discriminate. Similar results in elder adolescents have been reported by Vangberg et al. (2013) in a Norwegian sample. The moderately positive relations between the SD and P and the SD and CO also indicate that these constructs are related. Still, it is likely that correlations between these dimensions may be due to interactions of various behaviors in the development of personality over time. In fact, the SD and CO correlates significantly, though only moderately, with almost all the other temperament and character dimensions. The exception is the relation between the CO and ST, which had zero correlation on both the children's and caregivers' ratings. Comparable findings on the JTCI have previously been reported (Andriola et al., 2012; Luby et al., 1999; Lyoo et al., 2004; Vangberg et al., 2013).

Table 4
Comparison Between Child Self-Report and Caregiver Rating on JTCI Dimensions

	Child: *M* (*SD*)		Caregiver: *M* (*SD*)		Cohen's *d*[a]	
Dimension	Girls (*n* = 275)	Boys (*n* = 206)	Girls (*n* = 275)	Boys (*n* = 206)	Girls	Boys
Novelty seeking	7.1 (3.3)	7.7 (3.2)	7.7 (3.3)*	8.0 (3.4)	−.18	—
Harm avoidance	7.7 (4.5)	5.7 (4.2)	5.4 (3.9)***	5.0* (3.6)*	.56	.17
Reward dependence	5.0 (2.0)	3.9 (1.8)	5.3 (1.7)*	4.4 (1.7)**	−.18	−.29
Persistence	3.5 (1.4)	3.6 (1.3)	3.4 (1.6)	2.7 (1.6)***	—	.63
Self-directedness	14.3 (3.5)	14.4 (3.3)	16.3 (3.3)***	15.5 (3.7)***	−.57	−.32
Cooperativeness	15.9 (2.4)	14.9 (3.1)	16.7 (2.5)***	15.7 (3.0)**	−.32	−.26
Self-transcendence	4.0 (2.4)	3.6 (2.3)	2.0 (1.9)***	1.6 (1.7)***	.91	.99

Note. $N = 481$ paired samples. Dashes indicate data concerning effect sizes are not reported. JTCI = Junior Temperament and Character Inventory.
[a] An effect size of .2 to .3 can be interpreted as "small," around .5 as "medium," and .8 or more as "large" (Cohen, 1988).
* $p < .05$. ** $p < .01$. *** $p < .001$.

Concordance between children's self-reports and caregivers' ratings on their child's personality were modest and similar to results in previous research on spouses (Brändström et al., 2008) and child–parent dyads (Lyoo et al., 2004). Our findings display differences with small to large effect sizes between the children's own reports on temperament and character traits and their caregiver's ratings. It seems that caregivers tend to overestimate their child's SD (i.e., ability to maneuver behavior and degree of self-acceptance and self-efficacy) and to underestimate the child's HA (i.e., anxiety and fear of the unknown). These results are especially noticeable among caregivers' ratings of girls. Caregivers also seem to underestimate their sons' ability on the P (i.e., endurance in problem solving and commitment to tasks and goals despite frustration and fatigue). The same dissonance between caregivers' and their daughters' estimations did not exist even though girls and boys reported similar mean scores on the Persistence dimension. This highlights the importance of including the child's self-report on personality in both research and clinical settings.

A general pattern emerged in the comparison analyses, implying that caregivers rate their children as slightly more novelty seeking (i.e., active, impulsive, and in need of exploration) than do children. Caregivers also rated their children as higher on the RD (more reward seeking, with a higher level of attachment and social dependence) than did the children. The caregivers also rated the children higher (although with a small effect) on the CO (ability to cooperate with, accept, and help others) and significantly lower on the ST (spiritualism and ability to experience a larger universal perspective) than did the children themselves. This latter result was surprising, and even though the mean scores on the ST were relatively low, these results might indicate that parents lack insight into their children's spiritual life.

These results on personality ratings agree with findings in the literature, in which a relatively low congruence between children's and caregivers' reports on a child's mental health problems (worry, anxiety, and depressive symptoms) have been reported (Waaktaar, Borge, Christie, & Torgersen, 2005).

When interpreting our findings, some limitations should be considered. First, even though valid measures were used, the data for this study were based on self-reported information, which should be treated with caution when interpreting the results. The lack of external (to the JTCI) criterion measures is also a limitation. However, we believe that the study has strength in the multi-informant design, with nearly 500 pairs of reports from both child and caregiver.

It is also worth noting that only adolescents with a valid self-report—1,046 (72%) of the original 1,449—were included in the analyses, and of the originally 709 caregivers, only 654 were included for the norm data and 481 for the comparison analysis. There are several potential explanations for the more than 5% missing items and wrong answers on the control items. Children with reduced reading and/or concentration capabilities might have missed items and/or misinterpreted the control items that required them to answer true or false on certain questions. Missing items and incorrect answers on the control items might also be an indication of defiance. Further studies on how conduct problems and hyperactivity–inattention problems might be related to the JTCI's answering style are needed. Finally, it is important to recognize that personality, though apparent in early childhood, it is not stable until early adulthood and can continue to develop across the life course (Brändström et al., 2008).

The JTCI provides a complete inventory of both the adolescents' temperament (i.e., automatic emotional drives) and character (i.e., voluntary behavior and values). The Swedish JTCI shows reliable test scores on all dimensions except Persistence on the child self-report version in the 12–14 age group. Further evaluation in a wider range of age groups, which could lead to revision and expansion of this dimension, is suggested. The results also support the assumption that age- and gender-separated norms are important.

It is recommended to further examine the structure of the JTCI, especially longitudinally, to be able to evaluate children's personality development (i.e., maturity) and its effect on psychometrics. Swedish caregivers tended to rate their children's personality as more mature (higher scores on the SD and CO) than did the children themselves. Caregivers especially tended to overestimate their daughters' self-reported capabilities for self-acceptance and self-efficacy and to possibly underestimate their daughters' needs for emotional support. These results are likely to go beyond a Swedish setting and highlight the importance of including the child's self-report on personality in both research and clinical settings. The child's own voice is essential if caregivers and adults aim to draw conclusions about the child's psychological constitution and perception of the world.

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Received February 23, 2016
Revision received May 30, 2017
Accepted June 9, 2017 ■

III

Personality traits and mental health as predictors of alcohol inebriation among young adolescents: Gender-specific patterns

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Abstract

The aim of this study was to predict alcohol inebriation and potential gender-specific patterns among young adolescents by a two-continua model of mental health (internalizing and externalizing problems plus well-being) and a biopsychosocial model of personality traits. Self-reported data from 853 adolescents (479 girls) in Sweden, aged 13-15 years, from the Longitudinal Research on Development In Adolescence (LoRDIA) program were used. Predictions from personality and mental health to inebriation were estimated by means of logistic regression and generalized structural equation modelling. Separated gender analyses were performed throughout the study to reveal potential gender-specific patterns. Externalizing problems, Novelty Seeking and Cooperativeness had independent effects on alcohol inebriation for both genders as well as Harm Avoidance among girls and Internalizing problems among boys. Novelty Seeking and Self-Directedness had indirect effects through externalizing problems and Harm Avoidance and Self-Directedness had indirect effects through internalizing problems for boys. Self-directedness showed an indirect effect through externalizing problems for girls. The combination of an immature character (low Self-directedness and Cooperativeness) with an extreme temperament profile (high Novelty Seeking and low Harm Avoidance) was a predictor of inebriation across gender, both directly and indirectly through mental health. This study contributes with valuable information about gender specific considerations when developing and conducting preventative interventions targeting psychological risk and resilience factors for early alcohol inebriation among young adolescents.

Keywords: Adolescence; alcohol inebriation; biopsychosocial model of personality; externalizing problems; internalizing problems; mental well-being

Introduction

The biopsychosocial model of personality separate between temperament and character dimensions (Cloninger, 1994) and has shown associations with both mental health (Cloninger and Zohar, 2011) and with the initiation, development and maintenance of alcohol use problems (Mulder, 2002). The character dimension Self-directedness (i.e., the ability to steer and maneuver behavior, self-acceptance, and self-efficacy) is related to more positive and less negative feelings among adolescents, especially combined with high Cooperativeness (i.e., the ability to cooperate with, accept, and help others) (Schütz et al., 2013). High levels on these two character dimensions imply a *mature* personality and the capacity to regulate behavior despite a challenging temperament (Cloninger, 1994; Cloninger et al., 1993). The most vulnerable individuals regarding early onset of alcohol problems may be those with both high impulsivity (e.g., high Novelty Seeking) and high neuroticism/negative emotionality (e.g., high Harm Avoidance) (Mulder, 2002). Specific alcoholic subtypes among adults (Type I, Type II) have previously been defined based on debut of alcohol problems and personality profile (Cloninger et al., 1981; Cloninger et al., 1996), however the homogeneity of these subtypes has been criticized (Mulder, 2002; Wennberg et al., 2014). Type I has a relatively late onset and low Novelty Seeking, high Harm Avoidance and high Reward Dependence, while individuals with Type II have early onset and the opposite combination: high Novelty Seeking, low Harm Avoidance and low Reward Dependence . The effectiveness of these temperament dimensions as predictors of alcohol use have been confirmed in prospective longitudinal studies from childhood to early adulthood (Cloninger et al., 1988) as in studies of young adolescents (Adan et al., 2017; Nees et al., 2011; Whelan et al., 2014). For a systematic review on personality traits related to binge drinking, see Adan, et al. (2017).

Alcohol is usually introduced during adolescence and consumption of alcohol increases rapidly and almost linearity during this developmental phase (Behrendt et al., 2009; Duncan et al., 2006; Young, et al., 2002). Alcohol policies, laws and prevention programs intend to postpone the age of alcohol debut and reduce adolescent inebriation (Brand et al., 2007). This is due to the several risk factors (e.g., biological, psychological and social) associated with an early debut and several unfavorable outcomes, including future heavy drinking, alcohol-related problems and illicit drug use (Behrendt et al., 2012; Behrendt, et al., 2009; Lin et al., 2016; Pampati et al., 2018; Pedersen and Skrondal, 1998; Wennberg and Andersson, 2013; Wennberg et al., 2000). Still, knowledge about personality traits, mental health and their predictive associations with alcohol use, specifically alcohol inebriation, in early adolescence is scanty. Especially knowledge about gender-specific patterns is lacking.

Consistent gender differences have been found among adolescents cross-nationally were boys report higher levels of externalizing (behavioral) problems and girls report more internalizing (emotional) problems (Berlin, et al., 2012; Boson, et al., 2016; Currie, et al., 2012; Koskelainen, et al., 2001; Lundh, et al., 2008; Ronning, et al., 2004). Retrospective findings from adult informants show that co-morbidity of externalizing/internalizing problems and alcohol problems usually starts between the age of 12 to 14 (Kessler, et al., 1996) and works reciprocally (Malmgren, et al., 2008). For example, approximately 10-14 % of adolescents from age 14 to 17 in Canada report co-occurrence of high depression symptoms and alcohol use, and 32-37 % reported alcohol at risk use only (Willoughby and Fortner, 2015).

Despite gender differences, studies on externalizing problems suggest a strong link to alcohol use and other substances (e.g., tobacco, cannabis and other illicit substances) for both girls and boys (Miettunen, et al., 2014; Pedersen, et al., 2018; Steele, et al., 1995; Young, et al., 2002). However, the link might be stronger for boys than for girls (Steele, et al., 1995). On the contrary, higher scores on internalizing behavior problems as a child relates to less alcohol consumption in the future among girls (Lac and Donaldson, 2016; Steele, et al., 1995) and not stated as an individual risk factor regarding substance use, but rather following substance use (Miettunen, et al., 2014). Still, high levels of depressive symptoms among girls seem to be associated with alcohol problems initially and to a more aggressive progress over time for boys (Marmorstein, 2009, 2010). Longitudinal studies among elder age-cohorts (i.e., college students) also propose that females with higher emotional instability tend to avoid heavy alcohol intake (Lac and Donaldson, 2016). Findings propose that females may follow a different drinking trajectory than that of males (Lac and Donaldson, 2016; Steele, et al., 1995).

Complete mental health is however more than just the absence of mental health problems and should preferable also include a dimension on the presence of well-being (Keyes, 2005). The majority of young adolescents in western countries report high well-being (Berlin, et al., 2012; Currie, et al., 2012; Petersen et al., 2010). However, gender differences have been found, were girls typically, show a decline from age 11 to 15 (Currie, et al., 2012) and significantly lower levels at age 15 compared to boys (Currie, et al., 2012; Moksnes and Espnes, 2013). The concept of well-being can be defined both from an *emotional* (e.g., positive feelings and life-satisfaction) (Diener, 1984; Pavot and Diener, 2008), *psychological* (e.g., autonomy and purpose in life) (Ryff, 1989, 2014; Ryff and Keyes, 1995) and *social* (e.g., contribution and integration) (Keyes, 1998) perspective. Low well-being (e.g., life satisfaction) among children/adolescents aged 11-14 years is associated with early alcohol initiation (Proctor and Linley, 2014) and anything except flourishing (i.e., the presence of all well-being experiences;

emotional, psychological and social) is associated with greater burden both to self and society (Keyes, 2013; Keyes and Annas, 2009). In a Swedish study, where girls and boys were analyzed separately, girls not thriving in life with concurrent internalizing and externalizing problems emerged as a vulnerable subgroup for early alcohol use [one glass or more by the age of 12-13] (Boson, et al., 2016). In contrast boys with high self-reported well-being both with and without concurrent externalizing problems were also more vulnerable for early alcohol use (Boson, et al., 2016). Hence, the links between internalizing problems, externalizing problems and alcohol use are somewhat ambiguous as well as the link between well-being and alcohol use. Accordingly, recent findings on mental health and alcohol imply that young adolescents with an early alcohol debut are a heterogeneous group consisting of several subgroups (Boson, et al., 2016).

When estimating predictors for alcohol inebriation it can provide information about the etiology and early risk factors linked to psychosocial dysfunction. It can also guide practitioners and organizations in identifying young adolescents at higher risk of dysfunctional development and mental health problems. Personality is an important explaining predictor developmental trajectory for alcohol initiation and inebriation; however, mediating effects from mental health variables (e.g., internalizing and externalizing problems, low well-being) and gender are less studied.

Aims and hypotheses

The main aim of this study was to predict alcohol inebriation among young adolescents through the biopsychosocial model of personality (temperament and character dimensions) and a two-continua model of mental health consisting of one problem dimension (internalizing and externalizing problems) and one well-being dimension (emotional, psychological and social). We hypothesized that externalizing problems would relate to inebriation especially among boys and that internalizing problems would relate to inebriation especially among girls. Low well-being (i.e., languishing - the feeling of time and life waste as well as thoughts of life purposeless) was expected to have a linkage with inebriation for both gender. Further, we studied if temperament and character could predict alcohol inebriation directly or indirectly through high-risk mental health profiles. We hypothesized that Novelty Seeking and Harm Avoidance would show the strongest associations with alcohol inebriation among the four temperament dimensions. Secondly, we expected the character dimensions Self-directedness and Cooperativeness, which jointly indicate a mature or immature personality function, to be associated with inebriation. Gender analyses were conducted throughout the study for an integrated gender perspective.

Method

This study is a part of the ongoing prospective longitudinal program *Longitudinal Research on Development In Adolescence* (LoRDIA) which focus on social, behavioral and psychological developmental trajectories from age 12-18 in a general population from 15 schools with a total study population of 1866 which is 88 % of all invited. The research program is carried out in four small to middle sized municipalities in the south-west part of Sweden and involves 15 high schools. Data have so far been collected annually from Time 1 (T1) 2013 to 2017 (T5) and statistics from T1 (grade 6 – 7), T2 (grade 7 – 8) and T3 (grade 8 – 9) are included in the present study. For a more detailed description of the program and procedure, see Boson, et al. (2016). The Regional Research Ethics Board in Gothenburg, Sweden approved the program 2013-09-25 (No. T362-13) and confirmed the approval 2014-05-20 (No. T446-14) and 2015-07-31 (No. T553-15).

Participants

The inclusion criteria for the present study were to have complete responses on target variables and correct answers on validity items at both T1, T2 and T3, which included 855 adolescents (56 % girls). The internal loss at T3 was 452 subjects (41 % girls) and analyses revealed higher prevalence of both alcohol drinking (32% vs. 22.2%) and higher prevalence of alcohol inebriation the last 12 months (16.8% vs. 12%) in the excluded group compared to the included group. The originally amount of adolescents at T3 was 1307 subjects – i.e., 70% of the study population at T1. Analyses of attrition show that especially boys with alcohol experiences, lower school grades, absenteeism and immigrant background opt out over time (from T1 to T3). Mean ages (standard deviations) for the study sample were 14.36 years (0.65) for girls and 14.32 (0.61) for boys. Out of these: 95 % were born in Sweden, 77% had caregivers who lived together, 79 % perceived their family to have similar amount of money as other families in their neighborhood, 5 % reported to have less and 16 % reported to have more money than other families.

Procedure

Initially, all caregivers and children received an information letter that briefly explained the purpose of the study. Passive consent from the caregiver (i.e., no active “no” response when asked) was requested for the children’s participation, as well as written consent from the adolescent on the day of the survey. It was emphasized that participation was voluntary, that collected information would remain confidential, and that participants were free to withdraw from the study at any time. The questionnaire was group administered at schools in classrooms

and absent students got their questionnaire posted to their home by regular mail. Each survey was introduced by a member in the research team and filled out individually by the student using paper and pen. Approximate time for completing the survey was 1 to 1.5h.

Measures

Alcohol experiences were mapped from T1-T3 with modifications on time perspective (ever tried and ever been) at baseline (T1): "Have you been drinking alcohol, more than just a sip within the last year (Not light beer or light cider)" and "Have you been inebriated within the last year". Answers were given on an ordinal scale from "No" to "Once the last year", "Several times the last year", "Once a month", "A couple of times a month, "Every week". Due to limited variability, responses were binary coded "Yes, have been drinking alcohol more than just a sip within the last year" and "Yes, have been inebriated within the last year" for all answers reporting anything else than "No". The inebriation question "Have you been inebriated within the last year" at T3 was set as outcome variable in the analyses.

The Mental Health Continuum-Short Form (MHC-SF) was used at T3, consisting of 14 items, is measuring three components of well-being: emotional, social, and psychological (Keyes, 2009). The emotional well-being subscale refers to feelings of being happy, interested in life and satisfied, the social well-being subscale refers to acceptance, actualization, contribution, coherence and integration and the psychological well-being subscale refers to purpose in life, environmental mastery, autonomy, personal growth, positive relations and self-acceptance. Answers are given on a 6-point Likert scale from 0 = never, 1 = once or twice, 2 = about once a week, 3 = about 2 or 3 times a week, 4 = almost every day, 5 = every day. Scores on each well-being component were summed up and categorized into Flourishing, Moderately healthy or Languishing according to official MHC-SF guidelines (Keyes, 2009).

The Swedish self-report version of Strengths and Difficulties Questionnaire (SDQ-S), used at T3, consists of 25 items with the aim of detecting emotional and behavioral problems (Goodman, 1997, 2001; Goodman et al., 1998). The SDQ contain four problem subscales with five items each: hyperactivity/inattention, emotional symptoms, conduct problems and peer problems. Answers are given on a 3-point Likert scale from 0 = not true, 1 = somewhat true, to 2 = certainly true. We used the two-factor model consisting of internalizing (emotional symptoms and peer problems) and externalizing (conduct problems and hyperactivity/inattention) which are preferably used in low risk community samples (Boson, et al., 2016; Goodman and Goodman, 2009; Goodman et al., 2010).

The Swedish self-report version of the Junior Temperament and Character Inventory (JTCI) (Boson et al., 2018) was used to assess the child's personality at T2. The JTCI is a modified

version of the adult Temperament and Character Inventory (TCI) validated and adapted for children and adolescents (Boson, et al., 2018; Luby et al., 1999). JTCI builds on Cloninger's seven-dimensional biopsychosocial model of personality and consists of four dimensions of temperament and three of character to describe the underlying structure of an individual's personality. The self-reported version of JTCI includes 108 items to be answered as "true" or "false". The four temperament dimensions are Novelty Seeking (NS; activity level, impulsivity, need for exploration), Harm Avoidance (HA; emotionality, level of anxiety, fear, distrust of the unknown), Reward Dependence (RD; reward-seeking behavior, level of attachment, social dependence) and Persistence (P; endurance in problem-solving, commitment to tasks and goals despite frustration and fatigue) (Cloninger, 1994). The character dimensions relate to the individuals' understanding of one-self, other people and his/her life context, all of which is said to develop epigenetically through complex social learning processes during childhood (Cloninger, et al., 1993). The character scales are Self-Directedness (SD; ability to steer and maneuver behavior, self-acceptance, self-efficacy), Cooperativeness (CO; ability to cooperate with, accept, and help others), and Self-Transcendence (ST; level of spiritualism and ability to experience a larger universal perspective). According to standard, no more than 5 % missing items in total were accepted to obtain reliable scores on each dimension (Boson, et al., 2018).

Statistical methods

Chi-square test of independence was carried out to compare frequencies between girls' and boys' reports on having or not having experiences of alcohol drinking and inebriation and to compare categorical levels of mental health (internalizing and externalizing problems plus well-being) among those with or without alcohol inebriation experiences. Cramér's V was reported as effect-size. Levels of mental health linked to inebriation were labelled as high-risk mental health profiles. Logistic regression analyses were performed to ascertain the direct effects of mental health on alcohol inebriation (at least once) the last year (both measured at T3) and effects of personality (i.e., temperament and character dimensions) (T2). Path analyses by means of generalized structural equation modelling were conducted with alcohol inebriation as endogenous variable. All exogenous variables (personality and mental health) were initially included and non-significant ($p > .05$) paths were removed. Modification indices and model fit estimates are not available with binary endogenous variable and paths will be interpreted by their level of significance. Both the logistic analyses and path analyses were adjusted (as appropriate) for subjective socioeconomic status and school grade. Separated gender analyses were performed throughout the study to reveal gender specific patterns between mental health

variables, personality dimensions and alcohol use in early adolescence. Chi-square test of independence and logistic regression analyses were conducted using SPSS (version 25.0, 2017). Generalized structural equation modelling (GSEM) were conducted in STATA (version 15.1, 2017).

Results

Table 1 shows frequencies of alcohol use from T1 to T3 and analyses of gender differences. Significant interactions were found on alcohol drinking and inebriation in grade 6-7 (T1). Boys were more likely to have tried alcohol and girls were more likely to have been inebriated.

Insert Table 1 about here

Sample characteristics by alcohol inebriation last 12 month in grade 8-9 (T3) are presented in Table 2. Alcohol inebriation experiences among both gender were more often reported by those in 9th grade (compared to 8th grade), and among girls from families perceived as having both less and more money than other families (this underpinned the relevance of these covariates in further analyses). Externalizing problems, not internalizing problems, among both gender and low well-being (i.e., languishing) among girls were more commonly reported in the group with inebriation experiences. Low Persistence (P) were more typical among girls and low Self-Directedness (SD) and Cooperativeness (CO) were more commonly reported in the group with inebriation experiences for both gender.

Insert Table 2 about here

Four logistic regression models on the likelihood of alcohol inebriation were tested and evaluated separately by gender (Table 3). The first logistic regression model on girls' alcohol inebriation and occurrence of mental health problems and well-being was statistically significant and explained 26% (Nagelkerke R^2) of the variance in inebriation and correctly classified 89.2 % of cases. Temperament and character dimensions contributed significantly to the second model; explained variance increased to 37% and correctly classified 89.4 % of cases. Externalizing problems, high Novelty Seeking (NS), high P and low CO were associated with an increased likelihood of inebriation. Next, the logistic regression model on boys' alcohol inebriation and occurrence of mental health problems and well-being was statistically significant and explained 21% of the variance in alcohol drinking among boys and correctly

classified 89.3 % of cases. Temperament and character dimensions contributed significantly to the fourth model; explained variance increased to 37% and correctly classified 90.4% of cases. Externalizing problems and low CO were associated with an increased likelihood of inebriation. Odds ratio (OR) for the impact of low NS for boys could not be estimated due to zero subjects in this category.

Insert Table 3 about here

Figure 1 and 2 show final generalized structural equation models and path-estimates to alcohol inebriation for girls and boys respectively with significant direct and indirect effects displayed. For both gender, independent effects on alcohol inebriation were found from Externalizing problems, NS and CO to inebriation. Independent effects were also found from HA among girls and internalizing problems among boys. For boys, effects were found from NS and SD through externalizing problems to inebriation, and from HA and SD through internalizing problems. For girls, an effect was found from SD through externalizing problems to inebriation. Level of well-being, P and Self-Transcendence (ST) had no effect on alcohol inebriation. This was consistent across gender.

Insert Figure 1 & 2 about here

Discussion

This study aimed to predict alcohol inebriation among young adolescents through personality traits (i.e., temperament and character dimensions), the two-continua model of mental health consisting of a problem dimension (emotional and behavioral) and a well-being dimension (emotional, psychological and social). We investigated high-risk mental health profiles linked to alcohol inebriation and their etiology from a personality perspective. The results indicate that personality traits and their relation to high-risk mental health profiles and early alcohol inebriation differ between girls and boys.

Concurrent externalizing problems (conduct problems and hyperactivity/inattention) had the strongest link to alcohol inebriation for both gender. These results are in line with previously findings on early alcohol use and associations with externalizing problems (Adan, et al., 2017; Boson, et al., 2016; Mulder, 2002; Steele, et al., 1995; Young, et al., 2002). High

Novelty Seeking and low Self-Directedness combined with externalizing problems emerged as a risk-profile among boys as well as low Self-Directedness combined with externalizing problems among girls. Findings from the present study suggest that a personality profile characterized by impulsivity, curiosity, enthusiasm and disorderliness (high Novelty Seeking) among boys and immaturity, unreliableness, purposelessness and self-blaming (low Self-Directedness) among both gender are related to externalizing problems and in turn increases the risk of alcohol inebriation.

Internalizing problems were not more or less commonly occurring among those with alcohol inebriation experiences. Thus, our findings do not support concurrent internalizing problems as a risk factor of inebriation, as reported previously for depressive symptoms (Marmorstein, 2009, 2010). Instead, internalizing problems decreased the risk of inebriation among boys and had no effect among girls. This imply that boys with internalizing problems in early adolescence tend to avoid heavy alcohol use, and possible alcohol drinking generally. High Harm Avoidance and low Self-Directedness influenced boys' internalizing problems, which suggest that these personality dimensions, in particular, affect boys' self-reported internalizing problems. The reduced probability of early alcohol consumption due to increased internalizing problems is not present among girls. Instead, concurrent internalizing problems may not be a significant mental health factor related to alcohol inebriation among girls in early adolescence as previously reported (Boson, et al., 2016; Kessler, et al., 1996; Malmgren, et al., 2008; Marmorstein, 2009), even when concurrent externalizing problems (i.e., delinquent behavior) is accounted for as suggested before (Boson, et al., 2016; Marmorstein, 2010).

Low well-being (i.e., languishing - the feeling of time and life waste as well as thoughts of life purposeless) was only related to inebriation when unadjusted for subjective socioeconomic status and school year and other mental health variables, not elsewhere. This contrast research on the negative outcomes of anything except flourishing (Keyes, 2013; Keyes and Annas, 2009). However, in the present study, low well-being was strongly affected by personality traits, especially among girls. Low Novelty Seeking, low Harm Avoidance and high Reward Dependence and high Self-Directedness increased well-being among girls. Low Harm Avoidance and high Self-Directedness could also predict higher well-being among boys.

Temperament and character dimensions could predict alcohol inebriation independently within the next year regardless of concurrent externalizing problems. High Novelty Seeking, low Harm Avoidance and low Cooperativeness emerged as significant predictors of early alcohol inebriation among girls and high Novelty Seeking and low Cooperativeness among boys. These results continue to support high Novelty Seeking as the key temperament

component in behaviors of problematic alcohol use among young adolescents. Findings are in line with previous studies (Cloninger, et al., 1981; Cloninger, et al., 1988, 1996; Mulder, 2002; Oreland et al., 2018). However, the independent effect of Novelty Seeking on inebriation was potentially stronger among girls than among boys. One possible interpretation is that social and contextualized risk factors might more commonly occurring for boys.

Further, a personality characterized by lacking interpersonal skills (low Cooperativeness) had a consistent effect on alcohol inebriation across gender. That ability to cooperate, accept and help others are therefore important competences for adults (e.g., caregivers, teachers and significant others) to promote and encourage in everyday life with children and adolescents and also part of the *mature* personality (Cloninger, 1994; Cloninger, et al., 1993). The combination of high Novelty Seeking and low Cooperativeness relate to concurrent externalizing problems in present study and potentially to negative outcomes in the future such as further delinquent behavior, school problems, drop-out and psychosocial problems (antisocial behavior). Among girls, a personality described as optimistic, confident, outgoing and vigorous (low Harm Avoidance) was also related to inebriation. This suggest self-assertive and extrovert behavior as part of early alcohol inebriation among girls, however the combination of low Harm Avoidance with high Novelty Seeking and low Cooperativeness might be especially challenging.

Some limitations come with this study. First, correct responses on JTCI validation-items and no more than 5% missing answers totally were required for the included sample. This excluded approximately 35 % of the study sample from T3. Analyses of internal loss showed that alcohol experiences in the selected sample were less compared to the excluded cases, particularly among boys. However, the total prevalence of alcohol experiences (drinking and inebriation) in the selected vs. total study sample were similar (23 % vs. 26% for drinking and 12 % vs. 14 % for inebriation). Not filling out the questionnaire properly might also be interpreted as part of a larger structure of problem behaviors including concentration problems, conduct problems and misbehavior (e.g., early alcohol, nicotine and drug use), more commonly occurring among boys. The findings should therefore be interpreted with caution due to potential underrepresentation of externalizing problems. One might argue that a higher acceptance for missing data would be suitable to avoid sample attrition, but this would detach the present study from the opportunity to compare with other studies. One must therefore accept that our study suffers from the ability to generalize to all young adolescents aged 14-15 years. On the other hand, boys not filling in the questionnaire thoroughly might have a higher tendency to answer: “Yes, I have been drunk one time or more the last year” even though it is

untrue. Hence, the selected sample might have answers that are more reliable. Further, our findings recognize the problem to recruit adolescents in longitudinal studies based on voluntary participation. This is not negotiable due to ethical considerations. One must accept that adolescence with norm breaking behavior (e.g., early alcohol experiences) and perhaps low level of persistence and reduced concentration abilities to fill in an extensive questionnaire opt out over time. Mental health and alcohol inebriation experiences last year were measured simultaneously and no causal effect on inebriation can be drawn. However, the results may indicate that inebriation past year and currently reported well-being among both gender as well as internalizing problems among girls are weakly related at age 13-14. Comparable, externalizing problems and inebriation might work reciprocal as heavy alcohol drinking and the social context in which young adolescents drink alcohol might increase the level of externalizing problems.

The results indicate that personality traits and their relation to high-risk mental health profiles are both similar across gender, but also require some gender-specific knowledge about the etiology of high-risk mental health related to early alcohol inebriation. The combination of an immature character (low Self-directedness and Cooperativeness) with an extreme temperament profile (high Novelty Seeking and low Harm Avoidance) was a strong predictor of inebriation among young adolescents, both directly and indirectly through mental health. This study also provides professionals with deeper knowledge about gender-specific considerations when developing and conducting preventative interventions, targeting psychological risk and resilience factors for early alcohol inebriation among young adolescents. However, further studies on interventions targeting personality maturation are recommended.

Acknowledgments

A major financial contribution was granted in a combined decision (No. 259-2012-25) from four Swedish research foundations: Swedish Research Council (VR); Swedish Research Council for Health, Working Life and Welfare (FORTE); Sweden's Innovation Agency (VINNOVA); and The Swedish Research Council Formas. Additional contributions were granted from Säfstaholm Foundation (No. ST-2014-023), Sunnerdahl Disability Foundation (No. 40-14), and Futurum, Jönköping County (No. 2014/3821-271).

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Table 1. *Participant characteristics: alcohol use within the last year among girls and boys*

	Girls		Boys			
	n (total)	(% Yes)	n (total)	(% Yes)	χ 2 (*df*)	Cramér's V/ *p*
Alcohol consumption one time or more						
Grade 6-7 ever tried	50 (497)	10.1	60 (390)	15.4	5.702 (1)	0.080 / .017
Grade 7-8	75 (578)	13	65 (466)	13.9	0.210 (1)	0.014 / .647 *ns*
Grade 8-9	119 (481)	24.7	76 (374)	20.3	2.334 (1)	0.052 / .127 *ns*
Been inebriated one time or more						
Grade 6-7 ever been	14 (495)	2.8	3 (385)	0.8	4.800 (1)	0.074 / .028
Grade 7-8	32 (579)	5.5	16 (467)	3.4	2.605 (1)	0.050 / .107 *ns*
Grade 8-9	65 (480)	13.5	37 (375)	9.9	2.706 (1)	0.056 / .100 *ns*

Table 2. *Sample characteristics by alcohol inebriation within the last year in grade 8-9*

	Been inebriated last 12 months in grade 8-9									
	Girls					Boys				
	n	(% No)	(% Yes)	χ 2 (*df*)	Cramér's V/ *p*	n	(% No)	(% Yes)	χ 2 (*df*)	Cramér's V/ *p*
Grade	480			33.499 (1)	0.264 / .000	375			13.616 (1)	0.191 / .000
8'		95.7	**4.3**				95.5	**4.5**		
9'		77.6	**22.4**				84.1	**15.9**		
Subjective SES	480			18.177 (2)	0.195 / .000	369			5.001 (2)	0.116 / .082 *ns*
Less than other families		64.0	**36.0**				85.7	14.3		
Same as other families		89.3	10.7				92.0	8.0		
More than other families		77.0	**23.0**				83.6	16.4		
Internalizing problems	479			0.964 (1)	0.045 / .326 *ns*	374			0.521 (1)	-0.037 / .470 *ns*
Normal		87.2	12.8				89.8	10.2		
Borderline/abnormal		83.5	16.5				93.7	6.3		
Externalizing problems	479			30.779 (1)	0.253 / .000	374			15.576 (1)	0.204 / .000
Normal		89.3	10.7				92.2	7.8		
Borderline/abnormal		60.4	**39.6**				72.5	**27.5**		
Well-being	472			10.497 (2)	0.149 / .005	362			1.992 (2)	0.074 / .369 *ns*
Flourishing		90.7	9.3				92.4	7.6		
Moderately healthy		85.1	14.9				87.9	12.1		
Languishing		71.4	**28.6**				90	10.0		
Novelty Seeking	480			33.395 (2)	0.264 / .000	375			14.107 (2)	0.194 / .001
Low		94.8	5.2				100	**0.0**		
Moderate		89.9	10.1				90.3	9.7		
High		67.4	**32.6**				79.3	**20.7**		
Harm Avoidance	480			1.895 (2)	0.063 / .388 *ns*	375			0.627 (2)	0.041 / .731 *ns*
Low		82	18.0				91.1	8.9		
Moderate		87.3	12.7				90.7	9.3		
High		88.3	11.7				87.7	12.3		
Reward Dependence	480			4.198 (2)	0.094 / .123 *ns*	375			1.867 (2)	0.071 / .393 *ns*
Low		83.2	16.8				94.4	5.6		
Moderate		88.9	11.1				89.2	10.8		
High		81.5	18.5				88.9	11.1		
Persistence	480			17.473 (2)	0.191 / .000	375			1.114 (2)	0.055 / .573 *ns*
Low		74.5	**25.5**				87.5	12.5		
Moderate		89.5	10.5				91.6	8.4		
High		91.1	8.9				89.5	10.5		
Self-Directedness	480			14.927 (2)	0.176 / .001	375			8.589 (2)	0.151 / .014
Low		74.1	**25.9**				80.7	**19.3**		
Moderate		88.1	11.9				90.7	9.3		
High		93.4	6.6				96.6	3.4		
Cooperativeness	480			25.087 (2)	0.229 / .000	375			17.541 (2)	0.216 / .000
Low		66.7	**33.3**				76.7	**23.3**		
Moderate		88.3	11.7				91.2	8.8		
High		95.2	4.8				98.4	**1.6**		
Self-Transcendence	480			1.674 (2)	0.059 / .433 *ns*	375			1.803 (2)	0.069 / .406 *ns*
Low		88.9	11.1				94.9	5.1		
Moderate		86.9	13.1				89.3	10.7		
High		81.9	18.1				89.1	10.9		

Note. Bold font indicates major contributor concerning the significant result, R > 1.96

Table 3. *Adjusted*[a] *odds ratios and 95% confidence interval for associations between alcohol inebriation and occurrence of mental health problems, well-being and personality dimensions.*

	Girls n = 471					Boys n = 355				
Predictors	*B*	*SE B*	Wald's χ 2 (*df*)	*p*	OR (CI)	*B*	*SE B*	Wald's χ 2 (*df*)	*p*	OR (CI)
Alcohol inebriation last year										
Step 1										
Constant	-2.56	0.39	43.16 (1)	.000***	0.08	-2.63	0.43	37.16 (1)	.000***	0.07
Internalizing problems (0 = normal, 1 = borderline/abnormal)	-0.27	0.40	0.46 (1)	.496	0.76 (0.35 - 1.67)	-1.31	0.85	2.39 (1)	.122	0.27 (0.05 - 1.42)
Externalizing problems (0 = normal, 1 = borderline/abnormal)	1.60	0.40	16.03 (1)	.000***	4.97 (2.27 - 10.91)	2.25	0.54	17.40 (1)	.000***	9.51 (3.30 - 27.40)
Well-being (ref: flourishing)			3.34 (2)	.188	NA			1.29 (2)	.525	NA
Moderately healthy	-0.53	0.51	1.08 (1)	.299	0.59 (0.22 - 1.60)	0.70	1.12	0.39 (1)	.531	2.02 (0.22 - 18.12)
Languishing	-0.97	0.56	3.01 (1)	.083	0.38 (0.13 - 1.14)	0.28	1.13	0.06 (1)	.804	1.32 (0.15 - 12.01)
	Model χ 2(7) = 71.39, p= .000. R2= .26 (Nagelkerke).					Model χ 2(7) = 35.802, p= .000. R2= .21 (Nagelkerke).				
	Goodness-of-fit test (Hosmer & Lemeshow) p = .588					Goodness-of-fit test (Hosmer & Lemeshow) p = .409				
Step 2										
Constant	-2.44	0.53	21.36 (1)	.000***	0.09	-10.33	1576.21	0.00 (1)	.995	0.00
Internalizing problems (0 = normal, 1 = borderline/abnormal)	-0.15	0.46	0.11 (1)	.744	0.86 (0.35 - 2.13)	-1.97	1.08	3.34 (1)	.068	0.14 (0.02 - 1.15)
Externalizing problems (0 = normal, 1 = borderline/abnormal)	1.67	0.46	13.29 (1)	.000***	5.30 (2.16 - 12.97)	1.87	0.62	9.17 (1)	.002**	6.47 (1.93 - 21.67)
Well-being (ref: flourishing)			1.08 (2)	.584	NA			1.31 (2)	.521	NA
Moderately healthy	-0.36	0.56	0.42 (1)	.515	0.70 (0.23 - 2.08)	1.49	1.32	1.27 (1)	.259	4.45 (0.33 - 59.68)
Languishing	-0.63	0.62	1.02 (1)	.312	0.53 (1.16 - 1.80)	1.33	1.33	1.00 (1)	.317	0.28 - 50.55)
Novelty Seeking (ref: average)			5.87 (2)	.053	NA			0.02 (2)	.989	NA
Low	0.11	0.68	0.03 (1)	.873	1.12 (0.29 - 4.23)	-18.61	4728.63	0.00 (1)	.997	-
High	0.93	0.39	5.85 (1)	.016*	2.55 (1.19 - 5.43)	0.08	0.54	0.02 (1)	.884	1.08 (0.38 - 3.13)
Harm Avoidance (ref: average)			5.08 (2)	.079	NA			0.82 (2)	.663	NA
Low	0.86	0.45	3.70 (1)	.054	2.36 (0.98 - 5.64)	-0.24	0.70	0.12 (1)	.729	0.79 (0.20 - 3.09)
High	-0.65	0.59	1.22 (1)	.270	0.52 (0.17 - 1.66)	0.49	0.60	0.65 (1)	.420	1.63 (0.50 - 5.29)
Reward Dependence (ref: average)			0.70 (2)	.705	NA			4.33 (2)	.115	NA
Low	0.09	0.43	0.05 (1)	.831	1.10 (0.47 - 2.54)	-0.76	0.67	1.27 (1)	.26	0.47 (0.13 - 1.75)
High	0.35	0.41	0.70 (1)	.403	1.41 (0.63 - 3.19)	0.85	0.56	2.31 (1)	.128	2.35 (0.78 - 7.03)
Persistence (ref: average)			5.04 (2)	.08	NA			0.98 (2)	.614	NA
Low	0.89	0.40	4.83 (1)	.028*	2.43 (1.10 - 5.36)	0.19	0.53	0.12 (1)	.725	1.20 (0.43 - 3.39)
High	0.11	0.45	0.06 (1)	.813	1.11 (0.46 - 2.71)	0.56	0.57	0.97 (1)	.324	1.75 (0.58 - 5.29)
Self-Directedness (ref: average)			0.24 (2)	.888	NA			2.37 (2)	.306	NA
Low	-0.09	0.47	0.04 (1)	.843	0.91 (0.36 - 2.30)	0.55	0.57	0.92 (1)	.337	1.73 (0.57 - 5.26)
High	-0.28	0.62	0.20 (1)	.659	0.76 (0.22 - 2.58)	-1.04	0.91	1.31 (1)	.253	0.35 (0.06 - 2.10)
Cooperativeness (ref: average)			6.54 (2)	.038*	NA			11.56 (2)	.003**	NA
Low	1.01	0.43	5.41 (1)	.02*	2.74 (1.17 - 6.41)	1.53	0.53	8.36 (1)	.004**	4.63 (1.64 - 13.10)
High	-0.61	0.69	0.77 (1)	.379	0.55 (0.14 - 2.11)	-1.64	1.11	2.19 (1)	.139	0.20 (0.02 - 1.70)
Self-Transcendence (ref: average)			0.18 (2)	.916	NA			0.29 (2)	.863	NA
Low	0.13	0.48	0.07 (1)	.794	1.13 (0.44 - 2.92)	-0.39	0.73	0.29 (1)	.591	0.68 (0.16 - 2.83)
High	0.17	0.45	0.14 (1)	.711	1.18 (0.49 - 2.82)	-0.08	0.60	0.02 (1)	.890	0.92 (0.28 - 2.98)
	Model χ 2(21) = 105.82, p= .000. R2= .37 (Nagelkerke).					Model χ 2(21) = 68.20, p= .000. R2= .37 (Nagelkerke).				
	Goodness-of-fit test (Hosmer & Lemeshow) p = .362					Goodness-of-fit test (Hosmer & Lemeshow) p = 0.160				

Note. Referent = adolescents with normal levels of internalizing and externalizing problems, flourishing well-being and average levels on each personality dimension. NA = not applicable.
a Adjusted (as appropriate) for subjective socioeconomic status and school grade.
* $p < .05$. ** $p < .01$. *** $p < .001$

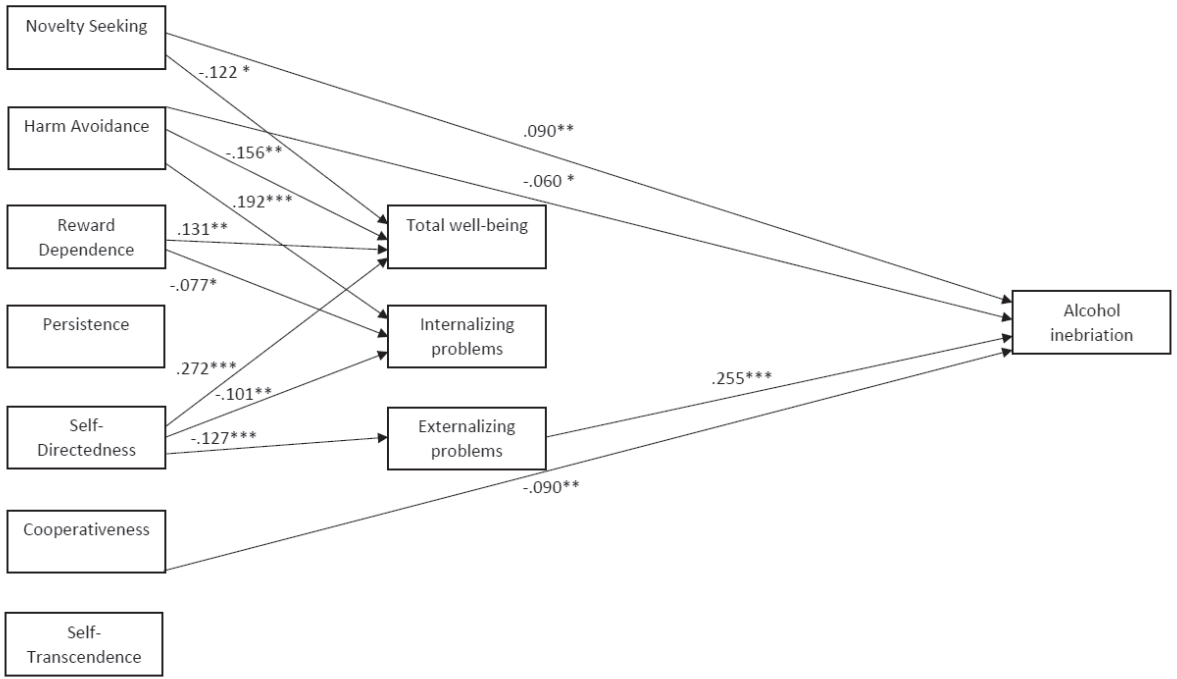

Figure 1. Path diagram for alcohol inebriation among girls * p < .05 ** p < .01 *** p < .001.

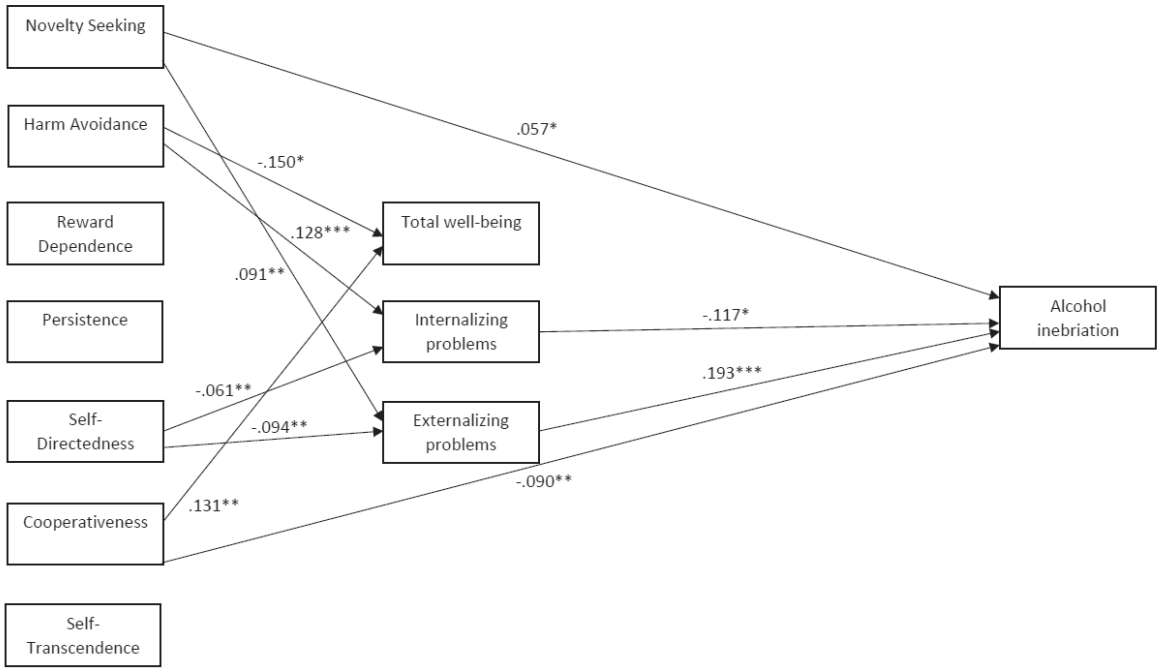

Figure 1. Path diagram for alcohol inebriation among boys * $p < .05$ ** $p < .01$ *** $p < .001$.