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The relationship between mental health in adolescents having self-reported neurodevelopmental disorders and sources of parental knowledge: A cross-sectional study

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Two-year master thesis 15 credits
Interventions in Childhood

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Spring Semester 2021

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ABSTRACT

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Pages: 35

The present study aimed to compare adolescents (14-15 years old) having self-reported neurodevelopmental disorders classified as flourishing with those adolescents classified as non-flourishing concerning rated mental health problems and adolescent perceptions of adolescent disclosure and parental control. The present study used a cross-sectional design based on a secondary analysis of data collected in the LoRDIA research program. Adolescents having self-reported NDDs in wave 3 were included ($n=198$). Adolescents rated their mental health using the Mental Health Continuum – Short Form, after which researchers classified them as flourishing, moderate, or languishing. Behavior and emotional symptoms were rated using the conduct problems subscale and emotional symptoms subscale of the self-reported version of the Strength and Difficulties Questionnaire. Adolescents rated adolescent disclosure and parental control using the adolescent disclosure scale and parental control scale. Independent Samples t-Tests, Mann-Whitney U test, and multiple regressions were performed to analyze data. Findings illustrated that adolescents having self-reported NDDs classified as flourishing report less conduct problems, lower adolescent disclosure, and same levels of parental control compared to those adolescents classified as non-flourishing. Emotional problems seem to be positively related to adolescent disclosure within family interaction patterns, while conduct problems appear to be negatively related to parental control. However, parenting style may be crucial in having few or many conduct- and emotional problems. Thus, adolescent disclosure plays a prominent role in relation to adolescents' mental health, mental health problems, and parent-adolescent interactions, while parental control plays a prominent role in relation to adolescents' mental health problems and parent-adolescent interactions.

Keywords: adolescents, adolescence, neurodevelopmental disorders, NDD, parent-adolescent interaction, parental knowledge, adolescent disclosure, mental health, well-being

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List of abbreviations

NDDs	Neurodevelopmental disorders
ICF-CY	International Classification of Functioning, Disability, and Health – Child and Youth Version
fPRC	Family of Participation-Related constructs
LoRDIA	Longitudinal Research of Development In Adolescents
SDQ	Strengths and Difficulties Questionnaire

I Introduction

Worldwide, 13% of adolescents aged 10-19 years old experience mental health problems, which remain undertreated and underdiagnosed (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015). The current COVID-19 pandemic has had a major effect on everyone's life. Many adolescents face challenges that are stressful during this pandemic and can cause strong emotions. Social distancing and online teaching were necessary to reduce the spread of COVID-19. Consequently, adolescents felt isolated and lonely and were at an increased risk of developing anxiety, depression, and stress (Centers for Disease Control and Prevention, 2021; Liu, Bao, Huang, Shi, & Lu, 2020). Mental health in adolescence has been related to the family atmosphere and having neurodevelopmental disorders [NDDs] (Bush et al., 2020). Adolescents having NDDs need to reflect on their emotion management and social skills as early as possible, as they are at increased risk of developing depression and at higher risk of decreased psychological- and social well-being (Berglund Melendez, Malmsten, Einberg, Clausson, & Garmy, 2020). The present study focuses on mental health in adolescents with self-reported NDD problems, with many of them probably under the threshold for an NDD diagnosis, and the relationship between their mental health and the family atmosphere.

NDDs are impairments primarily associated with abnormal development and functioning of the brain and the neurological system (American Psychiatric Association, 2013) and are rising among adolescents (Berglund Melendez et al., 2020). Adolescents having NDDs have a higher prevalence of mental health problems than their typically developing peers (Rodgers & Ofield, 2018), as mental health problems worsen the behavioral, communication, and interpersonal difficulties experienced by adolescents having NDDs (Baraskewich & McMorris, 2019) and vice versa. As a result, adolescents can develop risk behaviors, such as interpersonal violence or substance use, as well as sadness or depressive symptoms (Kapetanovic, Boele, & Skoog, 2019).

Emotionally close relationships, positive interactions, and trust between adolescents and their parents are key aspects to prevent adolescents from being exposed to risk behaviors (Kerr, Stattin, & Trost, 1999; Laird, Marrero, & Sentse, 2010). These aspects are related to a safe environment for adolescents to communicate with their parents about their activities and whereabouts (Kapetanovic, Bohlin, Skoog, & Gerdner, 2020). Adolescents who voluntarily share information about their activities and whereabouts with their parents enable their parents to learn about these whereabouts (Kapetanovic et al., 2019, 2020). Open communication between adolescents and their parents can contribute to parents' information

about their adolescent's activities (Kapetanovic et al., 2020). This can help them provide their adolescent with guidance and support, protecting their adolescent against engagement in risk behaviors (Kapetanovic et al., 2019, 2020). However, having NDDs in adolescence due to problems with interaction and communication can interfere with the ability to establish meaningful social relationships with parents, and can result in an increased risk of mental health problems (Baraskewich & McMorris, 2019). However, it may be that the family atmosphere rather than the NDD itself affects social relationships. Performing a study focusing on the relationship between mental health in adolescents having self-reported NDDs and sources of parental knowledge is important as the relationship between adolescents and parents is bi-directional. As a result, adolescents and parents can influence each other's behavior and mental health transactionally over time (Garbarino & Ganzel, 2000; Kapetanovic, 2019).

2 Background

2.1 Adolescence

Adolescence is the period of transition between childhood and adulthood where an individual is between 10 and 19 years old (World Health Organization [WHO], 2019). Adolescence can be divided into three phases: *early* adolescence (10-13 years old), *middle* adolescence (14-16 years old), and *late* adolescence (17-19 years old) (Verhulst, 2017). The present study focuses on middle adolescence (14-16 years old).

Adolescents can face many challenges and demands during this period when maturing biologically, developing cognitive skills such as abstract thinking, and getting a clearer sense of their personal and sexual identity (Christie & Viner, 2005). Even though many adolescents face positive developmental outcomes during early adolescence, it is also the phase in life when externalizing problems, such as conduct problems, and internalizing problems, such as anxiety and depression manifest (Hale III, Raaijmakers, Muris, van Hoof, & Meeus, 2009; Meeus, Branje, & Overbeek, 2004). These problems peak between early and middle adolescence (10-16 years old) (Kapetanovic & Boson, 2020). The relationship of adolescents to both family and friends changes, although they still need support from family and friends to cope with daily life, health, and stressors (Currie et al., 2012). Adolescents with NDDs in particular are reported to have a higher prevalence of mental health problems than other adolescents (Simonoff, 2017).

2.2 To live with neurodevelopmental disorders as an adolescent

Neurodevelopmental disorders [NDDs] affect 10 to 15% of all births, with prevalence rates increasing worldwide (Dewey, 2018). Genetics appears to play an important role in many neurodevelopmental disorders (American Psychiatric Association, 2013). However, most of the NDDs do not have one clear cause but have multiple and complex contributors. Most NDDs problems result from a combination of biological, environmental, genetic, and psychosocial risk factors (American Psychiatric Association, 2013). Many environmental risk factors may affect a child's neurodevelopment, including the family atmosphere, preterm birth, maternal use of alcohol, and drugs or tobacco during pregnancy (American Psychiatric Association, 2013; De Felice, Ricceri, Venerosi, Chiarotti, & Calamandrei, 2015).

The most common neurodevelopmental disorders in adolescence include Attention Deficit Hyperactivity Disorder [ADHD], Autism Spectrum Disorder [ASD], communication disorders, intellectual disabilities, learning disabilities, and motor disorders (Berglund Melendez et al., 2020; Mullin et al., 2013). Overall, adolescents having NDDs can experience difficulties with attention, behavior, language and speech, learning, memory, motor skills, other neuropsychological functions, and social relationships (Dewey, 2018). Adolescents with ASD or ADHD are more likely to face difficulties with social participation in their relationships with their family and peers (Barkley, Fischer, Edelbrock, & Smallish, 1991; Hoza et al., 2005). Adolescents with NDDs also vary in range from highly functional to severely impaired (Berglund Melendez et al., 2020). Besides difficulties with attention, language, learning and speech, other functions mentioned earlier affect not only the adolescents' everyday functioning and mental health, but also the adolescent's immediate environment (Kapetanovic, Boele, & Skoog, 2019). Therefore, adolescents and especially adolescents having NDDs must be seen in a family context.

2.3 Definition of a family

A family consists of any combination of two or more people who are bound together over time by ties of marriage or birth, adoption or placement, and take responsibilities for different activities in daily life (Rose & Hebblethwaite, 2020). Parents living together with their children is an example of a family, who directly or indirectly invest in their children by providing them with material resources, maintaining a safe home environment, transferring knowledge, engaging in caregiving activities, and supplying them with economic and social support (Hewlett, 2000). Family structure is linked to adolescents' well-being (Carlson &

Corcoran, 2001; Langton & Berger, 2011). Adolescents growing up in a stable two-parent family benefit from greater economic resources, experience higher parenting quality, are exposed to fewer stressful events, and are emotionally closer to their parents than adolescents growing up in other family structures, such as single-parent families (Amato, 2005). Growing up in a single-parent family can also positively affect the relationship between the adolescent and parent, as the parent does not have to share time with their spouse. As a result, the parent has more time and energy to develop a strong bond with their child (Gupta & Kashyap, 2020). Absence of parental arguments and conflicts in single-parent families also calms the household environment that positively influences adolescents well-being (Gupta & Kashyap, 2020). In addition, these adolescents are more likely to face lower levels of parental psychological well-being and greater stress levels than adolescents growing up in stable two-parent families (Langton & Berger, 2011). These factors can cause limited access to resources and social support, restricted parental authority, and lower levels of parental engagement and warmth (Amato, 2005; Thomson, Hanson, & McLanahan, 1994).

2.4 Mental health problems

Mental health problems can vary during various life stages, such as adolescence, where a change in biological functioning and role expectations occurs, which increases the possibility of developing mental health problems (Granlund et al., 2021). Most mental health problems develop slowly, and every individual will undergo periods in life with more or less mental health problems (Bailey, Totsika, Hastings, Hatton, & Emerson, 2019; Granlund et al., 2021). Mental health problems can be divided into *internalizing behavior problems* and *externalizing behavior problems*. *Internalizing behavior problems* are related to emotional problems, such as anxiety, depression, or somatic complaints (Narusyte, Ropponen, Alexanderson, & Svedberg, 2017). *Externalizing behavior problems* are related to conduct problems, such as aggression and disruptive or violent behavior (Narusyte et al., 2017). Conduct problems and emotional problems tend to increase during adolescence but follow various trajectories: during adolescence, emotional- and conduct problems increase, especially in girls, while conduct problems slightly decrease in boys (García-Moya, Johansson, Ragnarsson, Bergström, & Petersen, 2019; Kökönyei et al., 2015). Most of the time, mental health problems are not caused by a single factor but are due to various factors (Centers for Disease Control and Prevention, 2018). Risk factors contributing to mental health problems include childhood traumas or history of child abuse, genetic factors, misuse

of alcohol and drugs, feelings of loneliness or isolation, or having an ongoing health condition (Centers for Disease Control and Prevention, 2018; Mind for better mental health, 2017). A barrier in measuring mental health is that traditionally mental health is described as having no mental health problems. However, this does not define the construct of mental health as a positive state (Granlund et al., 2021).

2.5 Mental health

Mental health is seen as a complete state consisting of the absence of mental health problems and the presence of mental health (Keyes, 2002). Mental health is also related to ‘*being*’ (happy or satisfied), ‘*doing*’ (having goals, looking after self and others), and ‘*having*’ (relationships, rights, resources) (Powell, Graham, Fitzgerald, Thomas, & White, 2018), and are linked to two dominating viewpoints in well-being research: *hedonic well-being* and *eudaimonic well-being* (Keyes, Shmotkin, & Ryff, 2002; Westerhof & Keyes, 2009). *Hedonic well-being* is also known as *emotional well-being* (Keyes, 2007). *Eudaimonic well-being* consists of two aspects: *psychological well-being* and *social well-being* (Keyes, 1998; Ryff & Keyes, 1995). Based on this, Westerhof and Keyes (2009) argued that hedonic well-being, together with psychological and social aspects of eudaimonic well-being, define positive mental health. For adolescents with NDDs, ‘*doing*’ and eudaimonic well-being may require support from others (Granlund et al., 2021). Keyes (2002) argued that a combination of emotional, psychological, and social well-being is needed to be considered as positive functioning and being mentally healthy. *Emotional well-being* is defined as a cluster of symptoms indicating the absence or presence of positive feelings about life, including interest in life, feelings of happiness, and satisfaction (Keyes, 2007). *Social well-being* consists of five dimensions: social acceptance, social actualization, social coherence, social contribution, and social integration (Keyes, 1998). These elements describe an individual’s optimal functioning within society (Westerhof & Keyes, 2009). Besides, *psychological well-being* is shaped by six aspects of positive functioning: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance (Ryff & Keyes, 1995). Each element is important to realize an individual’s potential and strive to become a better person (Westerhof & Keyes, 2009).

Keyes (2005) distinguished mental health of individuals into flourishing, languishing, and moderate. An individual with *complete mental health* is *flourishing* in life with high levels of well-being (Keyes, 2002; Westerhof & Keyes, 2009). The individual is filled with positive

emotions and functions well socially and psychologically (Keyes, 2002). An individual with *incomplete mental health* is *languishing* in life with low levels of well-being (Keyes, 2002; Westerhof & Keyes, 2009). The individual is filled with negative emotions and functions low socially and psychologically (Keyes, 2002; Westerhof & Keyes, 2009). Also, Westerhof and Keyes (2009) argued that individuals who are not flourishing nor languishing are considered as having *moderate mental health*, which includes both reported problems in functioning (such as fatigue or problems in appetite) and anhedonia (loss of pleasure and interest or feeling sad), and moments of positive feelings and positive views of life.

2.6 To live with mental health problems and NDDs as an adolescent

Adolescents having NDDs are three times more likely to have mental health problems than their typically developing peers (Baraskewich & McMorris, 2019). The most frequent mental health problems within adolescents having NDDs are emotional problems, such as anxiety or depression, and behavioral problems, such as antisocial behavior due to behavioral, communication, and interpersonal difficulties experienced by these adolescents (Baraskewich & McMorris, 2019; Halvorsen et al., 2019). These difficulties can lead to bullying, leading to developing emotional problems, also known as internalizing issues, such as anxiety or depression (Baraskewich & McMorris, 2019). However, it may be the effect of family interactions and relationships rather than the NDD per se that influences mental health (Granlund et al., 2021). Lygnegård, Augustine, Granlund, Kåreholt, and Huus (2018) reported that the family atmosphere seems to be related to functioning and peer relations in adolescents with NDDs. The family atmosphere refers to the climate within the household in which relationships are developed between the parents, children, and other members of the family (Dreikurs & Soltz, 1964), and specific opinions and beliefs of immediate family members influence the individuals' behavior and actions (World Health Organization [WHO], 2007).

2.7 Parent-adolescent relationship

Kapetanovic and Boson (2020) stated that parents are responsible for providing appropriate guidance and promote positive developmental outcomes for their adolescents. This is in line with Article 18 of the Convention on the Rights of the Child [UNCRC], stating that parents have the primary responsibility for the development and upbringing of their adolescent (United Nations General Assembly, 1989). Parenting adolescents cannot be seen as a unidirectional process as parental characteristics are related to adolescent characteristics in a

dynamic manner (Soenens, Vansteenkiste, & Beyers, 2019). Thus, parent-adolescent relationships are better seen as a bidirectional process in which both the parents' and adolescents' behaviors or characteristics changes (Soenens et al., 2019) have to be taken into account. Healthy parent-adolescent relationships are important as they have proximal influences on adolescents' general development and psychosocial health (Kapetanovic & Boson, 2020; Sameroff, 2010). Children grow up, meaning their parent-adolescent interactions and relationships change over time (Kapetanovic, 2019). Chances of parent-adolescent conflicts are greater when parents do not acknowledge their adolescent's growing need for autonomy and privacy (Smetana, Campione-Barr, & Metzger, 2006), and can set them off on engaging in delinquent activities (Kapetanovic et al., 2019). On the other hand, the quality of parent-adolescent relationships can be increased by open parent-adolescent communication, where adolescents' connectedness to their parents helps the adolescent share information with their parents (Tilton-Weaver, 2014). As a result, parents have more information about their adolescents' activities and whereabouts outside the home (Kapetanovic, Bohlin, Skoog, & Gerdner, 2019). Therefore, the parents' approach to gain knowledge about their adolescents' activities seems to be important.

2.8 Sources of parental knowledge

To protect from negative mental and social development, parental knowledge about their adolescents' lives is necessary, making them more able to protect their adolescent (Kapetanovic, Bohlin, Skoog, & Gerdner, 2020). Protecting their adolescent against developing risk behavior factors can be achieved by obtaining knowledge of their adolescent's whereabouts through a parent-driven source, namely *parental control*, or adolescent-driven communication, namely *adolescent disclosure* (Kapetanovic et al., 2019; Kapetanovic & Boson, 2020). *Parental control* refers to parents' regulations and rules to control and regulate their adolescents' behavior (Stattin & Kerr, 2000). Even though parents show interest in their adolescents by asking them for information, this parent-driven source might be intrusive to adolescents (Tilton-Weaver & Galambos, 2003). Another difficulty with parental control is when parents do not renegotiate the regulations and rules for their adolescents, making the asynchrony between parents and their adolescents stronger (Kapetanovic et al., 2020). Also, increases in adolescents' conduct problems can raise parents' tolerance of deviant behavior, which results in decreased parental control (Bell & Chapman, 1986). *Adolescent disclosure* refers to adolescents' voluntary disclosure to their

parents about activities they undertake in their spare time (Stattin & Kerr, 2000). Parents can advise without being intrusive when they respond to a conversation induced by their adolescent (Kapetanovic et al., 2019). However, difficulties with disclosure may lead to an increased risk for mental health problems (Baraskewich & McMorris, 2019). Thus, it seems that parents' responsiveness to a conversation induced by the adolescent, more than parents obtaining knowledge themselves, is a protective factor for adolescent engagement in risk behaviors (Kapetanovic et al., 2019).

2.9 To be a family of an adolescent having mental health problems

Family care can be beneficial but can also become a source of stress within the family. Family members of an adolescent having mental health problems can develop social or psychological problems themselves, such as depression and sleeping problems (Campbell, 2013). They also often report that their energy, mental health, physical health, and time are negatively affected by the mental health problems of their adolescent (Moller, Gudde, Folden, & Linaker, 2009).

2.10 To be a family of an adolescent having neurodevelopmental disorders

Parents of adolescents having NDDs experience higher parental tiredness and stress levels than parents of typically developing children (Cavonius-Rintahaka, Aho, Voutilainen, Billstedt, & Gillberg, 2019). As a result, family functioning can be negatively affected (Biederman, 2006; Herring et al., 2006). Furthermore, parental stress seems to appear more when the adolescents' parents are older and when there is a higher level of comorbidity within the NDD (Deault, 2010; Falk, Norris, & Quinn, 2014). Another challenge parents of adolescents having NDDs could face is increased rates of depression (van Steijn, Oerlemans, van Aken, Buitelaar, & Rommelse, 2014). To cope with these challenges, families of adolescents having NDDs can benefit from parental education programs, focusing on enhancing parental communicative skills and providing behavior management strategies and psycho-education (Jackson, Liang, Frydenberg, Higgings, & Murphy, 2016). Lastly, receiving support from outside the family is important regarding family health (Cavonius-Rintahaka et al., 2019).

3 Theoretical framework

3.1 Two continua model of mental illness and mental health

Westerhof and Keyes (2009) designed the *two continua model* of mental illness and mental health. This model holds that mental health problems and mental health are related but distinct dimensions, where one continuum indicates the absence or presence of mental health problems, and the other continuum indicates the absence or presence of mental health (Westerhof & Keyes, 2009). Keyes (2005) categorized individuals into the two continua: individuals with and without mental health problems and individuals with flourishing, moderate, and languishing mental health. Individuals who are languishing do not have to experience mental health problems, and individuals who have mental health problems can nevertheless be flourishing (Granlund et al., 2021; Westerhof & Keyes, 2009). Moreover, the level of mental health differentiates the level of functioning of individuals with mental health problems, and not only of individuals who are free of mental health problems (Westerhof & Keyes, 2009). In other words, individuals who are flourishing but experience mental health problems function better than those who have moderate mental health. Individuals who have moderate mental health and experience mental health problems function better than those who are languishing and experience mental health problems (Westerhof & Keyes, 2009).

3.2 Family of Participation-Related Constructs (fPRC)

The International Classification of Functioning, Disability, and Health – Child and Youth Version [ICF-CY] defines participation as “involvement in a life situation” (WHO, 2007, p. 9). Although participation is one of the core concepts within the ICF-CY, the processes defining this construct are less understood (Imms et al., 2017).

Imms et al. (2017) proposed that participation can be seen as both a process and an outcome. Imms's et al. (2017) Family of Participation-Related Constructs [fPRC] will be applied as a framework within the present study, as this framework can be used to describe the relationship between important intrinsic and extrinsic factors of the adolescent that are influenced by past participation, and influence future participation (Imms et al., 2017). Both intrinsic and extrinsic factors can affect participation. An intrinsic factor affecting participation is sense of self (Imms et al., 2017), and an extrinsic factor affecting participation is the family atmosphere (Lygnegård et al., 2018).

3.2.1 Dimensions of participation

Within the fPRC, participation exists of two essential domains: attendance and involvement. The first domain is *attendance*, defined as being there. The second domain is *involvement*, defined as the experience of participation while attending (Imms et al., 2017), and might also include elements of engagement, level of affect, motivation, persistence, and social connection (Imms et al., 2016; Imms et al., 2017).

Concerning mental health, participation is a key concept related to well-being, as it focuses on functioning within the context of everyday activities (Granlund et al., 2021). Adolescents' participation in family activities and relationships are both an antecedent and a consequence of an adolescent's mental health (Granlund et al., 2021). Participation in family relationships and well-being can be seen as a bidirectional process, where participation in family relationships influences well-being, and positive well-being can increase participation possibilities (Granlund et al., 2021; Parasuraman, Purohit, Godshalk, & Beutell, 1996).

3.2.2 Intrinsic factors influencing participation

The fPRC recognizes that intrinsic factors of the adolescent, related to their possibility of participating, are influenced by past and present participation, and influences future participation (Imms et al., 2017). Intrinsic factors refer to *activity competence*, *sense of self*, and *preferences* (Imms et al., 2017). For the present study, only *activity competence* and *sense of self* will be applied. *Preferences* will not be applied as the present study does not focus on interests that are valued or hold meaning. *Activity competence* refers to “the ability to execute the activity being undertaken according to an expected standard” (Imms et al., 2017, p. 18), and includes affective, cognitive, and physical abilities and skills (Imms et al., 2017). According to Dewey (2018), adolescents having NDDs can experience difficulties with their behavior, language and speech and motor skills. They can also experience difficulties with social relationships with their parents (Barkley et al., 1991). These difficulties can negatively influence adolescents' activity competence in communicating and developing meaningful relationships within the family relationships. *Sense of self* refers to an individual's perception of their confidence, satisfaction, self-determination, and self-esteem, and these factors facilitate participation by helping the individual engage (Imms et al., 2017). Well-being seems to be most closely related to sense of self within the fPRC (Granlund et al., 2021; Imms et al., 2017). It is recognized that many adolescents having NDDs also have mental health problems such as emotional problems or antisocial behavior (Narusyte et al.,

2017). These problems can negatively influence their sense of self, meaning that having a low sense of self decreases these adolescents' possibilities to participate and being involved in everyday life situations (Imms et al., 2017; Moller-Christensen et al., 2019).

3.2.3 Extrinsic factors influencing participation

Within the fPRC, extrinsic factors are divided into *context* and *environment*. The *context* is personal and seen as the setting for activity participation, including the activity, objects, people, place, and time (Imms et al., 2017). The *environment* is external to the individual and refers to the broader physical and social structures in which the individual live (Imms et al., 2017). The relationship between the individual and environment is bidirectional, meaning that the environment affects the individual directly and indirectly, and the individual also affects the environment by engaging in activities within various places (Imms et al., 2017). Thus, the bidirectional relationship between the individual and the context results in changes within the individual and environment over time (Imms et al., 2017; Sameroff & Mackenzie, 2003). The family is part of the context, and within this environment, a positive interaction among the adolescent and its parents is an important key aspect of the adolescent's developmental context (Kapetanovic et al., 2020). Environmental barriers such as economic burdens or low family interrelationships are risk factors for low participation and are especially challenging for adolescents having NDDs (Moller-Christensen et al., 2019). Thus, both the environment and the adolescent's intrinsic factors influence family support patterns and need to be related in studies (Moller-Christensen et al., 2019). The present study's model in relation to the fPRC framework is illustrated in *Figure 1*.

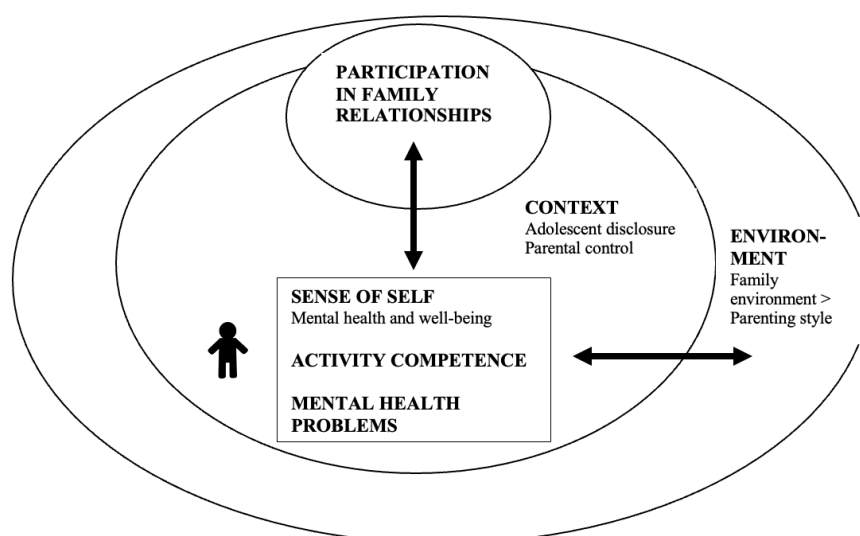


Figure 1. *Participation in family relationships and mental health in adolescents based on the fPRC-framework (Imms et al., 2017).*

3.3 Family communication and relationships

Within family relationships it is important to investigate parenting style and the adolescent's behavior. Parents become a model to the children concerning how to communicate about their whereabouts in daily life. The most known parenting styles are *authoritative* and *authoritarian* (Kapetanovic et al., 2020). *Authoritative* parents encourage adolescents to be independent within reasonable limits and rules. These parents guide their adolescent by explaining reasons to their limits and rules (Sartaj & Aslam, 2010). They allow bidirectional communication and are warm to their adolescent, referring to the degree of parental involvement, responsiveness, and support to make their adolescent socially competent (Hart, Newell, & Olsen, 2003; Sartaj & Aslam, 2010). Contrary, *authoritarian* parents tend to limit their adolescent's independence and force them to follow strict rules, which cannot be challenged. Adolescents are not allowed to question the rules, and parents on their turn, do not explain the reasoning of the rules (Sartaj & Aslam, 2010). This parenting style is characterized by high parental control and low parental warmth to their adolescent, which is related to adolescent's socially incompetent behavior (Baumrind, 1991). A combination of parental control (reasonable rules) and parental support (encouraging to be independent) seems to reduce conduct problems and emotional problems in adolescents (Darling & Steinberg, 1993; Finkenauer, Engels, & Baumeister, 2005). Thus, emotionally close relationships between adolescents and their parents are important as they can provide a safe environment for adolescents to voluntarily disclose information to their parents (Kapetanovic et al., 2019). Subsequently, from the adolescents' perspective, voluntary disclosing information might be more important for their mental health than parental control. Therefore, parental control and adolescent disclosure should be examined separately from each other.

4 Rationale

Previous studies focused on mental health in NDDs and sources of parental knowledge as separate subjects. Studies showed that adolescents having NDDs are three times more likely than their typically developing peers to have mental health problems, such as anxiety, antisocial behavior, or depression (Baraskewich & McMorris, 2019). A study performed by Moller-Christensen et al. (2019) showed that adolescents having NDDs are at an increased risk of exclusion from every day-life situations. Also, studies suggest there is a continuum of chronicity for mental disorders in boys with NDDs, such as attention problems and problems in social behavior (Copeland et al., 2013; Will & Wilson, 2014). Studies focusing on sources of parental knowledge showed that parental anxiety, maternal behavior, and low parenting

competence (use of parenting practices and perceived parent-adolescent connectedness) were related to an increased risk of substance use and delinquent behavior of adolescents in general (Jones, Ehrlich, Lejuez, & Cassidy, 2015; Jones & Prinz, 2005; Kapetanovic et al., 2019). Contrary, Kapetanovic and Boson (2020) showed that family cohesion, reasoning, and warmth contribute to higher levels of adolescents' psychological competence and well-being. A study performed by Kapetanovic et al. (2020) showed that adolescent voluntary disclosure was indirectly and negatively related to delinquent behavior and substance use (Kapetanovic et al., 2020). Thus, when adolescents voluntarily disclosed, the adolescent's chance for engagement in delinquent behavior and substance use decreased and was indirectly related via parental knowledge (Kapetanovic et al., 2020). Besides, girls rated higher levels of parental control and adolescent disclosure than boys (Kapetanovic et al., 2020). Concerning adolescents having self-reported NDDs, a more positive family atmosphere and open communication between adolescents and parents were related to the adolescent's frequency of participating in domestic life (Lygnegård et al., 2018).

Less research has been performed targeting mental health in adolescents having self-reported NDD problems and the relationship between mental health and the family atmosphere. Adolescents having NDDs can face difficulties in their communication within their immediate family (Kapetanovic et al., 2019), affecting adolescents' voluntary disclosure to their parents. Moreover, there is a gap in the literature concerning the relationship between mental health in adolescents having self-reported NDD problems and two sources of parental knowledge regarding adolescents activities and whereabouts: adolescent disclosure and parental control.

5 Aim and hypotheses

The present study aims to compare adolescents (aged 14-15 years old) having self-reported neurodevelopmental disorders [NDDs] who have been classified as flourishing ('good mental health') with adolescents having self-reported NDDs who have been classified as non-flourishing (languishing or moderate mental health) concerning rated mental health problems and adolescent perceptions of two sources of parental knowledge: adolescent disclosure and parental control. The study will be guided by the following hypotheses:

1. Adolescents having self-reported NDDs classified as flourishing will report less conduct problems and emotional problems than adolescents having self-reported NDDs classified as non-flourishing.

2. Adolescents having self-reported NDDs who report few conduct problems and emotional problems will report more adolescent disclosure and less parental control than adolescents having self-reported NDDs who report many conduct problems and emotional problems.
3. Adolescents having self-reported NDDs classified as flourishing will have higher adolescent disclosure than adolescents having self-reported NDDs classified as non-flourishing.
4. Adolescents having self-reported NDDs classified as flourishing will have lower parental control than adolescents having self-reported NDDs classified as non-flourishing.

6 Method

6.1 Study design

The present study used a cross-sectional design to compare two groups at a given time point (Kazdin, 2002), based on data collected in the longitudinal LoRDIA research program. For the present study, only adolescents having self-reported NDDs, aged 14-15 years old, were included. During the LoRDIA research program, these adolescents were further assessed and classified as flourishing or non-flourishing (languishing or moderate mental health), and flourishing was perceived as something positive. Adolescents having self-reported NDDs classified as flourishing represented the group with the condition flourishing, and adolescents having self-reported NDDs classified as non-flourishing represented the group without the condition. The two groups were compared with each other concerning mental health problems, adolescent disclosure, and parental control, which are all factors that can negatively affect the development of risk behavior (Kapetanovic et al., 2019).

6.2 Participants and sampling strategy

The present study was based on self-reported data from adolescents participating in an ongoing Swedish research program called Longitudinal Research of Development In Adolescents [LoRDIA]. This program studied adolescents' health, substance use, school functioning, and social networks (Kapetanovic et al., 2019). LoRDIA was designed to follow two cohorts of adolescents, aged 12 or 13 years old, until they turned 18 years old, in two midsized cities and two small cities in the south of Sweden. Participants were followed by answering questionnaires annually, starting in 2013 when they were in 6th or 7th grade, until 2018, when they were in 2nd grade senior high school (Kapetanovic et al., 2019, 2020).

In total, 2178 adolescents with and without self-reported NDDs were invited to participate in wave 3 (14-15 years old). Of these 2178 adolescents, 857 adolescents did not participate in wave 3, 57 of them moved from one of the study cities after wave 1 or 2, meaning the total number of participants in wave 3 was 1321. The present study focused on adolescents having self-reported NDDs in wave 3, therefore *purposive sampling* was used, as this type of sampling allowed to focus on a specific characteristic within a population (Kazdin, 2002). Thus, from the 1321 adolescents who participated in wave 3, 275 adolescents had self-reported NDDs. However, 77 of them did not participate in wave 3 as they were absent or declined to participate in the student survey (Boson, Berglund, Wennberg, & Fahlke, 2016), leaving the total number of adolescents having self-reported NDDs in wave 3 on $n=198$.

Demographic data of the participants in wave 3 showed that 45.3% of the participants were girls, and 54.7% were boys. Almost all participants were born in Sweden (93.9%) and live together with both parents (70.3%). Regarding the family's subjective socioeconomic status, 76.0% of the participants reported their family has as much money as other families. An overview of the demographic data of the participants in wave 3 is provided in *Table 1*.

To make between-group comparisons in the present study, participants with self-reported NDDs participating in wave 3 were divided into two groups: a flourishing group and a non-flourishing group. Due to too few adolescents in the languishing group to make comparisons, languishing and moderate mental health were put together into a non-flourishing group. Adolescents having NDDs can face many developmental and social challenges and in life and therefore moderate mental health is closer related to languishing than flourishing. The division of being in the flourishing or non-flourishing group was based on scores of the Mental Health Continuum – Short Form instrument. This instrument's scoring is further explained under subheading *6.4.1 Mental Health Continuum – Short Form*.

Table 1. *Demographic data of the participants in wave 3.*

Variable	Group	Participants (N)	Percent (%)
Gender	Boy	105	54.7
	Girl	87	45.3
Born in Sweden	Yes	184	93.9
	No	12	6.1
Parents' citizenship	Mother born in Sweden	161	82.6

	Father born in Sweden	165	84.6
Home situation	Living with both parents, parents live together	137	70.3
	Living with their mother	19	9.7
	Living with their father	3	1.5
	Switching between living with their mother and father	34	17.4
	Living in a foster family	2	1.0
Socioeconomic status	Family has less money than other families	22	11.2
	Family has as much money as other families	149	76.0
	Family has more money than other families	25	9.1

6.3 Data collection and procedure

The present study was based on a secondary analysis of data collected within the LoRDIA research program. Before recruiting participants in 2013, school administrators were notified about the research project, and parents and teachers were sent letters to inform them about the study (Kapetanovic et al., 2020). The letters sent to the parents were translated into 32 different languages, explaining the aim of the study and informing them about opt-out consent (Kapetanovic et al., 2019). Overall, the data utilized for the present study were derived from participant-rated questionnaires (Kapetanovic et al., 2019, 2020). Participants replied yearly to paper questionnaires in their classroom at school, and these questionnaires were collected by the LoRDIA research team (Kapetanovic et al., 2019, 2020). The LoRDIA program aimed to include both adolescents with and without disabilities. Therefore, an adaptive form of the questionnaire was available for participants with cognitive disabilities, such as attention deficiencies, intellectual impairments, or writing problems (Kapetanovic et al., 2020). Adolescents with cognitive disabilities and intellectual impairments can face difficulties in distinguishing the meaning of two similar response options and therefore response alternatives within the questionnaires were reduced from the 5-point Likert scale to the 3-point Likert scale. Completing the questionnaires took 60-90 minutes, whereby

participants with cognitive disabilities were given 30 minutes extra to complete the questionnaire (Kapetanovic et al., 2020).

6.4 Instruments

6.4.1 Mental Health Continuum – Short Form

The Mental Health Continuum – Short Form [MHC-SF] consists of 14 items measuring emotional, psychological, and social well-being (Keyes, 2006; Keyes et al., 2008). This scale measures the degree of *emotional well-being*, including three items, referring to feelings of happiness, interest in life, and satisfaction (Keyes, 2005; Westerhof & Keyes, 2009). This scale measures the degree of *psychological well-being*, including six items, referring to self-acceptance, environmental mastery, positive relations with others, personal growth, autonomy, and purpose in life (Keyes, 2005; Westerhof & Keyes, 2009). This scale also measures the degree of *social well-being*, including five items, referring to social contribution, social integration, social actualization, social acceptance, and social coherence (Keyes, 2005; Westerhof & Keyes, 2009). The internal consistency of each subscale was $\alpha = .80$ or higher (Keyes, 2006; Keyes et al., 2008; Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes, 2011). The response options for all items ranged from 0-5, where 0 = *never*, 1 = *once or twice*, 2 = *about once a week*, 3 = *two or here times a week*, 4 = *almost every day*, 5 = *every day* during the past 30 days (Keyes, 2006). The total score ranged from 0 to 70 points, meaning higher scores indicated higher levels of positive mental health (Keyes et al., 2008). Adolescents diagnosed as *flourishing* scored 4 (*almost every day*) or 5 (*every day*) on at least one of the three items about emotional well-being and six of the 11 items of positive functioning (psychological- and social well-being combined) during the past month (Keyes, 2005). Adolescents diagnosed as *languishing* scored 0 (*never*) or 1 (*once or twice*) on at least one of the three items about emotional well-being and six of the 11 items of positive functioning during the past month. Adolescents diagnosed with *moderate mental health* were neither flourishing nor languishing (Keyes, 2005).

6.4.2 Strengths and Difficulties Questionnaire

The Strength and Difficulties Questionnaire [SDQ] is a behavioral and emotional screening questionnaire for children and adolescents aged 4-16 years old, completed by their parents and/or teachers, and is also known as the informant-rated SDQ (Goodman, 1997). The SDQ consists of 25 items, divided into five scales of five items: conduct problems subscale,

emotional symptoms subscale, hyperactivity subscale, peer relationship subscale, and prosocial subscale (Goodman, 1997). As the present study only includes adolescents aged 14-15 years old, the *self-reported* Swedish version of the SDQ was utilized, which adolescents aged 11-16 years old can complete themselves (Goodman, Meltzer, & Bailey, 2003). The scales and items of the *self-report* version of the SDQ are the same as the informant-rated SDQ. The self-report SDQ only differs from the informant-rated SDQ in grammar, meaning items are changed from third-to first person, and words used are easier to understand (Goodman et al., 2003). The SDQ was chosen as an appropriate tool in the present study's context as this tool examines adolescents' behavior and emotions, which are factors related to their mental health and social networks studied in the LoRDIA research program. For the present study, only the *conduct problems subscale* and *emotional symptoms subscale* were utilized to define mental health problems of an individual. The *hyperactivity* and *peer problem subscales* were not utilized as they may not be defined as individuals' mental health problems (Granlund et al., 2021). The *hyperactivity subscale* was not utilized as hyperactivity is one of the most common NDDs in childhood, meaning adolescents having NDDs already experience more hyperactivity than their typically developing peers (Scandurra et al., 2019). Also, hyperactivity can exist when not having mental health problems and along good everyday functioning (Granlund et al., 2021). The *peer problem subscale* was not utilized as these items mainly focus on communication and interaction instead of focusing on child characteristics (Granlund et al., 2021).

The *conduct problems subscale* comprised the following items: 'I get very angry and often lose my temper'', 'I usually do as I am told'', 'I fight a lot. I can make other people do what I want'', 'I am often accused of lying or cheating'', 'I take things that are not mine from home, school, or elsewhere''(Goodman, 1997; Goodman et al., 2003). The *emotional symptoms subscale* comprised the following items: 'I get a lot of headaches, stomachaches or sickness'', 'I am often unhappy, down-hearted or tearful'', 'I worry a lot'', 'I am nervous in new situations. I easily lose confidence'', 'I have many fears and I am easily scared'' (Goodman, 1997; Goodman et al., 2003). Response options for both scales ranged from 0 to 2, where 0= *not true*, 1= *somewhat true*, 2= *certainly true* (Goodman et al., 2003). However, within the conduct problems subscale, response options for the item 'I usually do as I am told'' ranged from 2= *not true*, 1= *somewhat true*, 0= *certainly true* (Goodman et al., 2003). Goodman (2001) reported the internal consistency of the conduct problem scale ($\alpha=.63$) and emotional symptoms scale ($\alpha=.67$) as satisfactory. Scores of each scale were

generated by summing up the scores of the five items within the scale and generated a scale score ranging from 0 to 10 (Goodman et al., 2003). Total scores for both scales were divided into three subgroups. Total scores of the *conduct problems subscale* were divided in 0-3= *normal*, 4= *borderline*, 5-10= *abnormal*. Total scores of the *emotional symptoms subscale* were divided in 0-5= *normal*, 6= *borderline*, 7-10= *abnormal* (Goodman et al., 2003).

6.4.3 Adolescent disclosure scale

Stattin and Kerr (2000) developed the adolescent disclosure scale, which assessed adolescents' voluntary disclosure to their parents about activities they undertake during their spare time. This scale comprised five questions: "Do you spontaneously tell your parents about your friends?", "How often do you usually want to tell your parents about school?", "Do you keep a lot of secrets from your parents about what you do during your free time?", "Do you hide a lot from your parents about what you do during nights and weekends?", and "Do you like to tell your parents about what you did and where you went during the evening?" (Stattin & Kerr, 2000). A previous study performed by Kapetanovic et al. (2019) showed an acceptable internal consistency ($\alpha=.70$) for this scale. Within the LoRDIA research program, the 5-point Likert scale was modified to a 3-point Likert scale, meaning response options ranged from 1 to 3, where 1= *often/always*, 2= *sometimes*, 3= *never*.

6.4.4 Parental control scale

Stattin and Kerr (2000) developed the parental control scale, which assessed how parents set regulations and rules to regulate and control their adolescents' behavior. This scale comprised six questions: "Must you have your parents' permission before you go out during the weeknights?", "If you go out on a Saturday evening, must you inform your parents beforehand about who will be along as well as where you will be going?", "If you have been out past curfew, do your parents require that you explain why and tell who you were with?", "Do your parents demand that they know where you are in the evenings, who you are going to be with, and what you are going to do?", "Must you ask your parents before you can make plans with friends about what you will do on a Saturday night?", and "Do your parents require that you tell them how you spend your money?" (Stattin & Kerr, 2000). A previous study performed by Kapetanovic et al. (2019) showed a good internal consistency ($\alpha=.81$) for this scale. The 5-point Likert scale was also modified to a 3-point Likert scale, meaning response options ranged from 1 to 3, where 1= *often/always*, 2= *sometimes*, 3= *never*.

6.5 Data analysis

All analyses were performed using SPSS version 27.0. The dataset was previously checked for outliers and errors prior to the analyses, and a normality test was performed for each outcome variable to analyze the normality of distribution. Outcome variables in the present study were conduct problems, emotional problems, adolescent disclosure, and parental control. By performing tests of normality, Normal Q-Q plots showed that data of all outcome variables were normally distributed. Also, a descriptive analysis was performed, including mean, standard deviation, and minimum - maximum. The file was split to compare boys and girls in the descriptive analysis, and groups were based on the variable 'gender'. Independent Samples t-Test tested differences between boys and girls having self-reported NDDs regarding parental knowledge, conduct problems, and emotional problems.

As all hypotheses in the present study focused on adolescents having NDDs in wave 3, 'select cases' was chosen, making the condition satisfied when 'NDD=1' and 'participated in wave 3=1', meaning adolescents not having NDDs and not participating in wave 3 were excluded from further performed analyses. Participants' mental health conditions were divided into the variables '*flourishing*', '*languishing*', and '*moderate mental health*' within the existing dataset. Hypotheses one, three, and four aimed at performing between-group comparisons between adolescents having self-reported NDDs classified as '*flourishing*' and '*non-flourishing*'. Therefore, a new variable '*non-flourishing*' was created by combining the two existing variables '*languishing*' and '*moderate mental health*'. Crosstabs were performed to calculate the number of adolescents having NDDs classified as flourishing and non-flourishing in wave 3. A total of $n=190$ (100%) adolescents having NDDs were flourishing or non-flourishing in wave 3, with $n=75$ (39.5%) in the flourishing group and $n=115$ (moderate: $n=97$ (51.0%), languishing: $n=18$ (9.5%)) in the non-flourishing group.

6.5.1 Data analysis hypothesis I

To examine whether adolescents having self-reported NDDs classified as flourishing reported less conduct problems and emotional problems than adolescents having self-reported NDDs classified as non-flourishing, the Mann-Whitney U test was carried out. Although data of both dependent variables 'conduct problems' and 'emotional problems' were normally distributed, they were measured on an ordinal level. The Independent Samples t-Test can be performed if data is normally distributed and measured on continuous level (Aerd statistics,

2018a). As data was measured on ordinal level, the Mann-Whitney U test was performed to examine differences between the two groups (Aerd statistics, 2018b).

6.5.2 Data analysis hypothesis 2

Independent Samples t-Tests were performed to examine whether adolescents having self-reported NDDs reporting few conduct problems and emotional problems will report more adolescent disclosure and less parental control than adolescents having self-reported NDDs reporting many conduct problems and emotional problems. This test was chosen as both dependent variables ‘adolescent disclosure’ and ‘parental control’ were measured on a continuous level (Dassen, Keuning, Jansen, & Jansen, 2014).

The initial coding options for the conduct problems scale and emotional symptoms scale ranged from 0 to 10. These grouping variables were further recoded into categorical variables to allow the differentiation between adolescents with few or many conduct problems and adolescents with few or many emotional symptoms, which was in line with the banding defined by Goodman et al. (2003). The coding options for *conduct problems* were as follows: 1= ‘few conduct problems’ and 2= ‘many conduct problems’, where adolescents whose overall score was below four (<4) were considered as having few conduct problems, and adolescent who scored four or above (≥ 4) were considered to manifest many conduct problems (Goodman, 1997). This variable was renamed to ‘SDQ conduct2’. The coding options for *emotional symptoms* were as follows: 1= ‘few emotional symptoms’ and 2= ‘many emotional symptoms’ where adolescents whose overall score was below six (<6) were considered as having few symptoms of emotional problems, and adolescent who scored six or above (≥ 6) were considered to manifest many symptoms of emotional problems (Goodman, 1997). This variable was renamed to ‘SDQ emotional2’. As the above-mentioned variables were now categorical, it was possible to perform two separate Independent Samples t-Tests (Field, 2009), one with the variables ‘adolescent disclosure’ ‘parental control’ and grouping variable ‘SDQ conduct2’, and one with the variables ‘adolescent disclosure’ ‘parental control’ and grouping variable ‘SDQ emotional2’.

6.5.3 Data analysis hypotheses 3 and 4

An Independent Samples t-Test was also performed to examine whether adolescents having self-reported NDDs classified as flourishing reported higher adolescent disclosure than adolescents having self-reported NDDs classified as non-flourishing. This test was chosen as the dependent variable ‘adolescent disclosure’ was measured on a continuous level (Dassen et

al., 2014). Secondly, multiple regression was carried out to investigate whether conduct problems and emotional problems could significantly predict adolescent disclosure. Before running the multiple regression, the file was split into the variable ‘flourishing’ to examine whether there were statistically significant differences among the flourishing and non-flourishing group. Multiple regression was performed twice to investigate whether there were statistically significant differences in conduct problems and emotional problems predicting adolescent disclosure among boys and girls in the flourishing and non-flourishing group. To do so, the variable ‘gender’ was added to select cases. Then, multiple regression with girls as gender was performed, with a satisfied condition when ‘NDD=1’, ‘participating in wave 3=1’, and ‘gender=1’. Afterward, multiple regression with boys as gender was performed with a satisfied condition when ‘NDD=1’, ‘participating in wave 3=1’, and ‘gender=2’. The dependent variable ‘adolescent disclosure’ and independent variables ‘SDQ conduct’ and ‘SDQ emotional’ were the same in both multiple regressions.

To examine whether adolescents having self-reported NDDs classified as flourishing reported lower parental control than adolescents having self-reported NDDs classified as non-flourishing, an Independent Samples t-Test was performed as the dependent variable ‘parental control’ was continuous. Secondly, multiple regression was carried out the same way as mentioned above to investigate whether conduct problems and emotional problems could significantly predict parental control. The dependent variable ‘parental control’ and independent variables ‘SDQ conduct’ and ‘SDQ emotional’ were the same in both multiple regressions.

6.6 Validity and reliability

Four types of validity were assessed to analyze if the conclusions of the present study are well-grounded and valuable (Cook & Campbell, 1979). These types of validity are known as: *statistical conclusion validity*, *internal validity*, *external validity*, and *construct validity* (Almqvist, 2018; Cook & Campbell, 1979; Kazdin, 2002).

Overall *statistical conclusion validity* and plausibility were ensured by using standardized measurements, such as the conduct problem subscale and emotional symptoms subscale of the SDQ (Goodman, 1997), and the adolescent disclosure and parental control measurements (Stattin & Kerr, 2000). Adopting purposive sampling increased the threat of *sample selection bias* (Kazdin, 2002), as the probability of being included in a specific group was related to being flourishing or non-flourishing as an adolescent having self-reported NDDs. As for all

cross-sectional studies, this resulted in overall weak *internal validity* of the present study (Cook & Campbell, 1979). The threat of *observer bias* (Petursdottir & Carr, 2018) was reduced as the participants were not observed, the study only included paper questionnaires that were answered yearly by the participants, using the 3 point Likert scales (Kapetanovic et al., 2019, 2020). Only adolescents aged 14-15 years old having self-reported NDDs who are living in four specific cities in the south of Sweden were included in the present study. This increased the threat of *sample characteristics* (Kazdin, 2002), as the results are only generalizable to this specific population with its characteristics. Consequently, the strong control over participants' characteristics and requirements for the present study tends to lower the *external validity* (Almqvist, 2018).

The use of standardized measurements ensured the *plausibility* an overall *construct validity* (Almqvist, 2018). The *internal consistency* should not be less than .70 to be considered as acceptable (Nunnally & Bernstein, 1994). The internal consistency for the MHC-SF subscales was calculated. The internal consistency for the emotional well-being scale ($\alpha=.92$) and the psychological well-being scale ($\alpha=.91$) was excellent, and the internal consistency for the social well-being was good ($\alpha=.88$). These results align with previous studies, where $\alpha=.80$ or higher for the MHC-SF subscales (Keyes, 2006; Keyes et al., 2008; Lamers et al., 2011). A study performed by Lupano Perugini, de la Iglesia, Castro Solano and Keyes (2017) showed strong *concurrent-* and *discriminant validity* as the MHC-SF positively correlated with other well-being measures, and was negatively associated with mental illness measures, such as the General Health Questionnaire. Within the self-reported version of the SDQ, the internal consistency was satisfactory for both the conduct problem scale ($\alpha=.63$) and emotional symptoms scale ($\alpha=.67$), as reported by a previous study (Goodman, 2001). Good *discriminant validity* was found in a previous study as the emotional symptoms subscale showed discriminant validity by not correlating with prosocial behavior (Lundh, Wangby-Lundh, & Bjarehed, 2008). The internal consistency for the adolescent disclosure scale in the present study was satisfactory ($\alpha=.61$), while a previous study performed by Kapetanovic et al. (2019) showed an acceptable internal consistency ($\alpha=.70$). Lastly, the internal consistency for the parental control scale in the present study was acceptable ($\alpha=.76$), whereas a previous study performed by Kapetanovic et al. (2019) showed a good internal consistency ($\alpha=.81$).

7 Ethical considerations

Consent was sought by the ‘hierarchy of gatekeeping’, consisting of three layers: the research committee, professionals recruiting children, and the child’s parents (Mary Ann Powell, Fitzgerald, Taylor, & Graham, 2012). The LoRDIA research program, which the present study was based on, received ethical approval from the Regional Research Ethical Review Board in Gothenburg, Sweden, before each data collection wave (Kapetanovic et al., 2019, 2020). Participants were recruited by the LoRDIA research team and school administrators. Parental consent was given by using *passive consent*. An issue with passive consent is ensuring parents are informed (Cashmore, 2006), as parents may not receive the information, they may be unable to read or understand the information, or children are failing to inform the researchers their participation has been refused by their parents (Mary Ann Powell et al., 2012). Although passive parental consent was obtained, adolescents also had to actively decide to decline or not decline their participation by giving active consent (Beazley, Bessell, Ennew, & Waterson, 2009). Furthermore, participants and their parents were informed about the purpose of the study, their voluntary nature of participation, and the confidentiality of their answers (Kapetanovic et al., 2020).

As mentioned before, the present study was based on existing data. The aim and hypotheses were in line with the purpose of the LoRDIA study, which was to study trajectories of development with a special focus on mental health in adolescence. Thus, this secondary use of data falls within the frame of the LoRDIA purpose, and therefore no additional ethical approval was necessary. Using the existing data set allowed to accept or reject the hypotheses with lower costs and in less time (Doolan & Froelicher, 2009). Using the existing data set allowed use of hypotheses without putting participants at high risk of harm, and is in line with *non-maleficence*, which is known as one of the four important ethical principles (Greig, Taylor, & MacKay, 2013).

Lastly, an important ethical consideration of the LoRDIA research program was the focus on the adolescents’ perspectives instead of adults having an adolescent perspective (Nilsson et al., 2015). Using adolescents’ perspectives was important as they have their own views of what affects them directly and they have their unique perspectives on the world they are living in (Mukherji & Albon, 2011; Smith, 2011). Using adolescents’ own perspectives is also in line with Article 12 and 13 of the Convention on the Rights of the Child, stating that children who are capable to form their own views should be able to express their own views freely in all matters affecting the child, and have the freedom to impart, seek and receive

information and ideas of all kind to express their owns views (United Nations General Assembly, 1989).

8 Results

8.1 Descriptive statistics

Table 2 presents descriptive statistics for boys and girls having self-reported NDDs and their perception of adolescent disclosure, parental control, conduct problems, and emotional problems. In addition, statistically significant differences between boys and girls are displayed.

Table 2. Mean differences in boys and girls with self-reported NDDs and their perception of adolescent disclosure, parental control, conduct problems, and emotional problems.

Variable	Boys				Girls				<i>p</i>
	<i>n</i>	<i>M</i>	<i>SD</i>	Min – Max	<i>n</i>	<i>M</i>	<i>SD</i>	Min – Max	
Adolescent disclosure	100	1.86	.40	1.00 – 2.80	87	1.62	.44	1.00 – 2.80	<.001*
Parental control	95	2.02	.58	1.00 – 3.00	85	2.04	.49	1.00 – 2.80	.734
Conduct problems	103	3.11	2.27	.00 – 8.00	87	4.89	2.66	.00 – 10.00	<.001*
Emotional problems	103	4.88	2.26	.00 – 10.00	87	4.57	2.34	.00 – 10.00	.357

**p*<.001

The Independent sample t-Test analysis showed that there were significant differences between boys' and girls' adolescent disclosure (*p*<.001) and conduct problems (*p*<.001) (see Table 2). Boys reported higher adolescent disclosure than girls, and girls reported more conduct problems than boys (see Table 2). No statistically significant differences were found between boys' and girls' parental control and emotional problems.

8.2 Results hypothesis I

Table 3 presents the results of the Mann-Whitney U test which was performed to investigate if the flourishing group reported less conduct problems and emotional problems than the non-flourishing group.

Table 3. *Pairwise comparisons between the non-flourishing and flourishing group on conduct- and emotional problems.*

		N	Mean Rank	Sum of Ranks
Conduct problems	Non-flourishing	113	105.15	11882.50
	Flourishing	75	78.45	5883.50
	Total	188		
Emotional problems	Non-flourishing	113	96.39	10892.00
	Flourishing	75	91.65	6874.00
	Total	188		

The results of the Mann-Whitney U test indicated that adolescents having self-reported NDDs classified as flourishing differ statistically in reporting less conduct problems from adolescents having self-reported NDDs classified as non-flourishing, $U= 3033.50$, $z= -3.32$ $p < .001$, with a small effect size $r= -0.24$ (see *Table 3*). However, adolescents having self-reported NDDs classified as flourishing did not differ statistically in reporting emotional problems from adolescents having self-reported NDDs classified as non-flourishing, $U= 4024.00$, $z= -.59$, $p = .556$, with a small effect size $r= -0.04$. This finding indicates that both groups report comparable levels of emotional problems (see *Table 3*).

8.3 Results hypothesis 2

Table 4 presents the results of the Independent t-Tests which were performed to compare if adolescent having self-reported NDDs with few conduct- and emotional problems reported more adolescent disclosure and less parental control than these adolescents with many conduct- and emotional problems.

Table 4. *Independent t-Test results comparing emotional- and conduct problems on adolescent disclosure and parental control.*

		N	M	SD
Adolescent disclosure	Few conduct problems	138	1.70	.424
	Many conduct problems	52	1.89	.440
	Total	190		
Parental control	Few conduct problems	133	2.03	.562

	Many conduct problems	50	2.02	.484
	Total	184		
Adolescent disclosure	Few emotional problems	121	1.70	.435
	Many emotional problems	70	1.83	.430
	Total	191		
Parental control	Few emotional problems	115	2.03	.546
	Many emotional problems	68	2.03	.535
	Total	183		

The results of the Independent t-Tests indicated that adolescents having self-reported NDDs who report few conduct problems differed statistically in reporting less adolescent disclosure from adolescents having self-reported NDDs who report many conduct problems, $t(188) = -2.731, p < .05$, with a small effect size $r = .20$ (see *Table 4*). The findings indicated that boys ($M = 1.81, SE = .04$) and girls ($M = 1.52, SE = .06$) who report few conduct problems experienced less adolescent disclosure than boys ($M = 2.11, SE = .10$) and girls ($M = 1.78, SE = .07$) who report many conduct problems. No statistical difference was found in reporting adolescent disclosure between the two emotional groups, $t(188) = -1.861, p = .064$, with a small effect size $r = .13$ (see *Table 4*). Also, no statistical differences were found in reporting parental control between adolescents having self-reported NDDs in the two conduct problems groups, $t(181) = .093, p = .926$, with a small effect size $r = .01$, and between adolescents having self-reported NDDs in the two emotional problems groups, $t(181) = .001, p = .999$, with no effect size $r = .00$.

8.4 Results hypothesis 3

Table 5 presents the results of the Independent t-Test which was performed to investigate if the flourishing group reported higher adolescent disclosure than the non-flourishing group.

Table 5. Independent t-Test results comparing the non-flourishing and flourishing group on adolescent disclosure.

		<i>N</i>	<i>M</i>	<i>SD</i>
Adolescent disclosure	Non-flourishing	113	1.85	.437
	Flourishing	74	1.63	.395
	Total	187		

The results of the Independent t-Test indicated that adolescents having self-reported NDDs classified as flourishing differed statistically in reporting lower adolescent disclosure from adolescents having self-reported NDDs classified as non-flourishing, $t(185)= 3.458, p<.001$, with a small effect size $r=.25$ (see *Table 5*).

Table 6 presents the results of the multiple regression analysis which was performed to investigate whether conduct problems and emotional problems could significantly predict adolescent disclosure.

Table 6. Multiple regression predicting adolescent disclosure from conduct problems and emotional problems.

Group	Gender	Variable	<i>B</i>	<i>SE B</i>	β
Non-flourishing	Boys	Conduct problems	0.02	0.02	.13
		Emotional problems	-0.03	0.03	-.16
	Girls	Conduct problems	-0.02	0.03	-.09
		Emotional problems	0.06	0.03	.29*
Flourishing	Boys	Conduct problems	0.02	0.03	.13
		Emotional problems	0.06	0.02	.39*
	Girls	Conduct problems	0.03	0.03	.16
		Emotional problems	0.05	0.03	.31

* $p<.05$

The results of the multiple regression indicated that 5.1% of the variance in adolescent disclosure can be explained by conduct problems and emotional problems, $F(2,188)= 5.07, p<.05$. As shown in *Table 6*, findings indicated that an increase of emotional problems predicted an increase in adolescent disclosure for girls in the non-flourishing group ($\beta=.29, p<.05$) and boys in the flourishing group ($\beta=.39, p<.05$).

8.5 Results hypothesis 4

Table 7 presents the results of the Independent t-Test which was performed to investigate if the flourishing group reported lower parental control than the non-flourishing group.

Table 7. *Independent t-Test results comparing the non-flourishing and flourishing group on parental control.*

		<i>N</i>	<i>M</i>	<i>SD</i>
Parental control	Non-flourishing	111	2.04	.543
	Flourishing	70	2.01	.539
	Total	181		

The results of the Independent t-Test indicated that adolescents having self-reported NDDs classified as flourishing did not differ statistically in reporting parental control from adolescents having self-reported NDDs classified as non-flourishing, $t(179) = .344, p = .731$, with a small effect size $r = .02$ (see Table 7). This finding indicates that both groups report comparable levels of parental control.

Table 8 presents the results of the multiple regression analysis which was performed to investigate whether conduct problems and emotional problems could significantly predict parental control.

Table 8. *Multiple regression predicting parental control from conduct problems and emotional problems.*

Group	Gender	Variable	<i>B</i>	<i>SE B</i>	β
Non-flourishing	Boys	Conduct problems	-0.09	0.03	-.34*
		Emotional problems	0.02	0.04	.09
	Girls	Conduct problems	-0.01	0.03	-.06
		Emotional problems	-0.02	0.03	-.07
Flourishing	Boys	Conduct problems	-0.02	0.05	-.08
		Emotional problems	0.06	0.04	.23
	Girls	Conduct problems	-0.02	0.04	-.10
		Emotional problems	-0.04	0.04	-.22

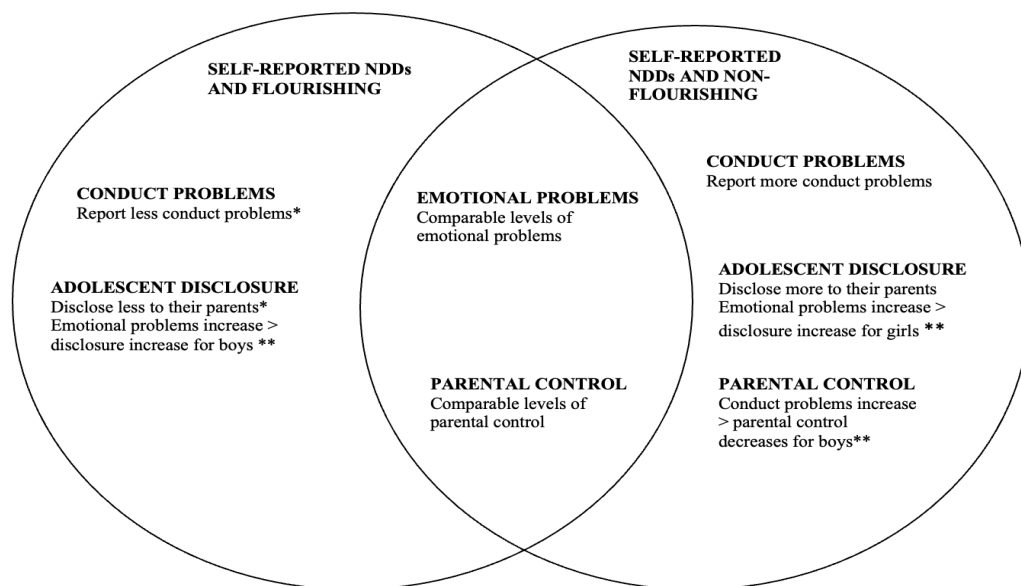
* $p < .05$

The results of the multiple regression indicated that the model explained 2.1% of the variance, but conduct problems and emotional problems were not significant predictors of parental control, $F(2, 180) = 1.96, p > .05$. Although the flourishing and non-flourishing group reported comparable levels of parental control (see Table 7), as shown in Table 8, it was found that when boys and girls in the flourishing and non-flourishing group were compared,

an increase in conduct problems predicted a decrease in parental control for boys in the non-flourishing group ($\beta=-.34, p<.05$).

9 Discussion

The present study aimed to compare adolescents (aged 14-15 years old) having self-reported NDDs who have been classified as flourishing with adolescents having self-reported NDDs who have been classified as non-flourishing concerning rated mental health problems and adolescent perceptions of two sources of parental knowledge: adolescent disclosure and parental control. An overview of the most important results regarding differences and similarities among adolescents having self-reported NDDs classified as flourishing and non-flourishing is provided in *Figure 2*. Concerning adolescents having self-reported NDDs with conduct problems and emotional problems, results indicated that adolescents having self-reported NDDs with few conduct problems report less adolescent disclosure than those adolescents with many conduct problems. No difference concerning parental control was found among the two conduct problems groups and among the two emotional problems groups.



* $p<.001$ and ** $p<.05$

Figure 2. Overview of most important results regarding differences and similarities among adolescents having self-reported NDDs classified as flourishing and non-flourishing

The present study showed that having NDDs and being flourishing as an adolescent is related to reporting less conduct problems. However, having NDDs and being flourishing as an adolescent is not related to reporting less emotional problems, as the flourishing and non-

flourishing group reported comparable levels of emotional problems. This finding is supported by the fact that many adolescents having NDDs also have emotional problems (Narusyte et al., 2017), and emotional problems peak between early and middle adolescence (10-16 years old) (Kapetanovic & Boson, 2020). Therefore, a higher prevalence of emotional problems might be expected, independent of being flourishing or non-flourishing. Concerning the *two continua model* of mental illness and mental health (Westerhof & Keyes, 2009), these results showed that adolescents who have mental health problems can nevertheless be flourishing (Granlund et al., 2021; Westerhof & Keyes, 2009). These results indicate that flourishing might protect more from developing conduct problems or vice versa than emotional problems. However, this might be related to factors within the family atmosphere.

In this study, adolescents having self-reported NDDs who report few conduct problems differ from adolescents having self-reported NDDs who report many conduct problems in reporting less adolescent disclosure. This result contrasts with what has been hypothesized. The finding might indicate that having barely any conduct problems do not give adolescents having self-reported NDDs any reason to disclose to their parents about their behavior outside the home. Concerning parental control, no difference was found between adolescents having self-reported NDDs in the two conduct problem groups and adolescents having self-reported NDDs in the two emotional problem groups. A possible explanation of lack of significant differences in both groups is that adolescents having NDDs are known to be at higher risk of conduct problems and emotional problems (Dewey, 2018; Halvorsen et al., 2019). Although both groups reported comparable levels of parental control, it is not known to what extent parents control their adolescents. It might be that parents of adolescents having self-reported NDDs with few conduct- and emotional problems use an authoritative parenting style by explaining reasons to their limits and rules, allow bidirectional communication, and support their adolescent to make them socially competent (Hart et al., 2003; Sartaj & Aslam, 2010), which contributes to higher levels of adolescents' psychological competence and well-being (Kapetanovic & Boson, 2020). Conversely, parents of adolescents having self-reported NDDs with many conduct- and emotional problems might use an authoritarian parenting style by forcing their adolescent to follow strict rules which cannot be discussed and do not explain the reasoning of the rules (Sartaj & Aslam, 2010), resulting in socially incompetent behavior (Baumrind, 1991). Thus, it seems that a combination of parental control (reasonable rules) and parental support (encouraging to be independent) results in few conduct- and emotional problems in adolescents (Darling & Steinberg, 1993; Finkenauer et al., 2005).

Furthermore, the study revealed that adolescents having self-reported NDDs classified as flourishing differ from non-flourishing adolescents in reporting lower adolescent disclosure, in contrast to what has been hypothesized. This finding might be explained by the fact that adolescents who are flourishing exhibit high levels on emotional well-being (hedonic well-being), such as satisfaction, and on psychological-, and social well-being (eudaimonic well-being), such as self-acceptance (Keyes, 2007). These factors of well-being are closely related to factors of sense of self within the fPRC, and are seen as intrinsic factors in the adolescent (Imms et al., 2017). As these factors can facilitate participation of the adolescent in family relationships, adolescents do not have to disclose much to their parents about what they do outside the home. Findings also indicated that emotional problems make adolescents disclose more to their parents. Also, it must be considered that this measurement measured if adolescents disclose to their parents, not whether they can. To do so however, parents should provide a safe environment within the family context, which are extrinsic factors to the adolescent (Imms et al., 2017; Lyngnegård et al., 2018). Within this safe environment, emotionally close relationships, positive interactions, open communication, and trust between the adolescent and its parents are important for adolescents to voluntarily disclose information (Kapetanovic et al., 2019, 2020; Kerr et al., 1999; Laird et al., 2010). These results indicate that adolescent disclosure is more related to emotional problems than conduct problems.

It was also found that adolescents having self-reported NDDs classified as flourishing did not differ in reporting parental control from adolescents having self-reported NDDs classified as non-flourishing. A possible explanation of the lack of significant differences is that adolescents with self-reported NDDs can experience difficulties with their behavior (Dewey, 2018) and social relationships with their parents (Barkley et al., 1991). As this can negatively influence their activity competence (Imms et al., 2017) in communicating and developing meaningful relationships with their parents, parents will control their adolescent's whereabouts and activities more. However, it should be addressed that there might have been a significant difference if flourishing was compared to languishing, and not to the combined group of moderate mental health and languishing.

Lastly, gender differences will be discussed. Results showed that boys reported less conduct problems than girls. This finding is in line with a study performed by García-Moya et al. (2019), stating that conduct problems tend to slightly decrease in boys and increase in girls during adolescence. Findings also indicated that boys having self-reported NDDs reported higher adolescent disclosure than girls having self-reported NDDs. However, concerning being flourishing or non-flourishing as an adolescent having self-reported NDDs it was

shown that when emotional problems increase, adolescent disclosure increase for girls having self-reported NDDs in the non-flourishing group, and for boys having self-reported NDDs in the flourishing group. It might be that girls tend to disclose more when they are non-flourishing as they may have more negative thoughts and worries, and internalize more emotional problems than boys (Kökönyei et al., 2015) which they want to share with their parents. For boys it might be that although they experience problems in their hedonic well-being (Keyes, 2007), they nevertheless flourish (Granlund et al., 2021; Westerhof & Keyes, 2009), meaning they feel well enough to disclose to their parents. Furthermore, findings indicated that when conduct problems increase, parental control decreases for boys having self-reported NDDs in the non-flourishing group. There is a continuum of chronicity for problems in social behavior in boys having NDDs (Copeland et al., 2013; Will & Wilson, 2014), and increases in conduct problems can raise parents' tolerance of deviant behavior, which results in decreased parental control (Bell & Chapman, 1986). Being non-flourishing as a boy having NDDs might worsen the problems in social behavior they face in the relationship with their parents due to low levels of eudaimonic well-being (Keyes, 1998; Ryff & Keyes, 1995). This can also negatively affect their parents mental health (Moller et al., 2009) as well-being and participation in family relationships should be considered as a bidirectional process (Granlund et al., 2021; Parasuraman et al., 1996). Consequently, their parents may become less controlling and supportive.

9.1 Limitations and future research

The findings of the present study should be interpreted by considering several limitations that are worth noting.

Due to too few participants in the languishing group to make comparisons, moderate mental health and languishing were aggregated into one group. As this compressed the data, it was not possible to make comparisons between moderate mental health and languishing, between flourishing and moderate mental health, and between flourishing and languishing. Consequently, the mean was pushed more towards the flourishing group, and the results for the languishing group might have been different when languishing was not combined with moderate mental health (non-flourishing group). Also, due to an implemented cross-sectional study design, it is important to consider that the processes the present study focused on, such as mental health state, conduct- and emotional problems, adolescent disclosure, and parental control, were analyzed as static rather than dynamic transactions, and could therefore not be

assessed properly. Future research concerning this topic might consider a larger sample for the languishing group to compare flourishing, moderate mental health, and languishing. Using a longitudinal study design in future research concerning this topic allows identifying differences between time points, which can indicate cause-effect relationships and factors that depend on each other (Kazdin, 2002).

As participants in the present study were 14-15 years old having self-reported NDDs and were recruited from four specific cities in the south of Sweden, results cannot be generalized to these adolescents' total population in Sweden or worldwide. In addition, results are not generalizable to all adolescents as the adolescents in the present study fall within *middle* adolescence (14-16 years old). Thus, results may differ for adolescents who fall within *early* adolescence (10-13 years old) or *late* adolescence (17-19 years old). Questionnaires were adapted for participants with cognitive disabilities, intellectual impairments, or writing problems. It might be that these adaptations were not enough for some adolescents having self-reported NDDs to participate in the LoRDIA study, which also make the results not generalizable to these adolescents' total population in Sweden or worldwide.

Lastly, the present study showed that parental control is more related to conduct problems. However, reasons for this result were not found due to the kind of measurements used to investigate families in the present study. As the family context is important for the development of the adolescent's outcomes, more information on family functioning is needed, such as the type of parenting style (Sartaj & Aslam, 2010) together with levels of parental warmth, parental support, and the quality of emotionally close relationships between the adolescent and their mother and the adolescent and their father (Baumrind, 1991; Finkenauer et al., 2005; Kapetanovic et al., 2019). Future research may consider including measurements that focus on family functioning to get a complete picture of how various aspects of family functioning affect mental health and mental health problems of adolescents having self-reported NDDs and sources of parental knowledge. This can be achieved by implementing the Swedish Family Climate Scale, which is a measurement where adolescents can report their family functioning and climate in relation to their health and health behavior (Hanson, 1989).

9.2 Practical implications

Despite several limitations, the results of the present study do support that there are some differences among the mental health state of adolescents having self-reporting NDDs and

their mental health problems, adolescent disclosure, and parental control. As the environment in which adolescents grow up affects their developmental outcomes, researchers may consider examining what factors in the environment of adolescents having self-reported NDDs are related to being flourishing or languishing. Policy makers in health organizations, parents of adolescents having self-reported NDDs, and adolescents having self-reported NDDs themselves can work together to develop interventions aiming at promoting the adolescent's participation in family relationships.

10 Conclusion

The present study's findings suggest that the family context is important for developing adolescents' outcomes. Flourishing is related to having fewer conduct problems in adolescents with self-reported NDDs, but emotional problems are the same for adolescents having self-reported NDDs classified as flourishing or non-flourishing. Flourishing is also related to lower adolescent disclosure in adolescents having self-reported NDDs classified as flourishing than those classified as non-flourishing, while parental control was the same for both groups. For adolescents having self-reported NDDs classified as flourishing or non-flourishing, adolescent disclosure and parental control are related to family interaction patterns within the environment of the family context. However, the relationships are different as emotional problems seem positively related to adolescent disclosure, while conduct problems appear to be negatively related to parental control within parent-adolescent interactions. Having authoritative parents or authoritarian parents may be crucial in having few or many conduct problems and emotional problems. Thus, the findings indicate that adolescent disclosure plays a prominent role in relation to adolescents' mental health, mental health problems, and parent-adolescent interaction patterns. Contrary, parental control plays a prominent role in relation to mental health problems and parent-adolescent interaction patterns. As the present study aggregated moderate mental health and languishing into one group due to too few participants in the languishing group, it is questionable if results would show the same when comparing adolescents having self-reported NDDs classified as flourishing to those classified as languishing. Future research needs to focus on how and what aspects of family functioning are related to being flourishing or languishing as an adolescent having self-reported NDDs, their mental health problems, and sources of parental knowledge.

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