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Big Questions: The Relation of Cognitive Profile to Sense of Meaning in Life, Self-Compassion, and Subjective Well-Being Among Highly Intelligent Youth

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Big Questions: The Relation of Cognitive Profile to Sense of Meaning in Life,

Self-Compassion, and Subjective Well-Being Among Highly Intelligent Youth

by

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Abstract

Cognitive characteristics may leave highly intelligent youth at higher risk of internalizing symptoms, problems in social functioning, or low subjective well-being. This study utilized archival psychoeducational assessment data to compare verbal-fluid intelligence discrepancy with social-emotional self- and parent-report scores in children and adolescents identified as highly intelligent. Results indicated that social stress is associated with verbal-fluid intelligence discrepancy while internalizing symptoms are not. Neither gender nor age was found to influence these relationships significantly. Questionnaire data were collected from a subsample of participants to compare intelligence with measures of self-compassion and meaningfulness in life. When gender and current difficulties (e.g., emotional symptoms, peer problems) were controlled for, intelligence was found to be associated with self-compassion, search for meaning in life, and discrepancy between search for meaning and presence of meaning in life. Female adolescents responded with a significantly greater discrepancy between search for meaning and presence of meaning than did males. These results suggest that cognitive characteristics are associated with social functioning and meaningfulness in highly intelligent youth and that highly intelligent female adolescents may be at particular risk of experiencing a crisis of meaning. Results may help to inform education practice, psychoeducational assessment procedures, and social-emotional intervention for highly intelligent youth.

Keywords: intelligence, adolescents, social stress, self-compassion, meaning in life, gender differences

Preface

This thesis is the original, unpublished, independent work by the author, J. Boey. The experiments reported in Chapters 3-5 were covered by Ethics Certificate number 21-1015, issued by the University of Calgary's Conjoint Faculties Research Ethics Board for the project "Big Questions: The Relation of Cognitive Profile to Sense of Meaning in Life, Self-Compassion, and Subjective Well-being Among Highly Intelligent Youth" on September 7, 2021.

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Chapter One: Introduction

Adolescence can be an exciting time of increasing independence and exploration. It can also be a time of difficult physical, emotional, social, and cognitive changes. For highly intelligent adolescents, this period may be fraught with additional challenges that others might not have to face. Having large discrepancies between their abilities, or abilities that do not match up with their peers, may combine with a natural sensitivity to emotions and sensations to contribute to social-emotional challenges. This study examines these possible challenges in two ways. First, the differences between two types of intelligence, verbal and fluid, are explored as they relate to social-emotional difficulties in highly intelligent youth. Then, measures of well-being are analyzed in a subsample of these youth.

Highly intelligent individuals have cognitive abilities at the high end of the intelligence spectrum and mentally develop at different rates than their peers. Asynchronous development is a misalignment between chronological, social, and/or mental age, often making socializing more difficult for highly intelligent youth (Cross & Cross, 2015; Guénolé et al., 2015; Kristensen & Torgersen, 2008). Although abilities such as attention, logical thinking, and language develop faster in highly intelligent children, other abilities appear to develop at typical rates (Bucaille et al., 2021). Highly intelligent children experience accelerated intellectual development but develop socially and physically at typical rates, and may have difficulties connecting with their peers due to differences in interests or ways of communicating. Perceived differences can contribute to a child being rejected or bullied (Allen, 2017). Children out of sync with typical milestones are at increased risk of social-emotional difficulties because of the way this early development interacts with the child's cultural and social context. For example, highly intelligent children tend to develop self-awareness and self-criticism earlier than expected (Vaivre-Douret,

2011). This may not be noticed or acknowledged by adults supportively, leading to negative socialization outcomes (e.g., diminished self-esteem, or internalizing symptoms such as depression or anxiety).

Given this research in child populations, highly intelligent adolescents may thus be at a higher risk of social and emotional misalignment leading to stress, anxiety, depression, exclusion, difficulty making friends, or a preference for socializing with older people. Specifically, those with very advanced verbal skills relative to their peers may present differently and experience more social isolation and self-criticism. Higher levels of negative self-talk and rumination could also contribute to difficulties, as research has identified a link between relatively high verbal skills and anxiety in highly intelligent youth (Guénolé et al., 2015; Kermarrec et al., 2020). Alternatively, highly intelligent adolescents with relatively low verbal abilities may also experience internalizing symptoms due to lower communication skills or over-analysis of social interactions.

Highly intelligent adolescents have been found to display a natural tendency toward sensitivity to rejection that may exacerbate social-emotional difficulty (Matta et al., 2019). It is typical for highly intelligent children to exhibit sensitivities, which predispose them to internalizing issues (Dabrowski, 1964; Karpinski et al., 2018; Kitano, 1990). Five types of sensitivity—intellectual, emotional, sensory, psychomotor, and imaginational—are so prevalent in highly intelligent youth that researchers have developed measures of sensitivities to aid in identification of high intelligence (Bouchard, 2004).

Researchers continue to hotly debate whether intellectual giftedness is associated with psychopathology (Francis et al., 2016; Tasca et al., 2022). While the evidence does not necessarily support differential outcomes for highly intelligent children, numerous studies have

found that they exhibit unique risk factors for some social-emotional vulnerabilities, such as asynchronous development, sensitivities, perfectionism, high pressure to succeed, boredom, and underachievement (Blaas, 2014; Cross & Cross, 2015; Dabrowski, 1964; Francis et al., 2016; Neihart, 1999; Preckel et al., 2010). Highly intelligent people may also be more likely to die by suicide (Voracek, 2006). Paradoxically, despite their higher achievement on average, highly intelligent teens are also more likely to drop out of school or severely underachieve (Davis, 2011; Matthews, 2009). This implies that they are a heterogeneous and diverse population. Researchers are trying to piece apart why some highly intelligent children seem to succeed with ease, while others seem to face exceptional difficulty.

Through examination of the literature, it appears likely that discrepancies in cognitive profiles may help to explain variance in the social-emotional functioning of highly intelligent youth. Specifically, a disagreement between verbal and fluid intelligence may be associated with internalizing symptoms and/or social functioning problems (Guénolé et al., 2015; Kermarrec et al., 2020). There also appears to be a connection between intelligence and subjective well-being. Researchers have begun to elucidate the way in which intelligence is related to well-being, with evidence suggesting that self-compassion and meaningfulness may be of particular importance to the well-being of highly intelligent individuals (Pollet & Schnell, 2017; Vötter, 2019).

Significance of the Study

Highly intelligent children with relatively high verbal abilities and/or relatively low fluid reasoning abilities may be more likely to experience internalizing symptoms (Guénolé et al., 2015; Kermarrec et al., 2020), but no studies have explored whether verbal-fluid intelligence discrepancy relates to depression, anxiety, and social functioning. Research in adults has found associations between intelligence, self-compassion, and meaningfulness (Pollet & Schnell,

2017), but these variables have not been explored in highly intelligent youth. The It is important for school psychologists, educators, and caregivers to better understand how certain characteristics may leave highly intelligent children more vulnerable to anxiety, depression, social struggles, feelings of meaninglessness, and low self-compassion. In knowing about risks, school psychologists can understand these children better during assessments and support them more effectively in achieving academic success. Through a series of quantitative analyses, the current study will explore the relationship between cognitive profile and subjective well-being in highly intelligent Canadian youth. First, the relationship between verbal-fluid intelligence discrepancy as it relates to social-emotional functioning will be explored. Then, the relationship between intelligence and two measures of subjective well-being (meaningfulness and self-compassion) will be examined.

Overview of the Thesis

Following this introduction, Chapter Two provides an overview of peer-reviewed scientific literature about high intelligence as it relates to cognitive profile, social-emotional functioning, and subjective well-being (specifically, meaningfulness and self-compassion). Chapter Three provides details about the current study's design and method, including participants, measures, and procedures. Chapter Four presents the results of the study and explains how the data were analyzed. Finally, Chapter Five offers a discussion and interpretation of the findings, along with strengths and limitations. Suggestions for future research are offered. A list of definitions of terms frequently used throughout this thesis is presented in Appendix A.

Chapter Two: Literature Review

The following literature review is guided by the premise that highly intelligent children with discrepancies in their cognitive profile may be at greater risk of experiencing low subjective well-being. This review explores extant literature to overview the nature of social-emotional functioning in highly intelligent youth with differential cognitive abilities. First, it inquires into best practices in identifying and labelling highly intelligent individuals. Next, cognitive profile analysis is investigated, in particular, verbal-fluid discrepancy as it relates to internalizing symptoms and social functioning. Finally, an overview of studies on internalizing symptoms, social functioning difficulties, sense of meaning, and self-compassion in highly intelligent youth contextualizes the research questions.

Identifying and Labelling High Intelligence

High intelligence is synonymous with terms such as high intellectual potential (Kermarrec et al., 2020; Vaivre-Douret, 2011), high-ability (Mammadov, 2019; Pfeiffer, 2015), intellectually precocious (Terrassier, 2005), and high-IQ (Peyre et al., 2016). Those in the highest bracket of intellectual functioning have traditionally been referred to by educators and researchers as intellectually "gifted," although there exists no agreed-upon cut-off percentile at which a person is labelled gifted, nor is there consensus about what gifted means, and so the literature is mired with controversy (Pfeiffer, 2003; Pfeiffer, 2015). Giftedness is not possible to operationally define, as it is a social construct that depends on numerous contextual variables, including culture and educational norms (Borland, 2021; Gentry, 2021; Olenchak, 2022). So, if giftedness is high intelligence, then individuals must be compared with a normative group that describes typical intelligence; but what is typical may change over time and vary by location and group. Thus, to be accepted as empirically accurate, cognitive measures tend to be normed by

locale, gender, and age, and are updated regularly (Sattler, 2018). It follows that who is "gifted" and who is not also varies according to social and historical context.

In addition to definitional difficulties, many researchers are discouraging use of the term "gifted." The term may enforce negative stereotypes of inequitable treatment, creating barriers for children of any intelligence level (Gentry, 2021; Meyer & Plucker, 2022). It also implies a fixed positive state, failing to acknowledge the contextual and complex nature of intelligence and the challenges that often come with it (Meyer & Plucker, 2022). Gentry (2021) argues that "gifted" carries implications of natural-born privilege with underpinnings of racial inequity, as visible minorities tend to be under-identified due to socioeconomic disparities and lower assessment access. He draws a parallel to the rejection of the "r-word" in education as the field moved toward more ethically neutral language to describe diversity. Olenchak (2022) questions the utility of "gifted," suggesting we consider favouring descriptions of high ability that avoid misinterpretation. He also acknowledges the ubiquity of the concept, cautioning against disposing of a recognizable term when an alternative is not presently available. Meyer and Plucker (2022) suggest labelling programming rather than students but do not offer alternative language. Experts tend to agree that the terminology is outdated, but there are no preferred substitutes at this time (Gentry, 2021; Olenchak, 2022).

The current study utilizes the term "highly intelligent" as a term that more effectively avoids enforcing stereotypes and more neutrally and contextually describes the population in question: individuals with relatively high scores on cognitive measures. This appears to be the term of choice in recent studies exploring the psychological functioning of youth with high intelligence quotient (IQ) scores (Gómez-Pérez & Calero, 2022; Kontakou et al., 2022; Rommelse et al., 2018; Tasca et al., 2022). "Highly intelligent" is inclusive of individuals who

may fall short of meeting strict giftedness criteria (i.e., IQ ≥ 130), and includes those who have not been assessed, or who demonstrate just one high cognitive ability (e.g., verbal but not fluid intelligence). The present author recognizes the contentious study of giftedness and uses the term "highly intelligent" throughout the thesis acknowledging that operationalizing this term has and remains to be a constant source of vigorous debate in the literature. Some of that debate is described in the literature review below.

Psychologists traditionally measure intelligence with standardized, norm-referenced tests (e.g., the Wechsler scales). Individuals who score well above mean performance for their age may be labelled as highly intelligent. Conventionally, researchers use the definition of giftedness as an IQ ≥ 130, or approximately the top 2.5% of ability (Newman, 2008). The exclusivity of IQ-only criteria means that assessment can theoretically identify high intelligence regardless of communication/motor ability, achievement, language spoken, psychiatric symptomology, or other barriers to conventional assessment (Gilman et al., 2013; Lohman, 2005). Critics argue that any cross-sectional (i.e., a single IQ test) or nationally normed measure may still under-identify highly intelligent students, and that repeated/multiple measures and local norms would provide a more accurate representation of an individual's functioning within their context (Pfeiffer, 2015). Neither local norms nor repeated testing are generally accessible due to the high associated costs, though. Wechsler scales have also faced criticism for decades for inherent bias against diverse populations (Graves et al., 2020; Mishra, 1983). Furthermore, clinical judgement plays a key role in the interpretation of cognitive assessment results, with cut-off scores used as more of a guideline than a strict rule (Pfeiffer, 2015). In fact, the average IQ in "gifted" programs has been measured at 115, suggesting that selection tends to utilize more broad cognitive criteria than overall IQ, for instance, a single high index score (Bracken, 2012).

Despite the general acceptance of the conventional approach to identifying high intelligence, a considerable proportion of studies use more inclusive definitions, such as IQ ≥ 115 or 120 (Francis et al., 2016; Gagné, 2005; Silver & Clampit, 1990). Adolescents are often deemed to be highly intelligent for research purposes if they score ≥ 120 on a single subtest (Silverman, 2018; Wellisch et al., 2011). Statistically, there is a high probability that a student who achieves a 125 may score 130 or 120 upon retesting. This assertion, which utilizes the standard error of measurement, implies that a strict cut-off of 130 may fail to identify individuals as highly intelligent, unfairly disqualifying them from programming (Francis et al., 2016; Thompson & Morris, 2018).

Failure to identify a child as highly intelligent may also lead to oversight of many social-emotional concerns that are described in this review (Eren et al., 2018). In the research realm, investigating only those with an IQ ≥ 130 limits the generalizability of results to a small portion of the population (2.5%). An IQ score of 115 is argued to be an adequate criterion for high intelligence in numerous psychological studies (Cross, 2013; MacCabe et al., 2012; Pfeiffer & Yaacov, 2008). This literature review includes studies that use the conventional definition of giftedness (IQ ≥ 130), as well as more inclusive score ranges (e.g., any index score ≥ 120; IQ ≥ 115) to improve generalizability and more broadly assess the available literature.

Cognitive Profile Analysis of Highly Intelligent Youth

Both in research and psychoeducational practice, the most popular family of measures to used to identify high intelligence in adolescents are the Wechsler scales (Pfeiffer, 2015). These and other contemporary measures follow the premises of the Cattell-Horn-Carroll (CHC) theory of intelligence (McGill et al., 2018; Pfeiffer, 2015). CHC theory posits that the intelligence of an individual can be summarized with a broad overarching factor known as *g*, and broken down into

multiple narrow abilities, such as acquired knowledge, reasoning, and visual processing (Sattler, 2018). Factor analysts posit that *g* underlies several sub-abilities that contribute to all other cognitive abilities, which can only be measured indirectly and imperfectly (Farmer et al., 2014). Thus, whenever a test is used to identify high intelligence, there is a risk of over- or under-representing the individual's actual *g* level. The ability of modern intelligence tests to measure *g* is thought to be quite good and remains the most accepted way to identify high intelligence when compared with other measures, like achievement (Farmer et al., 2014).

The Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V) is a commonly used measure for identifying high intelligence in children (National Association for Gifted Children, 2018), and is utilized in the current study. The WISC-V contains five primary index scales: the Verbal Comprehension Index (VCI), the Fluid Reasoning Index (FRI), the Visual Spatial Index, the Working Memory Index, and the Processing Speed Index (Wechsler, 2014). On the WISC-V, *g* is intended to be represented by the Full-Scale Intelligence Quotient (FSIQ) and the sub-abilities are captured by the five primary index scales (Sattler, 2018). In the fourth edition of the WISC, the VSI and FRI were one single index, the Perceptual Reasoning Index (PRI) (Wechsler, 2003). In recent years, researchers have advocated for the use of any single WISC-V index scale to identify a child as highly intelligent, rather than only the FSIQ (Silverman & Gilman, 2020).

Besides the WISC-V, other measures used to identify high intelligence in children include the Woodcock-Johnson IV Tests of Cognitive Abilities, Fourth Edition (WJ-COG-IV; Mather & Wendling, 2014), the Stanford-Binet Intelligence Scales, Fifth Edition (SB5; Roid, 2003), and the Differential Ability Scales, Second Edition (DAS-II; Elliot, 2007; Pfeiffer, 2015). Like the WISC-V, these three cognitive measures offer scores representing estimates of a child's

fluid and verbal intelligence and are considered by experts to have high validity and reliability as tools for identifying high intelligence (Pfeiffer & Yarnell, 2016). Despite the overlap between the constructs measured by the WISC-V and other cognitive measures, there is no extant research that has explored verbal-fluid discrepancy in relation to internalizing symptomology, social functioning, nor highly intelligent youth using the WJ-IV-COG, SB5, nor DAS-II.

Among scholars and practitioners, it is generally accepted that either the WISC-V FSIQ or the General Ability Index (GAI) can be used to identify high intelligence (National Association for Gifted Children, 2018; Rowe et al., 2010; Silverman, 2009). While the FSIQ is a broad measure of functioning, the GAI is a composite score that only includes data from three ability areas: verbal comprehension, fluid reasoning, and visual-spatial (Wechsler, 2014). GAI is not influenced by processing speed or working memory abilities, both of which tend to be more variable in highly intelligent students, i.e., closer to average (Bucaille et al., 2022; Gilman et al., 2018). Both the Working Memory Index and Processing Speed Index are also less statistically associated with g than the three abilities (Meyer & Reynolds, 2017).

In the current study, a score of 120 on a single WISC-V index scale, or an overall IQ of 115 (FSIQ or GAI), is considered sufficient evidence of high intelligence (Cross, 2013; MacCabe et al., 2012; Pfeiffer & Yaacov, 2008). These criteria combine both selection strategies for high intelligence used in many previous studies: overall IQ and specific ability areas.

Verbal-Fluid Discrepancy

Considering the variety of cognitive measures one can employ to estimate intelligence at a given time, researchers and practitioners can compare different factors (e.g., VCI and FRI) with overall ability (e.g., g as measured by FSIQ or GAI) or any other psychological or demographic variable (e.g., anxiety, age). Comparing scores in this way is called "cognitive profile analysis"

(McGill et al., 2018). The quantitative difference between measured abilities on a standardized test is known as a "discrepancy score" (Seashore, 1951).

Although different versions and translations of cognitive measures have been used over the years, numerous research teams have explored discrepancy scores in highly intelligent individuals between two broad categories of intelligence: verbal and performance. Verbal intelligence, which is measured on conventional Wechsler tests as with the VCI, refers to the formation and manipulation of verbal concepts and includes acquired knowledge (Wechsler, 2014). Researchers refer to this ability using different terminologies according to the common usage at the time of publication (e.g., Verbal IQ, verbal comprehension, crystalized intelligence). Alternatively, "performance" is the ability to find solutions to novel problems and includes the use of one's senses and reasoning to structure thought and action. Researchers have used the terms such as fluid reasoning, Performance IQ, and perceptual reasoning in place of performance when comparing it with verbal intelligence, again reflecting convention and factor structure of the specific WISC versions used (Guénolé et al., 2015; Kermarrec et al., 2020; Sweetland et al., 2006). For clarity, these two abilities will be referred to as verbal and fluid intelligence in the literature review below as these are the terms currently used.

Social-Emotional Difficulties in Highly Intelligent Youth

This study examines internalizing symptoms and social functioning in highly intelligent youth. There continues to be no consensus among experts about whether highly intelligent youth experience social-emotional difficulties at rates any different from the general population (Cross & Anderson, 2016; Eren et al., 2018; Tasca et al., 2022). Internalizing symptoms and social functioning problems are examined in-depth in the following sections.

Internalizing Symptoms

One systematic review found that most (i.e., 12) prior studies concluded that highly intelligent youth experience internalizing symptoms at lower rates than the general population (Francis et al., 2016). The other studies reviewed reported mixed or contrary findings. For instance, Guignard et al. (2012) found a complex relationship between anxiety and perfectionism in highly intelligent children. Messier and Ward (1998) found that highly intelligent adolescents in detention centers are more susceptible to depression than peers. Merrell and Gill (1994) found that, although most highly intelligent children adapted easily to life's challenges, some experience extreme emotional difficulty, a result that replicated earlier findings (Andreasen & Canter, 1974). Francis et al. (2016) urge future work to inquire into what makes life harder for this subset, and what role intelligence plays.

Francis et al. (2016) qualified that each of the studies they reviewed exhibited selection bias. They recommend the examination of more representative and diverse samples, individually administered cognitive assessments, and longitudinal designs. Of note, one study presented evidence of highly intelligent youth masking severe emotional distress due to shame and frustration at not being able to resolve their situation (Jackson & Peterson, 2003). Methodology in quantitative studies examining depression in highly intelligent youth is particularly important due to the commonality of masking (Jackson & Peterson, 2003). Further illustrating the masking of internalizing symptoms, one study found that although teachers rate highly intelligent students as better adjusted than peers, the youth themselves report more sadness and lower satisfaction with their social lives (Vialle et al., 2007).

Since the Francis et al. (2016) review, researchers have continued to explore internalizing symptoms in highly intelligent youth. A more recent review was not able to draw conclusions

about internalizing symptoms of highly intelligent youth as a homogeneous group (Tasca et al.,

2022). Peyre et al. (2016) found that highly intelligent preschoolers are more likely to appear

worried or have many worries, although the researchers did not find any other notable

associations. Yazid et al. (2019) explored correlations between intelligence and internalizing

symptoms with no statistically significant findings, although they suggest that future research

include additional contributing factors in analyses. The relationships between IQ and emotional

difficulties, if they exist at all, are complex. The current study aims to explore whether cognitive

discrepancy may partly explain why most highly intelligent youth are at lower risk of

internalizing symptoms, yet some appear to be at much higher risk.

Social Functioning

Most studies agree that highly intelligent youth experience fewer problems in social

functioning than their peers (Çitil, et al., 2020; Eklund et al., 2015; França-Freitas et al., 2014;

Lee et al., 2012; Merrell & Gill, 1994). Despite these findings, many researchers theorize that

asynchronous development puts highly intelligent adolescents at risk of misalignment of social

skills with cognitive ability, feelings of not fitting in, and having interests that do not match up

with peers' (Farrent & Grant, 2005; Manaster & Powell, 1983; Robinson, 2008; Roedell, 1986).

When examining narrower variables, evidence becomes mixed. For example, França-Freitas et

al. (2014) found that although highly intelligent youth seem to possess a higher range of social

skills overall, they may demonstrate a deficiency in empathic skills. Highly intelligent children

also tend to have a lower self-perception of their overall social functioning than typical children

(Eren et al., 2018).

Although there is general consensus about the social functioning of highly intelligent

youth, the studies described in this review carry methodological issues. Firstly, most conclusions

on social functioning are based on teacher- or parent-ratings (Çitil, et al., 2020; Eklund et al., 2015; Merrell & Gill, 1994) and may underrepresent subjective social functioning due to youths' masking efforts (Coleman & Cross, 1988; Cross et al., 1991; Jackson & Peterson, 2003; Vialle et al., 2007). Peer ratings may also produce different results: One study collected social status ratings via categorization (i.e., popular, rejected, or neglected), and highly intelligent girls were rated by their peers as the least popular group (Luftig & Nichols, 1990). Secondly, one study excluded children with a comorbid psychoeducational diagnosis (e.g., attention-deficit/hyperactivity disorder [ADHD], autism spectrum disorder; Çitil et al., 2020) which may partly explain the higher social functioning of their sample. Finally, two studies sampled children with high academic achievement as evidence of high intelligence (Lee et al., 2012; Merrell & Gill, 1994) thus excluding highly intelligent underachieving children. This is empirically problematic because underachievement is strongly associated with social-emotional difficulties in highly intelligent youth (Blaas, 2014). The current study seeks to address these three methodological issues by utilizing self-reports along with parent measures, and including individuals with a secondary diagnosis and/or who are underachieving academically.

Verbal-Fluid Discrepancy and Social-Emotional Functioning

Although there exists a plethora of research about the social-emotional functioning of highly intelligent youth (Allen et al., 2017; Eren et al., 2018; Francis et al., 2016; Peyre et al., 2016), few researchers have explored verbal-fluid discrepancy as it relates to social-emotional functioning, and fewer specifically examine highly intelligent individuals. As early as the 1950s, scholars considered cognitive discrepancy score analysis to better understand children's cognitive development, but these studies focus on demographic variables such as age, race,

socioeconomic status, and parental occupation, finding no significant differences between groups (Kaufman, 1976; Seashore, 1951).

Guénolé et al. (2015) examined verbal-fluid discrepancy among highly intelligent children referred for social-emotional difficulties or underachievement. They grouped participants based on whether or not they had a large discrepancy (i.e., ≥ 15 points between VCI and PRI) or a more homogenous cognitive profile (i.e., < 15 points). Those with a large discrepancy experienced lower rates of social preoccupation anxiety but higher rates of emotional dysregulation. Notably, the researchers did not differentiate between VCI and PRI as to which index score was higher. The current study utilizes relative difference, not the absolute value of the difference, to consider the direction of the discrepancy score, although absolute values are also presented for descriptive purposes.

Kermarrec et al. (2020) examined VCI and PRI scores in highly intelligent children and adolescents with controls using the WISC-IV French (Wechsler, 2005). The researchers examined whether abilities were related to anxiety symptomology. Those with high verbal scores (VCI ≥ 130) were found to have higher levels of anxiety, and those with high fluid scores (PRI ≥ 130) had lower levels. Within their sample, FSIQ itself was not associated with anxiety. Their research suggests that high verbal intelligence may be a risk factor for anxiety in highly intelligent youth, while high fluid reasoning may serve as a protective factor. They did not, however, compare the two index scores with each other to explore whether the discrepancy is associated with anxiety. The current study will aim to fill this gap by comparing verbal-fluid discrepancy with measures of social-emotional difficulties in highly intelligent youth.

More recently, Shevchenko et al. (2022) published a preprint on their study examining verbal-fluid discrepancy as it correlates with psychopathology in two large longitudinal cohorts

of 5- and 11-year-old children using scores from the Wechsler Preschool and Primary Scale of Intelligence, Third Edition, French (WPPSI-III; Wechsler, 2004). They examined whether verbal-fluid discrepancy is associated with internalizing symptoms in children of the full IQ range. They looked at both the magnitude of the verbal-fluid discrepancy (i.e., absolute value of the difference) and the relative difference (i.e., verbal IQ minus performance IQ). They found small relations between IQ and internalizing variables, but no association with discrepancy scores. They note that their evidence is contrary to Guénolé et al.'s (2015) findings, which focused on highly intelligent youth; however, they acknowledged that IQ was not tested in a standardized fashion, resulting in potentially inaccurate scores. Only two participants were identified as highly intelligent. Shevchenko et al. (2022) note that insufficient statistical power may be why none of their comparisons were significant after Bonferroni corrections to significance level ($p < 0.0011$).

A primary shortfall of prior research on verbal-fluid discrepancy may be that most studies the use dated Wechsler scales (e.g., WPPSI-III, WISC-R, WISC-III, WISC-IV) which measure fluid reasoning as part of the PRI rather than its own factor (i.e., FRI) as is the case in the WISC-V (Wechsler, 2014). Thus, the comparison between VCI and PRI may attenuate the relative difference between fluid and verbal abilities, resulting in much smaller effect sizes that may not be detected even with adequate statistical power. The current study utilizes the discrepancy score between the VCI and the FRI, providing purer comparisons between verbal and fluid intelligence.

No research has specifically inquired into verbal-fluid discrepancy as it relates to social functioning, although one study found that children with exceptional math ability are more likely to show impairment in social strategizing and mentalization of peers' feelings, and experience

more social isolation (Yun et al., 2011). Although math ability is predicted by fluid reasoning (Green et al., 2017), Yun et al. (2011) did not measure verbal ability, so verbal-fluid discrepancy was not examined. Peairs (2011) found that although most highly intelligent adolescents have higher social status, a subgroup experienced more peer rejection and that within this group, rejection was more harmful. The highly intelligent rejected children had fewer friendships than other rejected children. Profile analysis revealed that this group had higher verbal and reading scores, but the researcher did not inquire further into this phenomenon. Peairs did, however, speculate that verbally intelligent youth may be less practically able to mask their intelligence than those with high math ability, which is easier to hide.

Subjective Well-Being in Highly Intelligent Youth

Subjective well-being is a broad term that is used in the scientific literature to operationally define the evaluation of one's own experience of their well-being, as opposed to the use of more vague concepts, such as happiness or life satisfaction. According to seminal work on the topic by Diener and Ryan (2009), subjective well-being encompasses experiences such as sense of meaning, interest, health, emotions (e.g., joy, sadness), satisfaction/dissatisfaction with life, social relationships, and work, to name a few. Individual components of well-being, and well-being as a summative measure, can be quantified along a continuum of positive and negative (or low vs. high). Well-being is an entirely subjective phenomenon and is quantified by self-report measures (Diener & Ryan, 2009; Zeidner, 2017).

Research on subjective well-being has burgeoned in recent years, identifying strong associations with temperament, income, social relationship quality, health, creativity, and performance in work (Diener et al., 2018). Subjective well-being is thus not necessarily the absence of psychopathology, as a person could experience mental illness along with high self-

ratings of well-being, and vice-versa. Subjective well-being is explored in the current study through measures of self-compassion and meaningfulness.

Subjective well-being is related to age, resilience, generativity, and personality in highly intelligent adults (Dijkstra et al., 2012; Katanani, 2020; Pollet & Schnell, 2017; Vötter, 2019). Katanani (2020) explored subjective well-being in highly intelligent adults of different ages, finding that their oldest group (ages 36 to 40) enjoyed greater well-being compared to their youngest group (ages 26 to 30). This finding may be of limited utility, however, as the difference between groups was small. Males in the general population report slightly higher levels of subjective well-being than do females (Del Mar Salinas-Jiménez, 2013; Wirthwein & Rost, 2011). Researchers have also examined religiosity, income, work, friendships, positive/negative affect, and health as related to subjective well-being in highly intelligent adults, but no significant associations were found (Katanani, 2020; Wirthwein & Rost, 2011).

Factors related to subjective well-being in highly intelligent people are complex. For instance, the relationship between subjective well-being and meaningfulness in intelligent adults is mediated by resilience (Vötter, 2019; i.e., the ability to cope with adversity as measured by the Resilience Scale; Wagnild & Young, 1993). The trajectory toward well-being is different in academically high achievers, where self-control serves as a mediator but not resilience (Vötter, 2019). This suggests that highly intelligent young people may pursue a different path toward well-being than others.

Pollet and Schnell (2017) explored multiple predictors of subjective well-being in highly intelligent adults: demographics (i.e., age, gender, family status, and children), self-compassion, sources of meaning, school experiences, work experiences, and generativity (i.e., the desire to contribute to the well-being of the next generation). Of these, self-compassion emerged as the

largest predictor of subjective well-being. Participants also completed a brief measure of cognitive ability, finding that highly intelligent adults demonstrated higher fluid intelligence than the high-achieving group. The researchers posited that cognitive discrepancy may be a causal factor contributing to the variance observed between groups, but did not pursue further inquiry in this area. One longitudinal study compared highly intelligent adults (IQ M = 136) with adults of average intelligence (IQ M = 103), finding no difference between groups in subjective well-being (Wirthwein & Rost, 2011).

Research on subjective well-being in highly intelligent youth is limited, focusing on self-esteem/self-concept. Self-concept in highly intelligent youth has been of interest to researchers since the 1970s. Evidence has been so inconclusive, however, that the relationship between self-concept and intelligence in youth is still a mystery (Neihart, 1999). More recently, Kroesbergen et al. (2016) found that highly intelligent children in primary school report lower social acceptance and self-worth than their typically developing peers, although the difference is small.

It is unknown whether factors related to well-being in adults also apply to youth. According to a comprehensive literature review on the development of subjective well-being across the lifespan, there is no consensus about the nature of the relationship between well-being and age as conflicting studies claim a U-shaped, inverted U, or linear relationship (Ulloa et al., 2013). In the current study, well-being is estimated by two variables: meaningfulness and self-compassion. The study aims to determine how these two estimates of well-being present in highly intelligent youth.

Search for Meaning and Presence of Meaning

Research has consistently shown that a sense of meaning in life (or "meaningfulness") is strongly associated with subjective well-being (Jian-Bin et al., 2021; Roepke et al., 2014; Yu et

al., 2020). Correlations have been found between meaningfulness and happiness, life satisfaction, relationship satisfaction, self-esteem, and many other positive outcomes (Steger, 2018).

The author of a commonly used measure to identify meaningfulness, the Meaning in Life Questionnaire (MLQ), has established that the two elements of meaningfulness measured are differentially related to subjective well-being (Steger et al., 2006; Steger et al., 2008). One element, the Presence of Meaning in Life (PM) is more strongly related to subjective well-being than the other element, Search for Meaning in Life (SM). In adults, PM generally increases with age, whereas younger adults tend to be more actively searching for meaning (Steger et al., 2009). There appear, however, to be different correlates depending on age. While PM correlates positively with well-being across adult age groups, SM appears to be related to low well-being later in life (Steger et al., 2009). When controlling for depression, low meaningfulness (i.e., a crisis of meaning) is predictive of suicidality (Schnell et al., 2018). Park et al. (2010) found that SM is also associated with lower subjective well-being and depression symptomology. On the other hand, they determined that adults who self-report a high level of both SM and PM tend to experience higher well-being, suggesting that continued meaning exploration once meaningfulness has been established does not have negative impacts on well-being. This pattern is also evident in a sample of older adolescents (Krok, 2018). Most research has found no significant gender differences in SM and PM (Balgiu, 2020; Steger et al., 2006; Wang & Dai, 2008) although one study found that adult females reported higher SM and PM than males (Steger et al., 2009). None of the research reviewed provided gender comparisons involving nonbinary individuals, nor focused on highly intelligent individuals.

In youth, there is evidence that subjective well-being and meaningfulness are also strongly related (Krok, 2018; Shek, 1992; Rathi & Rastogi, 2007). Brassai et al. (2011) aimed to

explore SM/PM in adolescents, theorizing that searching promotes healthy identity development in adolescents aged 15 to 18. SM exceeded the average PM, and both variables were negatively correlated with the experience of hopelessness. The researchers concluded that search for meaning, in particular, serves as a protective factor against risky behaviour and mental health issues in young people. A similar study found that meaningfulness in Grade 7 predicted higher subjective well-being and lower risk behaviour in Grade 12 (Lin & Shek, 2019). The current study examines meaningfulness as separated into SM and PM, as according to the literature, the differences between these two concepts are important in well-being inquiry. The quantitative difference between the two scores is of particular interest in the current inquiry (Search-Presence Discrepancy; SPD).

When it comes to age and gender differences in youth, the evidence is equivocal. Female adolescents experience greater SM and PM than males (Beutel & Marini, 1995; Shoshani & Russo-Netzer, 2017), but this pattern was not identified in other studies (Rathi & Rastogi, 2007). Rathi and Rastogi (2007) compared younger (ages 12 to 15) and older adolescents (ages 16 to 18) on meaningfulness and well-being measures. They found significant differences on subscales of meaning by gender (e.g., females find meaningful relationships more important), but there were no overall differences. The researchers note, however, that their sample was relatively small ($n = 104$), and insufficient to generalize. This may also explain why their results for gender differed from other studies. Again, none of the research reviewed provided gender comparisons including nonbinary individuals.

Research on meaningfulness in highly intelligent people is limited. As discussed in the above section, Vötter (2019) explored meaningfulness as it relates to subjective well-being, resilience, and self-control in two groups: highly intelligent adults (IQ ≥ 130) and academically

high achievers. The highly intelligent group self-reported higher levels of crisis of meaning than the high-achieving group (post-doctoral). Vötter (2019) notes that associations found may be related to non-assessed variables. Furthermore, the high achievers are also likely to be highly intelligent, as each had achieved a doctorate with academic honours.

Given the dearth of research on meaningfulness in highly intelligent adults, research exploring meaningfulness in highly intelligent youth is all but nonexistent. The present study explored search for meaning, presence of meaning, and the difference score between these two variables in a sample of highly intelligent adolescents in hopes of addressing this research gap.

Self-Compassion

Self-compassion, a relatively new concept in psychology, is the awareness of one's own predicament along with the ability to emotionally respond to one's own pain with kindness and without judgement (Neff, 2003; 2016). Self-compassion is strongly associated with subjective well-being in highly intelligent adults (Pollet & Schnell, 2017; Vötter & Schnell, 2019), adolescents (Bluth et al., 2016; Campbell, 2017), and the general population (Neff, 2003; Yu et al., 2020). Bluth et al. (2016) focused on the moderating effects of age and gender on adolescent self-compassion. Older female adolescents self-reported lower self-compassion than their younger counterparts and males. Self-compassion was found to be associated with higher rates of well-being and lower depression across ages and genders (male/female). The researchers inferred that self-compassion may serve as a protective factor against low subjective well-being.

Researchers have found a particularly strong interaction between self-compassion and perfectionism in predicting subjective well-being and stress in adolescents (Campbell, 2017). Other research has noted that highly intelligent youth report higher levels of perfectionism (Neumeister, 2007). Perfectionism shows an inverse relationship with self-compassion, and it

mediates the relationship between self-compassion and subjective well-being (Campbell, 2017; Stoeber et al., 2020). It logically follows that highly intelligent youth may experience lower self-compassion, particularly if they also experience perfectionism, although no study inquiring into these associations could be found.

No studies exploring self-compassion in highly intelligent youth were identified, although notably, an unpublished thesis by Brown (2019) featured qualitative interviews to explore the phenomenological experiences of parents of twice-exceptional children (i.e., highly intelligent children with an area of disability), examining qualitative elements of self-compassion. The author explored themes of self-compassionate and non-self-compassionate communication between parents and children. Brown (2019) did not measure self-compassion in youth. The current study aims to fill this gap by comparing intelligence with self-compassion level, controlling for demographic variables and current difficulties in life.

Self-Compassion and Meaningfulness

Self-compassion and meaningfulness are both subjective well-being outcomes (Bercovich et al., 2020; Suh & Chong, 2020). These traits, however, interact in ways that the scientific community does not yet fully understand. Recent studies have identified mediation/moderation among self-compassion, meaningfulness, and other psychological variables in adults. Firstly, while low meaningfulness is itself a predictor of depression, meaningfulness and self-compassion together account for even more variance (Yu et al., 2020). Self-compassion also moderates the relationship between depression and threat to meaningfulness (Jiang & Chen, 2019). Secondly, compassion from others and resilience mediate the relationship between self-compassion and meaningfulness (Chan et al., 2022). Thirdly, meaningfulness mediates the relationship between self-compassion and boredom (O'Dea et al., 2022). Fourthly, some

elements of self-compassion (e.g., common humanity) moderate the relationship between meaningfulness and COVID-19 pandemic-related stress (Samios et al., 2022). Finally, both self-compassion and meaningfulness serve as mediators between meditation practice and psychological health. Evidence has not supported a moderating effect of self-compassion on the relationship between perfectionism and meaningfulness in adults (Suh & Chong, 2020).

Studies by the Existential Psychology Lab at the University of Innsbruck have helped elucidate how self-compassion and meaning in life correlate with subjective well-being, as well as how the two qualities interact in highly intelligent adults (Schnell, 2010). Pollet and Schnell (2017) found both meaningfulness and self-compassion to be predictors of subjective well-being in highly intelligent adults. They also found an interaction: Self-compassion and intelligence together predicted greater meaningfulness. The researchers interpreted this to mean that self-compassion has greater significance for highly intelligent individuals, possibly because identification as highly intelligent may lead people to be more self-critical or have higher expectations for achievement. Self-compassion, the team claims, may serve to protect highly intelligent adults from the devaluation of self and demotivation to pursue meaningful activities and goals. A second study explored whether self-compassion is associated with life meaning and/or subjective well-being in highly intelligent adults (Vötter & Schnell, 2019). They found moderate-strong associations among the three variables. Cross-lagged analysis revealed that self-compassion does not predict either meaningfulness or well-being over time.

Although the Existential Psychology Lab has explored variables highly relevant to the current study, their research was completed with European adults. One Canadian team developed a social-emotional learning program for highly intelligent children designed to enhance self-compassion and meaning (Armstrong et al., 2018). The program, Developing Resilience through

Emotions, Attitudes, and Meaning (DREAM), was created to enhance meaningfulness and self-compassion (Armstrong et al., 2018), two of the strongest predictors of subjective well-being in highly intelligent adults (Pollet & Schnell, 2017). Evaluation of the pilot found increased meaningfulness and mental health of participants. No other relevant Canadian studies were found. The current study aims to fill this gap by exploring meaningfulness and self-compassion variables in a population of highly intelligent Canadian youth.

The Current Study

Only two of the reviewed studies were conducted with Canadian populations (Armstrong et al., 2018; Brown, 2019). Although European studies have explored self-compassion and meaningfulness in highly intelligent adults, no known inquiry has explored these variables with an adolescent nor Canadian sample. The current study considers internalizing symptoms, social functioning, self-compassion, and meaningfulness in a sample of highly intelligent Canadian youth.

Research Questions

1. How is verbal-fluid discrepancy related to internalizing symptoms and problems in social functioning in highly intelligent youth? Age, gender, and rater (i.e., self- or parent-report) difference will also be explored.

2. How is intelligence related to self-compassion and meaningfulness in highly intelligent adolescents? Age and gender differences will also be explored, and, if found to be significant, will be controlled in exploring correlations among self-compassion, search for meaning, and discrepancy between search for and presence of meaning.

Chapter Three: Methods

Participants

Participants were recruited from the Centre for Wellbeing in Education clinic (previously known as Integrated Services in Education) at the University of Calgary, Alberta, Canada. Participants completed a psychoeducational assessment between 2015 and 2022. Children were referred for psychoeducational assessments to determine their level of functioning and needs in various domains, including intellectual, academic, emotional, social, behavioural, and/or adaptive. Assessment typically includes data collection from a variety of sources, including specialized tests, interviews, observations, and a review of historical information. Although it is not always the intention of assessment, professionals can also use data to support diagnostic decisions, recommendations for intervention, or educational placement. High intelligence is often identified by way of assessment, even if a giftedness query is not the referred reason for the assessment.

Approximately 600 files were screened from a digital database that included data from 2015 to 2019, and approximately 400 hardcopy files from 2020 to 2022 were manually screened for inclusion criteria. A total of 1,305 clients were seen at the clinic between 2015 and 2022, although an unknown number did not finish assessments and/or did not provide consent to be included in the database. Study inclusion criteria included a pre-determined age range, high intelligence (as operationalized below), and prior consent to be in the database and/or contacted for future research. The age range for the secondary data sample was 6 to 16, age of WISC-V assessment, and a current age of 10 to 18 for the Primary sample. As per the literature presented above, participants were deemed highly intelligent if they scored ≥ 120 on at least one WISC-V index score or achieved an IQ score (FSIQ or GAI) ≥ 115. Although scores ≥ 120 or 125 are

frequently utilized in intelligence research, it was anticipated that it would be difficult to achieve adequate sample sizes for the proposed analyses if this were the case. An IQ score of 115 has been used frequently among researchers to identify "high intelligence" (Cross, 2013; MacCabe et al., 2012; Pfeiffer & Yaacov, 2008), ensuring that results are generalizable to a greater proportion of the population than if more restrictive criteria were used. Thus, an IQ score ≥ 115 was deemed sufficient for "high intelligence" for this study.

Measures

The scales and subscales utilized in this study are summarized in Appendix B.

Wechsler Intelligence Scale for Children, Fifth Edition

Intelligence was measured with the Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V; Wechsler, 2014). Estimates of intellectual abilities are represented by standardized scores that include Full-Scale Intelligence Quotient (FSIQ), General Ability Index (GAI), and index scores for five discrete abilities. The FSIQ is an overall measure that combines these five broad areas of cognitive functioning: verbal comprehension, fluid reasoning, visual-spatial, processing speed, and working memory. The GAI is a similar scale that disregards the influence of processing speed and working memory on the individual's score, emphasizing the "higher order" abilities of verbal, fluid, and visual-spatial intelligence. The GAI is calculated from an individual's performance on five subtests: Similarities, Vocabulary, Block Design, Matrix Reasoning, and Figure Weights. The five WISC-V index scores are calculated from two subtests each, and provide estimates of the child's abilities in the five domains.

Individual ability areas and broad measures are quantified as standard scores ($M = 100$, $SD = 15$) which provide a relative comparison to other children of the same age and country. Standard scores are generally accepted to be stable from mid-childhood through to adulthood

(Deary, 2014). The WISC-V has good reliability and construct/content validity (Sattler, 2018).

Index scale reliability coefficients range from 0.88 to 0.90. Test-retest reliability is 0.92 for FSIQ

and range from 0.75 to 0.94 for index scales. For this study, GAI was used rather than the FSIQ

to represent general intellectual functioning. The GAI is thought to be a superior measure of

intelligence in highly intelligent youth than the FSIQ because of the specific abilities it measures

(i.e., fluid intelligence, verbal intelligence, and visual-spatial ability; Meyer & Reynolds, 2017;

Silverman & Gilman, 2020), as discussed in Chapter 2.

This study utilizes a new variable called Verbal-Fluid Discrepancy (VFD) to represent

the discrepancy between verbal and fluid intelligence. VFD is the difference between

participants' Verbal Comprehension Index (VCI) and Fluid Reasoning Index (FRI). The VCI is

the WISC-V measure of verbal intelligence, and the FRI is the WISC-V measure of fluid

intelligence.

Behavior Assessment System for Children, Third Edition

Social-emotional functioning at the time of psychoeducational assessment was measured

using the Behavior Assessment System for Children, Third Edition (BASC-3; Kamphaus &

Reynolds, 2015), a norm-referenced rating scale for children. It includes self, parent, and teacher

rating scales. Each index is illustrated as a *T* score ($M = 50$, $SD = 10$) which provides a relative

comparison to other children of the same age and gender (i.e., males and females). Indexes have

high reliability coefficients, at $\alpha = 0.93$ for ages 8 to 14 and $\alpha = 0.94$ for ages 15 to 18

(Kamphaus & Reynolds, 2015). This study utilizes the BASC-3 self-rating subscales for

Depression, Anxiety, and Social Stress. Depression measures feelings of unhappiness/sadness

(e.g., "I feel sad"; "I just don't care anymore"). Anxiety measures the amount of typical worry or

fear the respondent experiences (e.g., "I can never seem to relax"; "I worry a lot of the time").

Social Stress represents the respondent's stress about personal relationships or feelings of exclusion (e.g., "Other people seem to ignore me"; "My friends have more fun than I do").

Conners Comprehensive Behaviour Rating Scale

Social-emotional functioning at the time of psychoeducational assessment was measured using the Conners Comprehensive Behaviour Rating Scale (CBRS; Conners, 2008), a norm-referenced rating scale for children. It contains self, parent, and teacher scales. Each functioning index is represented by a *T* score (*M* = 50, *SD* = 10) which provides a relative comparison to other children of the same age and gender (i.e., males and females). Test-retest reliability and internal consistency of the CBRS are adequate, and it shows appropriate validity in assessing emotional, social, and behavioural concerns in children (Chan et al., 2021). The current study utilizes the Emotional Distress subscale (both self- and parent-ratings), an omnibus measure of a child's level of anxiety, sadness, energy level, social problems, isolation, and preoccupation with negative thoughts (e.g., "The future seems hopeless"; "I think about hurting myself"). This study also utilizes the Social Problems subscale, which represents perceived social awkwardness, shyness, and limits to conversational skills (e.g., "Is picked on or bullied by others"; "Is unable to develop peer relationships"). Social Problems is not available as a self-rating, so only parent-rating was utilized.

Strengths and Difficulties Questionnaire

Current social/emotional/behavioural difficulties were screened using the Strengths and Difficulties Questionnaire (SDQ, Appendix C; Goodman, 1997). The SDQ is a measure of global adjustment in children and adolescents that produces five subscales of psychological adjustment and one global measure. There are five subscales, which align with a confirmed five-factor structure (Van Roy et al., 2008). Four represent difficulties: Emotional Problems (e.g., "I worry a

lot"), Conduct Problems (e.g., "I am often accused of lying or cheating"), Hyperactivity-Inattention (e.g., "I am restless"), and Peer Problems (e.g., "I am usually on my own"). These subscales combine into a Total Difficulties (TD) score, which ranges from 0 to 40. The last scale represents Prosocial Behaviour (e.g., "I usually share with others"; Goodman, 1997) and is not included in TD nor used in this study.

Different versions of the SDQ with age-appropriate language are available for ages 2 through adulthood. The SDQ has been shown to have good validity and reliability in measuring these elements of social-emotional functioning across research and clinical settings (Goodman, 2001; Theunissen et al., 2019). The SDQ shows excellent concurrent validity with the Rutter questionnaire, which also demonstrates adequate validity and reliability in measuring childhood social-emotional difficulties (Goodman, 1997). The SDQ has been shown to reliably predict psychopathological disorders with accuracy (Goodman & Goodman, 2011).

Self-Compassion Scale for Youths

Self-compassion was assessed using the Self-Compassion Scale for Youths (SCS-Y, Neff, 2003; Appendix D). This scale has been tested to have adequate reliability and validity in assessing components of self-compassion (Neff, 2003; Neff, 2016; Raes et al., 2011). The SCS-Y is comprised of six factors of self-compassion (Neff, 2003). Three factors are positive: Self-Kindness (e.g., "I'm kind to myself when things go wrong and I'm feeling bad"), Common Humanity (e.g., "When I'm sad or unhappy, I remember that other people also feel this way at times"), and Mindfulness (e.g., "When something difficult happens, I try to see things clearly without exaggerations"). The other three scales are negative and reverse-coded: Self-Judgement (e.g., "I get mad at myself for not being better at some things"), Isolation (e.g., "When I feel sad

or down, it seems like I'm the only one who feels that way"), and Over-Identification (e.g.,

"When I'm feeling bad or upset, I can't think of anything else at the time").

The SCS-Y is shorter than the adult version and contains simplified language for

adolescents aged 10 to 14. Although some participants in this study are older than 14, the

constructs measured are identical to those in the adult version. This study utilizes the SCS-Y

Total Self-Compassion score (SC), which ranges from raw scores of 17 to 85 and shows

excellent reliability and validity measures (Neff et al., 2021). Each item ranges from a possible

one (Almost Never) to five (Almost Always) on a Likert scale, with three being the reported

average rating for people of all ages (Neff, 2003; Neff & McGehee, 2010).

Meaning in Life Questionnaire

Sense of meaning in life was measured using the Meaning of Life Questionnaire (MLQ;

Appendix E), which provides information on two constructs: Search for Meaning (SM) and

Presence of Meaning (PM; Steger et al., 2006). SM is measured by five items that assess the

extent to which the individual is searching for meaning in their life (e.g., "I am always searching

for something that makes my life feel significant"). PM (i.e., meaningfulness) is measured by

five items that tap into the respondent's current subjective evaluation of how meaningful their

life feels (e.g., "My life has a clear sense of purpose"). Research has shown PM to be strongly

positively associated with subjective well-being, while SM is weakly negatively associated (Jian-

Bin et al., 2021).

The MLQ has proven useful for both research and therapeutic purposes. It reliably

informs psychotherapists about their clients' current subjective experiences of meaningfulness

(Steger & Shin, 2010). It has been used worldwide in research publications, with dozens of

translations available for free use (The Meaning in Life Questionnaire, n.d.). Practical

applications include the promotion of engagement and meaningful vocation (Dik et al., 2013; Steger et al., 2013) and a greater understanding/cultivation of subjective well-being (Jian-Bin et al., 2021; Shin & Steger, 2014). In youth, the MLQ has been used to explore meaningfulness as a protective factor for mental health (Brassai et al., 2011). The MLQ shows good reliability, convergent validity, and discriminant validity in measuring both constructs (Steger et al., 2006). Each item response ranges from 1 (Absolutely Untrue) to 7 (Absolutely True), with total raw scores for both scales ranging from 5 to 30. This study uses the difference between these scores as a discrete variable by subtracting PM from SM (Search-Presence Discrepancy; SPD).

Procedure

Power analyses for correlations were conducted in G-Power Version 3 (Faul et al., 2007) to determine the sufficient sample size for the proposed analyses, a power of 0.80, large effect sizes, and two tails. Based on these parameters, the sample size of Secondary Data was adequate. The sample size of Primary Data was lower than anticipated, so few analyses were completed.

Secondary Data Analysis Plan

Of the pool of participants, those aged 6 to 16 at the time of assessment who had also completed a social-emotional rating scale (i.e., BASC-3 and/or CBRS) were included in the secondary analysis. Participants' guardians had provided prior consent for their child's data to be used for research purposes. Because both the BASC-3 and CBRS are normed by age and gender, there would presumably not be any significant effects by demographics. This assumption is examined with between-groups analyses. A series of correlations are performed on the secondary data. Participants' cognitive scores (i.e., GAI and VFD) are compared with BASC-3 subscales (Anxiety, Depression, and Social Stress), and CBRS subscales (Emotional Distress and Social Problems).

Primary Data Analysis Plan

Of the pool of participants, parents whose children were aged 10 to 18 in June 2022 were invited to participate in the primary data group by email (Appendix F). Of 63 potential participants, 33 adolescents completed questionnaires. Digitally fillable questionnaires included the SDQ, the SCS-Y, and the MLQ. Once parent consent was obtained (Appendix G) and questionnaires were returned, a $5 Tim Horton's e-gift card was delivered to participants. To explore the associations between intelligence, self-compassion, and meaningfulness, three hypotheses are tested via three partial correlations:

1. Intelligence is correlated with self-compassion in highly intelligent adolescents, when controlling for current difficulties and gender.

2. Intelligence is correlated with search for meaning in highly intelligent adolescents when controlling for current difficulties and gender.

3. Intelligence is correlated with discrepancy between search for and presence of meaning in highly intelligent adolescents when controlling for current difficulties and gender.

Chapter Four: Results

Research Question 1

How is verbal-fluid discrepancy related to internalizing symptoms and problems in social

functioning in highly intelligent youth? This question was answered with secondary data

analyses.

Data Preparation

Analyses were conducted using SPSS Version 26.0. The secondary dataset included a

total of 109 youth whom each had WISC-V standard scores and *T* scores on one of two social-

emotional ratings scales, the BASC-3 or the CBRS. Required WISC-V scores were the Fluid

Reasoning Index (FRI) and the Verbal Comprehension Index (VCI). The WISC-V General

Ability Index (GAI) had three missing data points that could not be calculated from available

scores. Participants were grouped into subsamples according to whether their assessments

included BASC-3 self-ratings, CBRS mother-ratings, or CBRS self-ratings, for a total of three

separate subsamples for analysis. Some youth had data for both CBRS self- and parent-ratings

and were included in both subsamples. Because participants completed either the BASC-3 or

CBRS, subsample sizes varied.

Variable Construction. One variable was constructed from the secondary data: Verbal-

Fluid Discrepancy (VFD). VFD was calculated for each participant by subtracting each youth's

WISC-V FRI score from their VCI score. VFD can thus be positive or negative, depending on

which index score was higher for each person; a positive VFD would indicate that the VCI is

higher for the youth, and a negative score indicates a higher relative FRI.

BASC-3-Self Subsample. The BASC-3-Self subsample (Anxiety, Depression, and Social

Stress *T* scores) contained 34 participants with one missing data point for Social Stress.

Inspection of boxplots revealed univariate outliers and pairwise deletion was utilized: Depression (3 cases) and Anxiety (2 cases). *T* scores were visually inspected for normal distribution using histograms and screening for unacceptable kurtosis and skewness values which were found to be acceptable.

CBRS-Self Subsample. The CBRS-Self subsample (Emotional Distress *T* scores) contained 49 participants. Inspection of boxplots revealed no univariate outliers. *T* scores were visually inspected for approximate normal distribution using a histogram and screened for unacceptable kurtosis and skewness values which were found to be acceptable.

CBRS-Parent Subsample. The CBRS-Parent subsample produced Emotional Distress (EDP) and Social Problems (SPP) *T* scores representing 74 participants. Although some participants had ratings from two parents, the vast majority had ratings coded as "mother," as the rater, and so this was the rating utilized across all participants. Although it is probable that some of the "mother" ratings are actually those of other types of guardians (e.g., grandparents, stepparents, same-sex parents, gender-nonbinary parents, etc.), this information was not available (i.e., data were coded either as "mother" or "father"). Thus, EDP and SPP are considered "parent" ratings. *T* scores were visually inspected for normal distribution using histograms and screened for unacceptable skewness and kurtosis values. SPP demonstrated a platykurtic distribution with a kurtosis value of -1.36, which is considered acceptable by experts (Hair et al., 2018; George & Mallery, 2010), although analyses carry a higher likelihood of Type II error. SPP *T* scores were retained for further analysis.

Descriptives

Participant age and gender are presented in Table 1. The mean age (*SD*) was 10.4 (*2.5*) years at the time of their psychoeducational assessment. Most participants identified as male (*n =*

65) followed by female (*n* = 42) and other gender (*n* = 2). The sample of youth who identified as

other gender was too small to be meaningfully included in any of the analyses.

Table 1

Demographic Characteristics, Secondary Participants

Age (years)	Male		Female		Other		Total	
	n	%	*n*	%	*n*	%	*n*	%
6	2	1.8	-	-	-	-	2	1.8
7	4	3.7	7	6.4	-	-	11	10.1
8	9	8.3	6	5.5	-	-	15	13.8
9	14	12.8	5	4.6	-	-	19	17.4
10	13	11.9	4	3.7	-	-	17	15.6
11	6	5.5	5	4.6	1	0.9	12	11.0
12	4	3.7	-	-	-	-	4	3.7
13	6	5.5	8	7.4	-	-	14	12.8
14	3	2.8	2	1.8	1	0.9	6	5.5
15	1	0.9	4	3.7	-	-	5	4.6
16	3	2.8	1	0.9	-	-	4	3.7
Total	65	59.6	42	38.5	2	1.8	109	100
M (*SD*)	10.2 (*2.4*)		10.6 (*2.8*)		12.5 (*2.1*)		10.4 (*2.5*)	

Cognitive Standard Scores. Sample sizes, means, and standard deviations are presented

in Table 2. The mean GAI standard score was 115.89 (*9.53*), reflecting an approximation of the

inclusion criteria for high intelligence (i.e., at least one WISC-V index score ≥ 120 or GAI/FSIQ

≥ 115). Mean VFD was near zero (-0.03 points), indicating an even spread of VCI and FRI score

deviations from the mean (i.e., the full sample overall demonstrates even verbal and fluid

ability). Described as an absolute value, the mean VFD, irrespective of the direction of the

difference between VCI and FRI, was one standard deviation (*M* = 14.98 points; *SD* for all

standard scores is 15 points).

Table 2

Descriptive Statistics, Secondary Data

	n	*M*	*SD*	Skewness	Kurtosis
Verbal-Fluid Discrepancy (VFD)	107	-0.03	18.16	-0.03	-0.69
VFD Absolute Value	107	14.98	10.15	0.50	-0.51
General Ability Index (GAI)	104	115.89	9.53	0.05	-0.37
BASC-3 Depression	31	49.03	5.63	0.31	-1.00
BASC-3 Anxiety	32	49.28	6.81	0.09	-0.27
BASC-3 Social Stress	33	50.03	8.53	0.52	-0.48
CBRS Emotional Distress Self-rating (EDS)	49	61.41	12.56	0.39	-0.27
CBRS Emotional Distress Parent-rating (EDP)	74	74.86	15.42	-0.71	-0.68
CBRS Social Problems Parent-rating (SPP)	74	71.46	15.85	-0.26	-1.36

Social-Emotional* T *Scores. Mean BASC-3 scores approximated a mean *T* score of 50,

suggesting that the subsample closely matched the standardization norms for BASC-3 social-

emotional scores (Kamphaus & Reynolds, 2015). The mean Depression score was 49.03 (*5.63*),

Anxiety was 49.28 (*6.81*), and Social Stress was 50.03 (*8.53*). CBRS scores varied substantially

from normative levels; mean EDS was 61.41 (*12.56*), and EDP was 74.86 (*15.42*). This places

the average self-rating within the Elevated range (*T* score ≥ 60; more concerns than typical) and

the average parent-rating within the Very Elevated range (*T* score ≥ 70; many more concerns

than typical). Likewise, the mean SPP was also within the Very Elevated range, *M* = 73.47

(*16.87*).

Between-Group Comparisons

Two-way analyses of variance were conducted that examined the effect of gender and

age category on social-emotional scores. Multiple ANOVAs were conducted due to social-

emotional scores being from different samples of different sizes. The significance level for the

BASC-3 subsample was adjusted with a Bonferroni correction for three analyses (α = .017). Age

groupings were formed around median age to approximate equal group sizes (ages 6 to 9 and

ages 10 to 16; Table 3). Levene's test showed homogeneity of variance for all *T* scores except

EDS and EDP, and both were excluded (Table 4). There were no significant age x gender

interactions: Depression, $F(1, 30) = 0.51$, $p = .48$, Anxiety, $F(1, 31) = 1.24$, $p = .28$, Social

Stress, $F(1, 32) = 0.46$, $p = .50$, and EDS, $F(1, 48) = 0.35$, $p = .56$ (Table 5). Demographic

variables did not interact to produce significant differences for the four social-emotional T

scores.

Table 3

Secondary Data Group Means: Gender and Age Categories

	Males			Females		
	n	*M*	*SD*	*n*	*M*	*SD*
Depression	19	48.47	5.81	12	49.92	5.47
Anxiety	19	47.89	7.48	13	51.31	5.33
Social Stress	20	49.50	8.24	13	50.85	9.25
Emotional Distress Self-rating (EDS)	26	57.58	12.39	23	65.74	11.52
Emotional Distress Parent-rating (EDP)	43	72.98	16.86	31	77.48	12.99
Social Problems Parent-rating (SPP)	43	70.91	17.56	31	77.03	15.44
	Age 6–9			Age 10–16		
	n	*M* (*SD*)	*SD*	*n*	*M*	*SD*
Depression	16	49.31	5.16	15	48.73	6.26
Anxiety	17	49.35	6.73	15	49.20	7.14
Social Stress	18	51.11	9.37	15	48.73	7.52
Emotional Distress Self-rating (EDS)	13	58.46	9.21	36	62.47	13.53
Emotional Distress Parent-rating (EDP)	32	70.69	18.11	42	78.05	12.31
Social Problems Parent-rating (SPP)	32	68.56	18.01	42	77.21	15.11

Table 4

Levene's Tests of Equality of Error Variances, Age and Gender

	Levene Statistic	*df*1	*df*2	*p*
Depression	1.01	3	27	.40
Anxiety	1.76	3	28	.18
Social Stress	1.86	3	29	.16
Emotional Distress Self-rating (EDS)	1.74	3	45	.17
Emotional Distress Parent-rating (EDP)	6.78	3	70	< .001[a]
Social Problems Parent-rating (SPP)	6.78	3	70	< .001[a]

[a] Excluded based on violation of equality of variance assumption.

Table 5

Between-Subjects Effects, Age and Gender

	Sum of Squares	df	Mean Square	F	p	Partial η^2
Depression						
Corrected Model	35.65	3	11.88	0.35	.79	.04
Intercept	71145.21	1	71145.21	2098.63	.00	.99
Gender	14.98	1	14.98	0.44	.51	.02
Age Group	6.79	1	6.79	0.20	.66	.01
Gender x Age	17.40	1	17.40	0.51	.48	.02
Error	915.32	27	33.90	-	-	-
Total	75480.00	31	-	-	-	-
Corrected Total	950.97	30	-	-	-	-
Anxiety						
Corrected Model	147.21	3	49.07	1.06	.38	.10
Intercept	75496.08	1	75496.08	1637.08	.00	.98
Gender	80.08	1	80.08	1.74	.20	.06
Age Group	3.04	1	3.04	0.07	.80	.002
Gender x Age	57.20	1	57.20	1.24	.28	.04
Error	1291.26	28	46.12	-	-	-
Total	79155.00	32	-	-	-	-
Corrected Total	1438.47	31	-	-	-	-
Social Stress						
Corrected Model	96.75	3	32.25	0.42	.74	.04
Intercept	78381.49	1	78381.49	1018.30	.00	.97
Gender	11.08	1	11.08	0.14	.71	.01
Age Group	63.14	1	63.14	0.82	.37	.03
Gender x Age	35.63	1	35.63	0.46	.50	.01
Error	2232.22	29	76.97	-	-	-
Total	84929.00	33	-	-	-	-
Corrected Total	2328.97	32	-	-	-	-
Emotional Distress Self-rating						
Corrected Model	1011.34	3	337.11	2.31	.09	.13
Intercept	139977.59	1	139977.59	959.84	.00	.96
Gender	470.48	1	470.48	3.23	.08	.07
Age Group	158.89	1	158.89	1.09	.30	.02
Gender x Age	51.25	1	51.25	0.35	.56	.01
Error	6562.49	45	145.83	-	-	-
Total	192351.00	49	-	-	-	-
Corrected Total	7573.84	48	-	-	-	-

Note: α = .017 for Depression, Anxiety, and Social Stress after Bonferroni correction.

Gender. When comparing internalizing symptoms by gender, results showed that males

($M = 48.47$, $SD = 5.81$) did not differ significantly from females ($M = 49.92$, $SD = 5.47$) on

measures of Depression, $F(1, 30) = 0.20$, $p = .51$. Males ($M = 47.89$, $SD = 7.48$) and females ($M = 51.31$, $SD = 5.33$) also reported similar levels of Anxiety, $F(1, 31) = 1.74$, $p = .20$. On EDS, males ($M = 57.58$, $SD = 12.39$) and females ($M = 65.74$, $SD = 11.52$) did not differ significantly, $F(1, 48) = 3.23$, $p = .08$. Regarding Social Stress, males ($M = 49.50$, $SD = 8.24$) did not differ significantly from females ($M = 50.85$, $SD = 9.25$), $F(1, 32) = 0.14$, $p = .71$. Overall, males and females self-reported similar levels of internalizing symptoms and social stress.

Age Category. When comparing internalizing symptoms by age category, children aged 6 to 9 ($M = 49.31$, $SD = 5.16$) reported similar mean Depression T scores as those aged 10 to 16 ($M = 48.73$, $SD = 6.26$), $F(1, 30) = 0.20$, $p = .66$. Anxiety did not differ significantly between younger ($M = 49.35$, $SD = 6.73$) and older ($M = 49.20$, $SD = 7.14$) youth, $F(1, 31) = 0.07$, $p = .80$. Younger ($M = 58.46$, $SD = 9.21$) and older youth ($M = 62.47$, $SD = 13.53$) did not differ significantly on EDS, $F(1, 48) = 1.09$, $p = .30$. Finally, social stress was not found to differ significantly between younger ($M = 51.11$, $SD = 9.37$) and older youth, ($M = 48.73$, $SD = 7.52$), $F(1, 32) = 0.82$, $p = .37$. Age groups self-reported similar levels of internalizing symptoms and social stress.

Rater. Given the apparent large disparity between self- and parent-ratings on the Emotional Distress subscale, a paired-sample t test comparing EDS and EDP was conducted to determine if the difference was statistically significant (Table 6). A total of 46 participants had both parent- and self-rating scales completed. Mean EDP ($M = 74.86$, $SD = 15.42$) was significantly higher than mean EDS ($M = 61.41$, $SD = 12.56$), $t(45) = -6.14$, $p < .001$, suggesting that parents perceived greater emotional distress in their highly intelligent children than the youth did in themselves.

Table 6

Emotional Distress Self-Rating vs. Parent-Rating

	n	ED Self-Rating		ED Parent-Rating		t (45)	p
		M	SD	M	SD		
EDS vs. EDP	46	61.91	12.75	75.85	14.69	-6.14	< .001

Bivariate Correlations

Pearson correlation coefficients were computed to assess linear relationships between cognitive and social-emotional scores (Table 7). GAI correlations were also calculated to determine if overall intellectual functioning is correlated with social-emotional functioning in the sample. Correlations between BASC-3 and CBRS *T* scores were not possible as participants completed one or the other measure.

Table 7

Correlation Matrix, Secondary Data

Variable	n	M	SD	1	2	3	4	5	6	7	8
1. VFD	107	-0.03	18.16	-							
2. GAI	104	115.89	9.53	.14	-						
3. Depression	31	49.03	5.63	-.29	-.05	-					
4. Anxiety	32	49.28	6.81	-.05	.09	.53**	-				
5. Social Stress	33	50.03	8.53	-.50**	-.11	.67***	.61***	-			
6. EDS	49	61.41	12.56	-.13	.24	-	-	-	-		
7. EDP	74	74.86	15.42	-.07	.004	-	-	-	.38*	-	
8. SPP	74	71.46	15.85	-.08	-.02	-	-	-	.16	.71***	-

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

Cognitive Variables and Internalizing Symptoms. VFD was not significantly correlated with Depression, $r(29) = -.29$, $p = .11$, Anxiety, $r(30) = -.05$, $p = .78$, EDS, $r(47) = -.13$, $p = .39$, nor EDP, $r(72) = -.07$, $p = .54$. Likewise, GAI was not significantly correlated with Depression, $r(29) = -.05$, $p = .81$, Anxiety, $r(30) = .09$, $p = .63$, EDS, $r(44) = .24$, $p = .11$, nor EDP, $r(69) = .00$, $p = .97$. Within the sample, neither verbal-fluid discrepancy nor overall intellectual

functioning were associated with internalizing symptoms. VFD and GAI were also not significantly correlated, $r(102) = .14$, $p = .17$. The difference between fluid and verbal scores did not significantly increase as overall intellectual functioning did. Anxiety and Depression self-ratings were moderately correlated, $r(28) = .53$, $p < .01$; those who self-reported higher symptoms of anxiety also tended to report higher symptoms of depression. EDS and EDP were moderately and positively correlated, $r(45) = .38$, $p = .01$; this means that the parent ratings of their children's emotional distress tended to be similar to the youth's ratings of their own distress.

   Cognitive Variables and Social Functioning. VFD was negatively and significantly correlated with Social Stress, $r(31) = -.50$, $p < .01$; as fluid intelligence increased relative to verbal intelligence, self-ratings of social stress also increased (Figure 1). Social Stress was not found to be significantly correlated with GAI, $r(31) = -.11$, $p = .54$, suggesting that intelligence alone is not associated with subjective social stress, but that verbal-fluid discrepancy is. VFD did not demonstrate a significant relationship with SPP, $r(72) = -.08$, $p = .53$, and neither did GAI, $r(69) = .00$, $p = .97$. Social Stress was positively and significantly correlated with the other BASC-3 measures: Depression, $r(28) = .67$, $p < .001$, and Anxiety $r(29) = .61$, $p < .001$; this means that, as participants' ratings of social stress increased, so did their ratings of depression and anxiety. SPP was not significantly correlated with EDS, $r(44) = .16$, $p = .28$, but the two parent-ratings (EDP and SPP) were highly correlated, $r(72) = .71$, $p < .001$, meaning that parents tended to rate their children as having similar levels of emotional distress and social problems (i.e., both ratings high/low).

Figure 1

Verbal-Fluid Discrepancy (VCI-FRI) vs. BASC-3 Social Stress Self-Rating
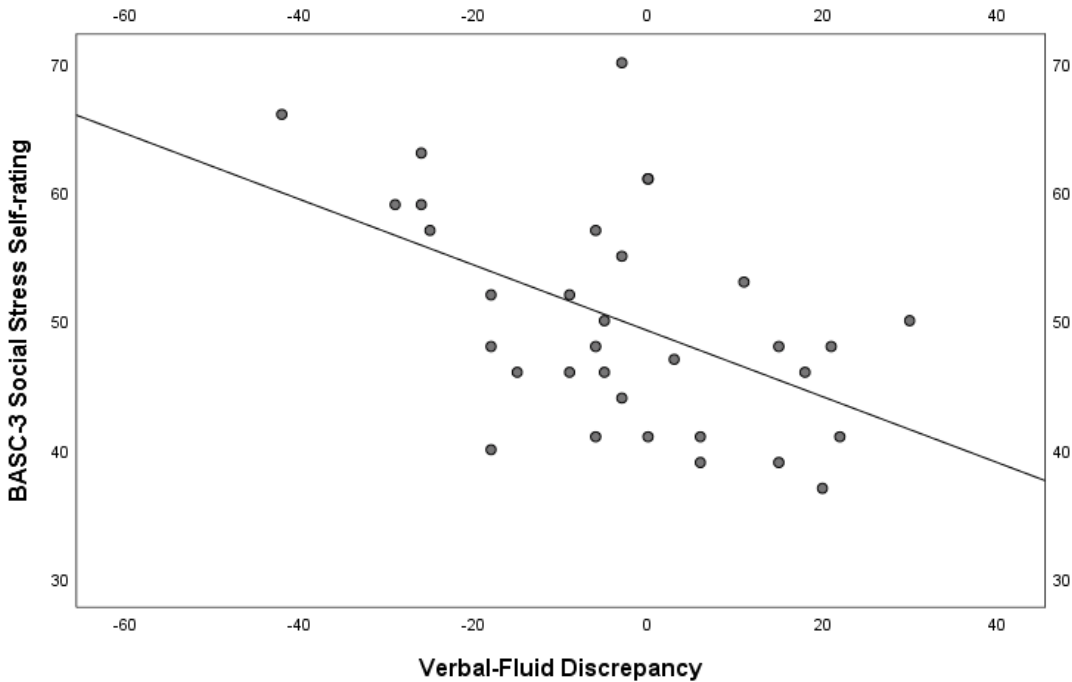
Research Question 2

How is intelligence related to self-compassion and meaningfulness in highly intelligent

adolescents? This question was answered with analysis of primary collected data.

Data Preparation

Analyses were conducted using SPSS Version 26.0. Participants completed all

questionnaires except one participant who completed two of three. Inspection of boxplots

revealed one statistical outlier each for intelligence (GAI) and Self-Compassion total score (SC),

which were excluded pairwise. Other variables showed no significant outliers. Histograms were

screened visually for approximation of a normal distribution. Variables showed good values for

kurtosis and skewness, except Presence of Meaning in Life (PM) which demonstrated a

platykurtic distribution with a kurtosis value of -1.08. This value is acceptable although analyses

with the platykurtic scores carry a higher likelihood of Type II error (George & Mallery; 2010 Hair et al., 2018). PM was retained for further analysis.

Means and standard deviations are presented in Table 8. The mean (*SD*) GAI was 121.35 (*8.16*). The mean SC was 46.00 (*10.35*), which is below the approximate mean SC score of 51 for the general population, although the SCS-Y is not a standardized measure (Neff & Tóth-Király, 2022). The mean TD was 14.78 (*6.19*) out of a possible 40. General population TD means are not available for comparison to the sample mean.

Table 8

Descriptive Statistics, Primary Data

Variable	*n*	*M*	*SD*	Skewness	Kurtosis
General Ability Index (GAI)	31	121.35	8.16	0.44	-0.83
Total Difficulties (TD)	32	14.78	6.19	0.41	-0.46
Self-Compassion (SC)	31	46.00	10.35	-0.06	-0.36
Presence of Meaning (PM)	31	19.32	7.48	-0.12	-1.08
Search for Meaning (SM)	31	21.13	8.23	-0.18	-0.16
Search-Presence Discrepancy (SPD)	31	1.81	11.59	-0.11	-0.57

Variable Construction. A new variable, Search-Presence Discrepancy (SPD), represents the quantitative difference between a person's rating of Search for Meaning in Life (SM) and actual Presence of Meaning in Life (PM). A positive SPD value indicates that a person is actively seeking meaning, but not yet experiencing meaning to the desired level. A negative value may indicate that a person is feeling satisfied with the level of meaning they are currently experiencing. A near-zero value would indicate that a person is not experiencing a disparity between the level of meaning they are searching for and the level they experience, regardless of whether both levels are high or low.

Descriptives

Thirty-two youth participated in the study, and participant age and gender are presented

in Table 9. The mean age (*SD*) at the time of data collection was *M* = 13.3 (*2.3*). Most

participants identified as male (*n* = 22), followed by female (*n* = 10), and other gender (*n* = 1).

The responses from the participant who identified as other gender was too small to be

meaningfully included in gender analyses and was removed.

Table 9

Demographic Characteristics, Primary Participants

Age (years)	Male		Female		Other		Total	
	n	%	*n*	%	*n*	%	*n*	%
10	7	21.2	1	3.0	0	0.0	8	2.4
11	2	6.0	0	0.0	0	0.0	2	6.0
12	3	9.1	2	6.0	1	3.0	6	18.2
13	2	6.0	1	3.0	0	0.0	3	9.1
14	4	12.0	3	9.1	0	0.0	7	21.2
15	1	3.0	2	6.0	0	0.0	3	9.1
16	3	9.1	0	0.0	0	0.0	3	9.1
17	0	0.0	0	0.0	0	0.0	0	0.0
18	0	0.0	1	3.0	0	0.0	1	3.0
Total	22	66.7	10	30.3	1	3.0	33	100
M age (*SD*)	12.9 (*2.3*)		14.2 (*2.2*)		12.6		13.3 (*2.3*)	

Between-Group Comparisons

Gender. *T* tests were conducted to determine whether mean differences on TD, SC, and

meaningfulness scores were statistically significant across age and gender (Table 10). The

significance level was initially set at .05 and was corrected to .01 for five age and gender

comparisons. Levene's test showed homogeneity of variance for all comparisons.

Table 10

Between-Group Comparisons, Primary Data

Variable	Levene's Test	Levene's *p*	Males (*n* = 22)		Females (*n* = 10)		*t*(29)	*p*
			M	*SD*	*M*	*SD*		
TD	2.06	.16	12.91	4.91	18.90	6.95	-2.81	< .01
SC	0.32	.56	47.52	9.14	42.80	12.43	1.20	.24
PM	1.01	.32	20.52	6.95	16.80	8.27	1.31	.20
SM	0.06	.82	18.62	7.30	26.40	7.83	-2.71	.01
SPD	0.28	.60	-1.90	9.40	9.60	12.30	-2.88	< .01
			Age 10-12 (*n* = 16)		Age 13-18 (*n* = 16)		*t*(29)	*p*
			M	*SD*	*M*	*SD*		
TD	1.78	.19	13.56	5.34	16.00	6.89	-1.19	.27
SC	0.15	.70	44.67	10.43	47.25	10.45	-0.69	.50
PM	0.76	.39	18.00	7.10	20.56	7.83	-0.95	.35
SM	1.01	.30	17.87	8.25	24.19	7.16	-2.28	.03
SPD	0.26	.62	-0.13	12.20	3.63	11.06	-0.90	.38

Mean TD was significantly higher in females (*M* = 18.90, *SD* = 6.95) than males (*M* = 12.91, *SD* = 6.95), *t*(29) = -2.81, *p* < .01, indicating that they were experiencing higher rates of difficulty in their lives. Regarding SC, there were no significant differences between males (*M* = 47.52, *SD* = 9.14) and females (*M* = 42.80, *SD* = 12.43), *t*(29) = 1.20, *p* = .24. Males (*M* = 20.52, *SD* = 6.95) and females (*M* = 16.80, *SD* = 8.27) also did not differ on PM, *t*(29) = 1.31, *p* = .20, indicating similar levels of presence of meaning. Females did report a significantly higher SM (*M* = 26.40, *SD* = 7.83) than males (*M* = 18.62, *SD* = 7.30), *t*(29) = -2.71, *p* = .01, suggesting that they are searching for meaning at a higher intensity than males. Males reported a slightly negative value for SPD (*M* = -1.90, *SD* = 9.40); as a group, they are mostly satisfied with their current experience of meaning in life. Females, on the other hand, reported a positive and significantly higher value for SPD (*M* = 9.60, *SD* = 12.30), *t*(29) = -2.88, *p* < .01; they are actively seeking more sense of meaning than they currently experience, when compared with males.

Age. *T* tests were utilized to compare youth aged 10 to 12 (*n* = 16) with youth aged 13 to 18 (*n* = 16) on questionnaire data. No differences between age groups were identified after Bonferroni correction; participants did not differ significantly on total difficulties faced, self-compassion experienced, nor meaning measures according to which age group they were in. Older adolescents (*M* = 16.00, *SD* = 6.89) reported higher TD than younger adolescents (*M* = 13.56, *SD* = 5.34), but this difference was not statistically significant, *t*(29) = -1.19, *p* = .27. Likewise, older adolescents rated themselves higher on SC (*M* = 47.25, *SD* = 10.45) than the younger group (*M* = 44.67, *SD* = 10.43), but again this difference was not significant, *t*(29) = -0.69, *p* = .50. The younger (*M* = 18.00, *SD* = 7.10) and older group (*M* = 20.56, *SD* = 7.83) did not differ significantly on PM, *t*(29) = -0.95, *p* = .35. SM was higher in the older adolescent group (*M* = 24.19, *SD* = 7.16) than the younger group (*M* = 17.87, *SD* = 8.25), but this difference was not significant after Bonferroni correction, *t*(29) = -.2.28, *p* = .03. Finally, SPD also showed no significant difference between younger (*M* = -0.13, *SD* = 12.20) and older adolescents (*M* = 3.63, *SD* = 11.06), *t*(29) = -0.90, *p* = .38.

Bivariate Correlations

Bivariate correlations were conducted among meaningfulness and self-compassion factors to determine specific constructs that may help explain any significant partial correlations (Table 11). Meaningfulness variables include SM and PM. Self-compassion factors that combine into the total self-compassion score (SC) include three "positive" constructs: Self-Kindness, Common Humanity, and Mindfulness, and three "negative" constructs: Self-Judgement, Isolation, and Overidentification. The three negative constructs are reverse scored, such that a higher score corresponds to a more positive outcome (e.g., a higher rating of Isolation actually corresponds with lower feelings of isolated suffering unique to the self).

Table 11

Correlation Matrix, MLQ and SCS-Y Subscales

Variable	*n*	*M*	*SD*	1.	2.
1. Search for Meaning (SM)	31	21.13	8.23	-	-
2. Presence of Meaning (PM)	31	19.32	7.48	-	-
3. Self-Kindness	32	8.97	2.51	-.26	.25
4. Common Humanity	32	7.63	2.35	-.37[*]	.13
5. Mindfulness	32	8.53	2.63	-.22	.33
6. Self-Judgement	32	8.41	2.98	-.38[*]	.50[**]
7. Isolation	32	8.53	3.46	-.50[**]	.49[**]
8. Overidentification	32	4.97	1.84	-.39[*]	.51[**]

[*]$p < .05$. [**]$p < .01$.

SM was significantly negatively correlated with all three of the negative self-compassion constructs: Self-Judgement, $r(31) = -.38$, $p = .03$, Isolation, $r(31) = -.50$, $p = .004$, and Overidentification, $r(31) = -.39$, $p = .03$. As search for meaning increased, these negative experiences tended to be more intense because these scales are reverse scored. PM was significantly positively correlated with the same subscales: Self-Judgement, $r(31) = .50$, $p = .004$, Isolation, $r(31) = .49$, $p = .005$, and Overidentification, $r(31) = .51$, $p = .004$. This means that a higher presence of meaning tended to be associated with lower levels of negative experiences. SM was also significantly negatively correlated with one of the positive constructs: Common Humanity, $r(31) = -.37$, $p = .04$. This means that as search for meaning increased, the sample's beliefs that their experiences are universal tended to decrease (i.e., their suffering is unique to them). Common Humanity was not significantly correlated with PM. Self-Kindness and Mindfulness were not significantly correlated with SM nor PM.

Partial Correlations

Partial correlations (controlling for gender and total difficulties) were conducted to explore the correlation between GAI and the outcome variables (i.e., SC, SM, and SPD).

Linearity statistics were computed between pairs of scale variables (i.e., GAI, TD, SM, and

SPD), none of which indicated significant deviation from linearity (Table 12). Visual

examination of scatter plots also appeared to show approximately linear relationships (Appendix

H).

Table 12

Deviation from Linearity Tests for Partial Correlations

	Sum of Squares	*df*	Mean Square	*F*	*p*
GAI vs. TD	756.55	15	50.44	0.58	.82
GAI vs. SC	1350.28	17	79.43	1.74	.18
GAI vs. SM	937.36	17	55.14	0.96	.55
GAI vs. SPD	1336.19	21	63.63	0.94	.58
TD vs. SC	296.30	18	16.46	0.87	.62
TD vs. SM	681.50	18	27.71	1.37	.30
TD vs. SPD	439.95	21	20.95	0.53	.88

Partial Correlation 1: Is intelligence correlated with self-compassion in highly

intelligent adolescents when controlling for current difficulties and gender? A partial

correlation was conducted to determine whether intelligence is associated with self-compassion

when controlling for total difficulties and gender. The correlation between GAI and SC was

statistically significant, $r(26) = .41$, $p = .03$ (Table 13). When the effects of gender and

difficulties are partialled out, intelligence is moderately and significantly correlated with self-

compassion. This means that among highly intelligent adolescents, as intelligence increases, self-

compassion also tends to increase, but only to a modest degree.

Table 13

Primary Data Partial Correlations

Control Variables			SC	SM	SPD
TD, Gender	GAI	$r(df)$	.41*(26)	-	-
		p	.03	-	-
TD, Gender	GAI	$r(df)$	-	-.61* (26)	-
		p	-	.001	-
TD, Gender	GAI	$r(df)$	-	-	-.49* (26)
		p	-	-	.008

$^*p < .05.$ $^{**}p < .01.$

  Partial Correlation 2: Is intelligence correlated with search for meaning in highly intelligent adolescents when controlling for current difficulties and gender? A partial correlation was conducted to determine whether GAI is associated with SM when controlling for TD and gender. The correlation between GAI and SM was statistically significant, $r(26) = -.61$, $p = .001$ (Table 13). When the effects of gender and difficulties are partialled out, intelligence is inversely correlated with search for meaning in life in highly intelligent adolescents.

  Partial Correlation 3: Is intelligence correlated with discrepancy between search for and presence of meaning in highly intelligent adolescents when controlling for current difficulties and gender? A partial correlation was conducted to test whether GAI is correlated with SPD when controlling for TD and gender. The negative correlation between GAI and SPD was statistically significant, $r(26) = -.49$, $p = .008$ (Table 13). This is interpreted to mean that, for highly intelligent youth, intelligence is inversely correlated to meaningfulness disparity (i.e., SM-PM) when the effects of current difficulties and gender are partialled out. This suggests that as intelligence level increases, youths' search for meaning tended to decrease relative to their presence of meaning.

Chapter Five: Discussion

Growing up feeling different than others can be uncomfortable. If what makes a child feel different is viewed by society as a "gift" or due to nature (i.e., genetics), there can be confusing social and emotional consequences. The purpose of this study was to explore intelligence and cognitive discrepancy as they relate to social-emotional functioning and subjective well-being in highly intelligent youth. A comprehensive review of the scientific literature revealed significant knowledge gaps regarding verbal-fluid discrepancy in relation to social-emotional functioning and the experiences of meaningfulness and self-compassion in highly intelligent adolescents. There is also a dearth of research into these areas of interest in Canadian populations, and across ages and genders. The current study aimed to fill these gaps through an expansion of relevant research with highly intelligent adults and studies exploring self-compassion and meaningfulness in the general population. Gender and age-based analyses further place the current study within an important niche of school psychology research and practice.

Through analyses of archival psychoeducational assessment data, the current study examined the discrepancy between verbal and fluid intelligence as it relates to internalizing symptoms and social functioning problems. A statistically significant correlation was found between verbal-fluid discrepancy and subjective social stress in highly intelligent youth. Parents rated their children as experiencing significantly more emotional distress than the children noted themselves. Within a subsample of the secondary data participants, significant correlations were found between meaningfulness and intelligence. Gender differences were revealed regarding current life difficulties, search for meaning, and meaningfulness discrepancy, such that females reported more negative experiences in these dimensions. A discussion of these results continues

below, followed by an overview of the study's strengths and limitations, as well as

recommendations for future research.

Verbal-Fluid Discrepancy and Internalizing Symptoms

The current study's first research question involved determining how verbal-fluid

discrepancy is related to internalizing symptoms and problems in social functioning in highly

intelligent youth. To answer this question, participants' fluid intelligence scores were subtracted

from their verbal intelligence scores to create a discrepancy score. The discrepancy score was

correlated with six social-emotional functioning T scores, which were also compared by gender

and age category for demographic analyses using t tests.

Gender and age differences were not found for any social-emotional T scores. This result

was expected, as both the BASC-3 and CBRS rating scales are age- and gender-normed. Thus,

even if age categories and genders differed in their social-emotional experiences, mean

differences between groups would still be expected to be small because each individual is

compared to others of their same age and gender. This result provides support for the sample's

representativeness and generalizability to the general population.

The mean discrepancy between verbal and fluid ability was observed to be large relative

to the general population (i.e., full IQ range), but large cognitive discrepancies are typical in

highly intelligent youth (Detterman & Daniel, 1989; Guénolé et al., 2015; Lohman et al., 2008;

Silver & Clampit, 1990; Sweetland et al., 2006; Wilkinson, 1993). This observation therefore

suggests absence of sampling bias as the sample therefore resembles the typical distribution of

scores within the general population of highly intelligent youth.

Depression and anxiety self-report T scores closely matched those of the standardization

sample. These findings were expected based on prior research assertions that highly intelligent

youth do not experience internalizing disorders at higher than typical rates (Francis et al., 2016).

Anxiety and Depression self-ratings were moderately correlated, as would also be expected

given the frequent cooccurrence of these symptoms (Clark & Watson, 1991).

Parents rated their highly intelligent children within the highest range for emotional

distress and, on average, their ratings exceeded the threshold of clinical significance. This was a

surprising finding. Neither parent- nor child-rating of emotional distress was significantly

correlated with intelligence, so the high emotional distress ratings are not directly explainable by

the selection criteria for the sample (i.e., high intelligence). One possible explanation is that

youth who are referred by their parents for psychoeducational assessments tend to be

experiencing disorders or situations that may directly or indirectly lead to emotional distress

(Jerome, 2019). For example, youth referred for assessment are diagnosed with internalizing

disorders at higher rates than would be found at random (Khodeir et al., 2020; Margari et al,

2013; Tung et al., 2006). Not surprisingly, because they have been referred for specific

psychological or behavioural concerns, clinical populations also are diagnosed at high rates with

internalizing disorders (Khodeir et al., 2020) and neurological conditions such as learning

disabilities (Kamphaus et al., 1991) and ADHD (Fairman et al., 2017).

Parents often demonstrate disagreement about the nature and severity of problems in their

children through rating scales (Schroeder et al., 2010) with mothers tending to rate child

problems as worse than fathers. Because the current study primarily utilized mother ratings, and

rating scales typically combine parent ratings when developing normative statistics, it is possible

that the exclusion of father ratings inflated mean score for CBRS parent-ratings. This does not

explain, however, why the BASC-3 subsample's Anxiety and Depression scores were typical.

Another explanation might be that parents referring children for private assessments, like the current study's sample, are more sensitive to their children's distress than those in the greater normative population or those who opt to wait for publicly funded assessment. One study found that parents who seek private assessment generally have a higher socioeconomic status, with most having a moderate to high income and at least a university level of education (Jerome, 2019). Thus, these parents may have more free resources (e.g., time, knowledge) and lower stressors (e.g., poverty, negative health outcomes) contributing to a higher sensitivity to their children's emotional distress. This theory aligns with Conger et al.'s (1992) Family Stress Model, which asserts that parental sensitivity tends to decrease with socioeconomic status due to these additional stressors. The Family Stress Model has been substantiated by empirical research (Mesman et al., 2011), and significant relationships have been found between socioeconomic status and parental sensitivity to distress (Downer & Pianta, 2006; Cooke et al., 2022).

Self-ratings of emotional distress were significantly lower than parent-ratings but still above typical rates on average. Although previous research has found that highly intelligent youth tend to mask internalizing symptoms around others (Jackson & Peterson, 2003; Vialle et al., 2007), this was not evident in the study sample. Differences between parent- and self-ratings may be explained by sampling bias in favour of parent-ratings of high emotional distress, either due to parent characteristics (e.g., parents who refer their children for private assessments) or child characteristics (e.g., children who are not as aware of their distress as their parents are). Research has shown that children with ADHD, for example, often show low self-awareness in their rating scale reports, inflating discrepancies between parent- and self-ratings (Steward et al., 2017).

Within a research population of children referred for psychoeducational services, the cross-informant agreement between parents and children on the Emotional Distress subscale was low, $r = .13$ (Mullins, 2010). Within the CBRS normative sample, this correlation was moderate, $r = .52$ (Conners, 2008). Thus, cross-informant disagreement appears to be more typical among clinical populations. Indeed, there is lower correspondence between parent- and self-ratings among children with intellectual disabilities (Huebner et al., 2002), autism (Youngdahl, 2020), ADHD (Steward et al., 2017), and anxiety (Rapee et al., 1994). Other potential factors affecting clinical populations, such as level of maternal stress (Reyes et al., 2008), might further influence parent-child disagreement on rating scales (Murphy & Dodd, 2020).

Further understanding of this phenomenon would be relevant to practitioners of psychoeducational assessment, psychometricians, and other professionals who develop or utilize psychological rating scales in their practice. Knowing that interrater disagreement is typical among clinical populations may, for instance, quell alarm if major discrepancies are found. On the other hand, something more worrisome might be going on within these groups, such as symptom-masking (Jackson & Peterson, 2003), lower parent-child attunement (Miller et al., 2017), parental overinvolvement (Pfeiffer, 2001) or overcontrol (Miller et al., 2017).

Neither intelligence nor verbal-fluid discrepancy demonstrated significant correlations with internalizing symptoms in the current study. These findings align with prior research indicating that highly intelligent youth do not experience internalizing symptoms at higher rates than their average intelligence peers (Francis et al., 2016; Tasa et al., 2022; Yazid et al., 2019), and expand on this finding, in that verbal-fluid discrepancy is not directly associated with internalizing symptoms as measured by rating scales. Although some highly intelligent youth report high levels of internalizing symptoms, it does not appear as if these symptoms are

specifically related to the discrepancy between verbal and fluid intelligences. As informed by Yazid et al. (2019), the current study explored the relationship between intelligence and emotional difficulties through the inclusion of additional variables (e.g., demographics, cognitive discrepancy), but did not find notable associations between intelligence and internalizing symptoms when considering age, gender, or verbal-fluid discrepancy. It is possible, of course, that there still exist conditions that place some highly intelligent youth at greater risk of internalizing symptoms. Possible conditions include socialization variables (e.g., quality of attachment relationships, parental attunement, parental depression) or practical living situations (e.g., traumatic events, abuse, socioeconomic status, limited access to enrichment or social-emotional learning programming) (Brumariu & Kerns, 2010; Orvaschel et al., 1980; Vibhakar et al., 2019; Zare et al., 2018). In other words, known risk factors for internalizing disorders may still be exacerbated (or moderated) by intelligence or verbal-fluid discrepancy. Alternately, other intelligence discrepancies (e.g., verbal-visual, visual-fluid) may serve as significant predictors of internalizing symptoms.

The current study examined overall intelligence as it relates to subjective well-being, but did not possess the statistical power to explore current difficulties (e.g., hyperactivity, peer problems) or subjective well-being (e.g., meaningfulness and self-compassion) as they relate to verbal-fluid discrepancy. Like risk factors for depression or anxiety, is possible that such traits may act as mediators or moderators for internalizing symptoms or social functioning difficulties in highly intelligent youth.

Verbal-Fluid Discrepancy and Social Functioning

The current study found that verbal-fluid discrepancy is moderately and significantly correlated with social stress in highly intelligent youth. Higher fluid intelligence relative to

verbal intelligence was found to be associated with higher self-reported levels of social stress. Social stress was measured by a scale that quantifies level of stress about personal relationships or feelings of exclusion. This finding contributes to the evidence for asynchronous development in highly intelligent youth being associated with social functioning problems (Farrent & Grant, 2005; Manaster & Powell, 1983; Roedell, 1986; Robinson, 2008). Prior research in the social functioning of highly intelligent youth has pointed at deficiency in empathic skills (França-Freitas et al., 2014), feeling different or having misaligned interests with peers (Francis et al., 2010; Manaster & Powell, 1983), and age-restricted settings such as school classrooms (Farrent & Grant, 2005). These studies did not explore cognitive profile. Verbal-fluid discrepancy, thus, may contribute to some youth in these studies experiencing more social difficulty.

Research has established that intelligent youth experience high rates of peer victimization (Peterson & Ray, 2006), but the current study is the first known to establish a link between verbal-fluid discrepancy and social stress in this population. Although it is not known why higher relative fluid intelligence might be associated with more social stress in intelligent youth, one possible explanation is that the greater the difference between abilities, the more developmental asynchrony may be present within the social world of an adolescent (Cross & Cross, 2015; Guénolé et al., 2015; Kristensen & Torgersen, 2008). This asynchrony may present by way of mismatched interests, underdeveloped social skills, or difficulty communicating due to the inability to express complex thoughts (Farrent & Grant, 2005; Manaster & Powell, 1983; Roedell, 1986; Robinson, 2008). An individual with highly advanced fluid reasoning may be experiencing an abundance of cognitive activity that remains within an adolescent's subjective world, without the verbal skill to adequately connect their inner world to their social world.

Verbal-fluid discrepancy could reinforce rumination, overthinking, or misinterpretation of social interactions, although further research is needed to determine the specific impacts.

Verbal-fluid discrepancy may also contribute to peer relationship problems. Advanced fluid reasoning, but without the verbal ability to mask or mitigate it socially, may lead to a youth's peers seeing them as different or not fitting in. Associated issues such as peer rejection or bullying may accompany this perception from others (Peterson & Ray, 2006). Furthermore, because participants in the current study were sampled from a clinically referred population, it is possible that a proportion of the sample may be on the autism spectrum. Within the possible proportion of the sample with autism, lower masking ability may partly explain the correlation between verbal-fluid discrepancy and social stress. This previously unknown pattern in highly intelligent youth has important implications for educators, psychologists, parents, and youth themselves. Instead of assuming a mathematically gifted child is doing well because they are achieving good grades and appear to have positive relationships, we might investigate their subjective social well-being.

Youth demonstrated large discrepancies between verbal and fluid abilities, much like participants in previous research (Detterman & Daniel, 1989; Guénolé et al., 2015; Lohman et al., 2008; Silver & Clampit, 1990; Sweetland et al., 2006; Wilkinson, 1993). School psychologists, then, should approach verbal-fluid discrepancy with caution when interpreting cognitive scores for highly intelligent youth as evidence of psychopathology. Other discrepancies (e.g., verbal-visual or visual-fluid) were not explored in the current study, but may be useful toward further understanding of the emotional characteristics of highly intelligent youth.

Self-ratings of social stress were found to be moderately correlated with verbal-fluid discrepancy, but parent-ratings of social problems were not, implying that verbal-fluid

discrepancy may impact subjective social functioning but not necessarily objective social functioning. This is an important distinction for practitioners and educators, as social functioning problems may not be apparent to observers. If intelligent children with relatively higher fluid intelligence are likely to experience social anxiety, for example, but are also highly skilled at masking their anxiety, then parents and teachers may be entirely unaware of the child's subjective state of suffering. Although is not known yet whether this pattern is limited to highly intelligent youth, practitioners of school psychology should take moderate to high self-ratings of social stress seriously, even when associated with low levels of parent-rated social problems. In clinically referred populations of children, correlations between self- and parent-ratings may be minimal (Mullins, 2010), so it is up to the psychologist's judgement about which rating to trust more or when to dig deeper. Although professional clinical judgement is required in all psychoeducational assessment decisions, this study's results suggest that when it comes to highly intelligent youth, low self-ratings of social functioning should not be taken lightly. Furthermore, if an individual demonstrates significantly higher fluid than verbal intelligence, a thorough practitioner may do well to screen for low subjective social functioning during assessment, regardless of the referral question. Identifying social stress is a critical first step to addressing it, but there is important work to be done before evidenced-based intervention can be recommended for highly intelligent youth experiencing social functioning difficulties.

Parent-ratings of social problems were high on average, but they were not correlated with either intelligence or fluid-verbal discrepancy. The CBRS does not include a Social Problems self-rating, so it is not known how youth would have rated themselves on such a measure. This finding is different from the current study's other finding about youth with higher intelligence tending to have higher ratings of social functioning difficulty (i.e., BASC-3 Social Stress). This

may be explained, however, by the different underlying constructs measured by Social Stress, a subjective scale, and Social Problems, an objective scale (see Appendix B for summaries of scales used in the current study). Social Stress is a subscale that measures a youth's feelings of exclusion, loneliness, stress in relationships, and feelings of peer victimization. Social Problems, on the other hand, measures a parent's perceptions of these same things, along with poor communication skills, social awkwardness, low sociability, or difficulty with social reciprocity. It is therefore possible for an individual to report high social stress while their parent reports low social problems, if the social functioning problems are primarily subjective and are masked (e.g., social anxiety, but has healthy friendships). Research has demonstrated that people experiencing social anxiety, for instance, become skilled at hiding their anxiety, meaning it would be difficult to detect objectively, but also difficult to treat (Voncken et al., 2006). Likewise, parents may report high social problems, but the youth may report low social stress. For instance, a youth may demonstrate low social reciprocity, but this might not lead to subjective distress. Youth with ADHD, for example, tend to report fewer social problems than their parents report about them (Steward et al., 2017).

Intelligence and Self-Compassion

The current study's primary data analysis investigated how intelligence is related to self-compassion and meaningfulness in highly intelligent adolescents. Age and gender differences were examined using *t* tests, which contributed to partial correlations controlling for gender differences and current life difficulties. The three partial correlations correlated intelligence with self-compassion, search for meaning in life, and the discrepancy between search for and presence of meaning in life (search-presence discrepancy).

Females reported a lower level of self-compassion than males, but this difference was not statistically significant and therefore does not align with prior research (Bluth et al., 2016). The current study's low sample size may have limited statistical power in identifying a significant mean difference, and it cannot be definitively denied that there are gender differences in self-compassion in highly intelligent adolescents.

Results of the current study align with research asserting that highly intelligent adults experience self-compassion differently than other groups (Pollet & Schnell, 2017). When gender and current difficulties were partialled out, the correlation between intelligence and self-compassion was statistically significant; intelligence was positively correlated with self-compassion. Evidence suggests that relational perspective-taking varies with intelligence (Gore et al., 2010). Perhaps intelligence provides more mental resources to understand situations from a broader perspective (i.e., seeing the big picture), including a more accurate assessment of one's contributions to a problem without overemphasizing self-blame.

Another possible reason for the correlation between intelligence and self-compassion might be that intelligent adolescents are simply more confident in their abilities during their school years. Research has shown that youth with higher self-compassion participate more in class, seek more help, and fear negative social evaluation less than their lower-self-compassion counterparts (Long & Neff, 2018), and intelligence is strongly predictive of academic success (Deary et al., 2007). Thus, intelligence, leading to high academic achievement, may serve as a protective factor against low subjective well-being in highly intelligent youth by way of encouraging participation and social interaction in the classroom setting. It might be thought that highly intelligent youth would naturally participate more in class because of an easier time understanding lessons, but research has not identified a correlation between participation and IQ

(Montello, 1988; Williams, 1971). So, because greater self-compassion is related to greater class participation, classroom interventions should focus on self-compassion development for all students. Children grasp information at different rates, but all may benefit from teacher/peer acknowledgement of unique strengths, confidence-building tools through social-emotional learning, and emphasis on hard work rather than achievement. Building confidence in school, regardless of intelligence and achievement, may improve outcomes for all youth.

Intelligence and Meaningfulness

Search for Meaning

Intelligence was strongly correlated with search for meaning when gender and difficulties (i.e., peer problems, behavioural issues) were partialled out. The direction of this association, however, was contrary to the hypothesis that higher intelligence would be correlated with higher search for meaning. In fact, search for meaning tended to decrease as intelligence increased. Although the current study carries methodological limitations, results in this adolescent sample do not align with Vötter's (2019) finding that highly intelligent adults experience higher levels of crisis of meaning. It appears that the reverse pattern is evident in adolescents, with young people experiencing less of a search-presence discrepancy as their intelligence increases. Possibly, this association is due to trends of identity development in highly intelligent youth. Lovecky (1997) argues that moral sensitivity (i.e., internalizing of empathy, justice, fairness) is a primary catalyst to identity development, and that highly intelligent children experience earlier development of moral sensitivity. Thus, identity formation may occur sooner for these youth than for their peers. An earlier formation of identity would mean that the big questions of life's meaning (e.g., "who am I?"; "Why am I here?"; "What does it all mean to me?") may have already started to resolve within the individual by the time they reach adolescence.

It is unclear why these patterns in meaningfulness may differ between youth and adults. One can imagine that many highly intelligent youth achieve success easily in their school years, but find more difficulty reaching their goals as adults due an underdeveloped work ethic not keeping up with increasing demands. Feelings of failure may contribute to a subsequent crisis of meaning. Vötter (2019) provides support for this notion, having found that resilience serves as a moderator between crisis of meaning and subjective well-being in highly intelligent adults (but not high achieving adults). When this concept is theoretically expanded to adolescents, as highly intelligent youth mature, those with lower resiliency resources may experience greater impacts from the challenges of adult life than those with higher natural resiliency, leading to crisis of meaning. An abundance of research has established that resiliency factors, such as self-efficacy, self-control, and motivation to succeed help young people overcome adversity (Masten et al., 1990; Ungar & Theron, 2020). It is not far-fetched to consider that highly intelligent youth may not develop these particular resiliency factors like typically developing youth do. Replication of Vötter (2019) and the current study is warranted in order to confirm the associations and to learn more about how intelligence and meaningfulness interact.

Search-Presence Discrepancy

Males reported a slight negative value for search-presence discrepancy suggesting that as a group they are satisfied with their current experience of meaning in life. Females, on the other hand, reported experiencing a significantly greater discrepancy between their search for meaning and presence of meaning, with search much higher than presence. This was an unexpected finding, given that prior research has found no gender differences in meaningfulness (Balgiu, 2020; Steger et al., 2006; Steger & Samman, 2012; Wang & Dai, 2008), although studies were completed with adults. Between binary genders, there was a mean difference of 11.5 points on

search-presence discrepancy. The possible values for the discrepancy variable range from -25 to +25, so this difference is both statistically and qualitatively large. Meaningfulness, therefore, may be experienced differently between genders among highly intelligent youth. It is possible that intelligent females experience more crisis of meaning in adolescence than do intelligent males. Prior research has found numerous trait trends between adolescent girls and boys that could conceivably contribute to differences in meaningfulness. These include emotional self-awareness and attunement (D'Amico & Geraci, 2022), perceived school pressure (Låftman & Modin, 2011), locus of control (Chubb et al., 1997), and self-esteem (Kearney-Cooke, 1999). Any of these established differences may serve as moderators or mediators for the subjective experience of meaningfulness. A full interpretation of this gender difference, however, is beyond the scope of the current study.

It was hypothesized that intelligence would be positively correlated with meaningfulness disparity, but results did not provide support for this. The current study found that intelligence and meaningfulness disparity are moderately correlated when the effects of gender and current difficulties are controlled for, but as intelligence increased, search-presence discrepancy decreased. Although causality cannot be inferred, it is possible that intelligence serves as a protective factor against crisis of meaning in adolescents.

As mean Total Difficulties increased, so did Search-Presence Discrepancy. This correlation was stronger than that between Total Difficulties and Presence of Meaning/Search for Meaning, both of which were also statistically significant. In other words, those experiencing a crisis of meaning may also be experiencing difficulties in other domains of life (e.g., socially, behaviourally, emotionally). This suggests that meaningfulness may be an important metric for well-being in highly intelligent adolescents. The sample size of the current study was too small

to compare meaningfulness scores with specific difficulties (e.g., peer problems). Such a comparison, however, would be useful to future research, as would be a comparison between meaningfulness scores and social-emotional T scores from norm-referenced scales such as the BASC-3 or CBRS.

Elucidation of the precise relationship between the two subjective well-being outcome variables remains to be done. Due to limitations to statistical power, an in-depth exploration of the six discrete constructs measured by the SCS-Y as they relate to the two MLQ meaningfulness constructs could not be done. Bivariate correlations, however, revealed that Search for Meaning and Presence of Meaning were differentially correlated with these constructs in the sample of highly intelligent adolescents. In general, the "negative" self-compassion scores (Self-Judgement, Isolation, and Overidentification) tended to worsen with a greater search for meaning, and decrease with a greater presence of meaning. These patterns suggest that those experiencing a crisis of meaning may also experience more actively negative lack of self-compassion. Not surprisingly, presence of meaning in life appears to be associated with less actively negative self-directed thoughts. These findings provide support for the assumption that these two experiences, meaningfulness and self-compassion, likely go hand in hand. Interventions for one may, therefore, influence the other.

Interestingly, searching for meaning was also correlated with an actively positive self-compassion factor: Common Humanity. Speculating as to why this might be certainly warrants further inquiry, but it is possible that those seeking meaning are finding relief through connectedness with others, either in fact or in thought. The belief that one is not alone may help to satisfy some of the most basic of human psychological needs: attachment and belonging.

Strengths and Limitations

The current study demonstrates several strengths and limitations. A discussion of the study's methodological and theoretical strengths is followed by a discussion of limitations.

The selection of cognitive and social-emotional functioning measures offers robustness of data. The WISC-V, the CBRS, and the BASC-3 are all standardized, norm-referenced measures that compare individuals to other youth of the same age. Normed, standardized tests are crucial if one wishes to determine whether an individual varies significantly from their peers on a specific trait. These tests were therefore more useful in answering the study's specific research questions than measures that determine whether a youth meets specific diagnostic criteria for a disorder (i.e., criterion-based measures). Each of the measures utilized in the current study has been used extensively in scientific studies and have been investigated for validity and reliability measures. The WISC-V requires specialized training and significant time to administer. It is therefore a more authentic representation of cognitive functioning than would be a group-administered, online, or proprietary test, such as the Mensa IQ Challenge (a 25-minute online test required to gain entry to the Mensa International Society).

Another methodological strength is the use of a clinical population. Clinical assessment data were collected individually by trained practitioners who were supervised by experienced psychologists. The cognitive and social-emotional data, therefore, can be considered trustworthy and secure. The data was also collected anonymously from the clinic database, providing a level of distance between the researcher and the data. Primary data were also collected individually from the youth. Because no specific outcomes were associated with youths' specific answers, this data can be trusted as an honest and true representation of youths' self-compassion, strengths and difficulties, and meaningfulness experienced.

A theoretical strength of the current study was the factoring out current difficulties faced (TD). Because it was assumed that current life events and level of functioning (e.g., mental health concerns, bullying behaviour/victimization, learning difficulties) would be strongly associated with subjective well-being variables of interest, it was important to control for the difficulties that the youth may currently be facing in order to get a purer understanding of how intelligence contributes to outcomes. If each separate difficulty area had been measured separately, statistical power would have been drastically reduced, and questionnaire-answering would have been significantly more arduous and invasive. The pool of potential participants was small initially, so any further barriers to participation needed to be removed where possible.

This study offers an exploratory investigation of a variety of facets of well-being in highly intelligent youth. Rather than limiting its scope to pathology, this study specifically includes well-being as an outcome state. This is an important distinction as the fields of psychology and human development move away from the philosophy that our ideal state is the absence of disease and dysfunction and toward the goal of a positive state of holistic well-being.

Adolescent self-report allowed for a more direct measure of social-emotional functioning and subjective well-being, but may also be considered a limitation of the current study. Adolescents, particularly younger ones, may not yet have the developmental capacity to recognize and communicate their subjective experiences. One facet of internalizing symptoms was measured by both self- and parent-ratings, the intention being to determine whether raters differed in their assessment of a youth's emotional distress. Rater differences were in fact present in the current study. Like this study, research involving adolescents should include data from multiple raters to gain a more holistic understanding of youth mental health and well-being.

Limitations include sampling bias, research design, and lower-than-ideal statistical power. The sample consisted of children whose parents paid privately for psychoeducational assessment services, suggesting that they are likely highly involved parents and possess adequate resources to pay privately for assessment. Approximately half of the potential families responded to the invitation to participate, which was higher than expected, but still indicative of possible sampling bias. For instance, parents who respond to research invitations may answer rating scales differently than those who chose not to respond or are too busy to participate, which would point to non-random sampling from the participant pool. Youth were also assessed at an urban location, excluding rural children and adolescents. The final sample was two-thirds male, and there was a smaller number of older adolescents represented. Thus, the results of this study may not be representative of a diverse population, including broad ranges of socioeconomic statuses, nonbinary genders, cultures, races, or locations. These variables were not included in the current study for analysis, but future research would do well to include such factors when possible.

There are also limitations associated with the study design. The current study was cross-sectional. Because individuals had completed a social-emotional rating scale at the time of assessment, it would have been interesting to examine how such scores might have changed over time. A longitudinal design that collected current BASC-3/CBRS data would be a useful analysis when compared with self-compassion and meaningfulness measures. Another limitation of the research design is the exclusive participation of highly intelligent youth. As it was determined that overall intelligence was not associated with social-emotional functioning, future studies may explore how verbal-fluid discrepancy relates to social-emotional scores across the entire IQ range. Further, it has been established that anxiety symptoms can impact verbal and fluid

intelligence scores (Oliver, 1999) and so youth experiencing higher levels of anxiety may be achieving lower scores than they otherwise would, potentially confounding the measured association between verbal-fluid discrepancy and internalizing symptoms.

Another design limitation was the arbitrary cut-off of cognitive scores used for inclusion criteria. The current study aimed to be inclusive of non-identified gifted individuals (i.e., IQ $\geq$ 115 instead of $\geq$ 125) to improve estimates of sample size and better represent the general population. It is acknowledged that this cut-off is still arbitrary, and is still not representative of youth who would not meet inclusion criteria. Unfortunately, the more inclusive the IQ range, the less representative of "highly-intelligent" youth the sample would be, with the assumption that greater effects of intelligence would be observed the higher the level of intelligence.

Finally, the Self-Compassion Scale for Youths (SCS-Y) was developed for youth aged 10 to 14. The current study utilized the same scale for older participants (up to age 18) for ease of comparison. The SCS-Y and the adult version of the SCS are very similar, with the SCS-Y somewhat simplified, although neither measure is normed to the population, and both are scored the same way.

Future Directions

The current study found that among highly intelligent youth, verbal-fluid discrepancy is associated with social stress and that intelligence is associated with self-compassion and meaningfulness. These findings have important implications for the fields of education and psychology. A greater understanding of the unique vulnerabilities of highly intelligent youth can assist teachers in addressing educational and social-emotional needs of students of the entire intelligence spectrum. School boards may consider that directed programming for highly intelligent children should include social-emotional learning modules to moderate the risk factors

identified in this study. In assessing highly intelligent youth, school psychologists will come to more accurate conclusions when considering IQ and discrepancies between fluid and verbal intelligence, and how these factors may be associated with other areas of risk, such as social stress and difficulties in finding meaning in life. These results may help inform social-emotional interventions for highly intelligent youth, with a greater focus on developing a sense of meaning (e.g., Armstrong et al., 2018; Turanzas et al., 2020).

Further research into the specific social stressors experienced by this population is warranted to better conceptualize the difficulties faced by those with relatively higher fluid intelligence. Future studies would do well to more intentionally explore these associations to inform programming for all highly intelligent youth (e.g., social-emotional learning modules), and intervention for those who show extreme difficulty (e.g., counselling). Exploration of the effects of other types of cognitive discrepancies (e.g., fluid-visual, and verbal-visual), longitudinal study, and phenomenological inquiry would all be important elements toward a fuller picture of social stress in this population. Future researchers would also do well to include the full spectrum of intelligence to confirm that verbal-fluid discrepancy is not associated with social stress in other youth.

Deepening our understanding of why highly intelligent adolescents appear to benefit from greater self-compassion and sense of meaning would also be of use to practitioners in developing programming for all youth. The current study's findings also bring up important new questions, such as why intelligence might play a protective role against low self-compassion. Qualitative inquiry might be especially useful in better understanding these trends. Another question to explore is whether cognitive discrepancy plays a role in self-compassion and/or meaningfulness in highly intelligent youth, but also youth in any other intelligence range.

Self-compassion was found to be associated with intelligence. As self-compassion is a relatively new concept within the field of psychology, especially child psychology, there is justification for further exploration of how socialization and genetics each might contribute to the subjective experiences of self-compassion, and how self-compassion may contribute to differential youth outcomes for all genders.

This study also found that intelligence is associated with meaningfulness and that highly intelligent females and males experience meaning differently. In particular, females may be at a higher risk of crisis of meaning. It is warranted for future studies to explore this phenomenologically to determine where additional support may be needed to alleviate existential stress for highly intelligent female adolescents. Through further research to inform practice we can better serve these youth by way of more precise assessment, and more informed caregiving and educating. It may be that highly intelligent females would benefit from targeted intervention to assist them in their search for meaning, whatever this may mean for each individual. In doing so, we can help improve subjective well-being of more students and their families.

Intelligence was found to be negatively correlated with search-presence discrepancy in highly intelligent adolescents. Further research with adolescents of other intelligence ranges would help to elucidate whether the pattern holds for all youth. It is also recommended that future studies account for other variables that may influence sense of meaningfulness besides those accounted for by the Strengths and Difficulties Questionnaire's "Total Difficulties" score as was used in this study. Such variables might include location, historical trauma, religiosity, or socioeconomic status.

Finally, in future studies, it is recommended that efforts be made to allow for greater recruitment of people with diverse gender identities, as well as include options for individuals to

choose between more options besides "other gender." Those who did not identify as either a male or female were not represented in these results, and to be fully representative of people with diverse gender identities, future researchers face an ethical imperative to put forth the effort to explore subjective well-being measures in nonbinary individuals. There continues to be a gap regarding nonbinary individuals in research about highly intelligent adolescents. Further research, including qualitative inquiry, is warranted in exploring the unique needs of highly intelligent youth of all genders.

Conclusion

Educators have long identified the gifts that are enjoyed by highly intelligent youth. These "gifted" children, despite their higher likelihood of success as a group, also contains individuals who face significant difficulty. These youth may fall through the cracks due to exceptional skill at masking distress, and their likelihood to still achieve an average level of accomplishment when faced with extreme life challenges. This study has found that meaningfulness is experienced differently for highly intelligent youth and that individuals with a large discrepancy between certain cognitive abilities may experience more of these challenges. Therefore, programming for highly intelligent youth should contain a social-emotional learning component specifically designed for the unique risk factors this population faces. Educators and school psychologists may do well to screen informally for crises of meaning and social distress in these youth. We must work toward a system where no young people fall through the cracks, with special attention provided to those who face hidden risks.

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Appendix A

Terms and Definitions

Asynchronous development	A misalignment between chronological, social, and/or mental age, often making socializing more difficult for highly intelligent youth (Cross & Cross, 2015; Guénolé et al., 2015; Kristensen & Torgersen, 2008). Highly intelligent children experience accelerated intellectual development but develop socially and physically at typical rates, and may have difficulties connecting with their peers due to differences in interests or ways of communicating. Also referred to as "developmental asynchrony."
Cognitive profile analysis	Comparison of different cognitive profile measures (e.g., VCI, FRI) with each other, with overall ability (e.g., FSIQ, GAI), or with other measures (e.g., social-emotional rating scale scores, demographic variables).
Discrepancy score	The quantitative difference between measured abilities on a standardized test. The current study utilizes two discrepancy scores: the discrepancy between WISC-V Verbal Comprehension Index (VCI) and the Fluid Reasoning Index (FRI), and the discrepancy between the MLQ Search for Meaning (SM) and Presence of Meaning (PM).
Fluid intelligence	The ability to find solutions to novel problems. Includes the use of one's senses and reasoning to structure thought and action. Also referred to as fluid reasoning, Performance IQ, and perceptual reasoning. Measured on the WISC-V by the Fluid Reasoning Index.
Gifted	A traditional term for those in the highest bracket of intellectual functioning. The conventional criterion for giftedness is having an intelligence quotient or a single cognitive index score at least two standard deviations above the mean score (i.e., a standard score of $\geq$ 130).
Highly intelligent	Having cognitive abilities at the high end of the intelligence spectrum.
Index score	A composite score on a cognitive test representing a single area of functioning (e.g., WISC-V Fluid Reasoning Index for fluid intelligence).
Intelligence Quotient (IQ)	An overall score from a standardized test designed to measure intelligence. IQ scores are normally distributed and represented by standard scores, with a mean score of 100 and a standard deviation of 15 points. Tests that measure IQ in adolescents include the WISC-V, SB5, WJ-COG-IV, or DAS-II.

Internalizing symptoms	Symptoms experienced by an individual but may not be apparent to others. Includes feelings associated with depression, anxiety, and/or somatic complaints.
Meaningfulness	A subjective evaluation of the experience of having meaning in an activity/event or one's life overall. In the current study, meaningfulness is representative of an estimate of subjective well-being. It is quantified by the MLQ Search for Meaning and Presence of Meaning scores.
Norm-referenced	Tests that compare an individual's performance or rating to others of the same category (e.g., age, gender). Data is collected from a representative population, which is referred to as "norming" of the measure. E.g., a nationally normed measure compares an individual's score to a representative sample from the same country. Several measures utilized in the current study are norm-referenced, including the WISC-V, BASC-3, and CBRS.
Resilience	Ability to cope with adversity.
Self-compassion	The awareness of one's own predicament along with the ability to emotionally respond to one's own pain with kindness and without judgement (Neff, 2003; 2016). In the current study, self-compassion is quantified by the SCS-Y Total Self-Compassion score (SC).
Social functioning problems	Deviations from normal social functioning and/or social distress. Includes subjective experiences (e.g., social anxiety, withdrawal, loneliness, difficulty forming/maintaining friendships, poor social skills, or peer victimization) and objective observations (e.g., social awkwardness, limited social connections, social exclusion, poor communication skills, or difficulty with social reciprocity).
Subjective well-being	The quantifiable evaluation of one's own experience of their well-being. Encompasses experiences such as sense of meaning, interest, health, emotions (e.g., joy, sadness), satisfaction/dissatisfaction with life, social relationships, and work (Diener and Ryan, 2009). Subjective well-being is explored in the current study through measures of self-compassion and meaningfulness.
Verbal-fluid discrepancy	The quantitative difference between an individual's innate verbal and fluid intelligence abilities as measured by standardized cognitive tests, such as the WISC-V, SB5, WJ-COG-IV, or DAS-II.
Verbal intelligence	The formation and manipulation of verbal concepts, including acquired knowledge (Wechsler, 2014). Also referred to as Verbal IQ, verbal comprehension, and crystalized intelligence. Measured on the WISC-V by the Verbal Comprehension Index.

Appendix B

Scales and Subscales

Behavior Assessment System for Children, Third Edition (BASC-3; Kamphaus & Reynolds, 2015)	A system of norm-referenced rating scales that measure a young person's social, emotional, and behavioural functioning. Scales include self-, parent-, and teacher-ratings and are used for people aged 2-21. Indexes provided include scales of externalizing problems, internalizing problems, behavioural symptoms, and adaptive functioning. Clinical probability indexes compare ratings with diagnostic criteria to provide information about an individual's likelihood of psychopathology. All scales are presented with *T* scores.
Anxiety Subscale	A subscale that provides a rating for a child's worries and fears relative to the normative population. A child who scores high on the Anxiety Subscale may experience feelings of nervousness, excessive fears, preoccupation with the opinions of others or making mistakes, or be overwhelmed by problems (imagined or real). E.g., "little things bother me."
Depression Subscale	A subscale that provides a rating for a child's experiences of sadness, unhappiness, and thoughts about suicide, relative to the normative population. A child who scores high on this subscale may demonstrate sadness, self-criticism, mood lability, pessimism, loneliness, or may get upset easily. E.g., "I just don't care anymore."
Social Stress Subscale	A subscale that provides a rating for a child's experiences of stress in relationships and feelings of exclusion. A child who scores high on social stress may demonstrate avoidance of social interactions, loneliness, difficulty maintaining friendships with peers, poor social skills, or peer victimization. E.g., "Other people seem to ignore me."

Conners Comprehensive Behaviour Rating Scale (CBRS; Conners, 2008)	A norm-referenced rating scale that measures behavioural, emotional, and social functioning in youth aged 6 to 18. Scales include self-, parent-, and teacher-ratings. Indexes provided include scales of emotional distress, academic difficulties, defiant/aggressive behaviours, hyperactivity/impulsivity, and social problems, relative to the normative population. Symptom scales provide information on diagnostic criteria for psychological and behavioural disorders.
Emotional Distress Subscale (EDS and EDP)	A subscale on the CBRS parent, self, and teacher scales that encompasses internalizing symptoms such as anxiety, depression, low energy, social isolation, rumination, somatic complaints, and difficulty with friendships. E.g., "the future seems hopeless."

Social Problems Subscale (SPP)	A subscale on the CBRS parent and teacher rating scales that indicates issues with social interactions. A youth with a higher score on this subscale may be socially odd/awkward, have difficulty with friendships, have limited social connections, have poor communication skills, or difficulty with social reciprocity. E.g., "I have problems that make friendships really hard for me."
Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997).	A measure of global adjustment for use in people aged 2 and up. The SDQ produces five subscales of psychological adjustment and one global measure of functioning. Subscales include Emotional Symptoms, Conduct Problems, Hyperactivity/Inattention, Peer Relationship Problems, and Prosocial Behaviour. E.g., "I am often unhappy, tearful, or depressed" (Emotional Symptoms).
Total Difficulties Score (TD)	A global measure of functioning that is comprised of the total scores of all SDQ subscales except Prosocial Behaviour (excluded due being conceptually unrelated to other measured difficulties, even inversely). Possible scores range from 0 to 40.
Self-Compassion Scale (SCS; Neff, 2003)	A measure of self-compassion, or compassion/non-judgement directed at oneself. Different forms of the SCS are available for adults and youth. The SCS provides indexes of six elements of self-compassion: three positive elements (self-kindness, common humanity, and mindfulness) and their "negative" opposites (self-judgement, isolation, and over-identification). E.g., "I try to be kind and supportive to myself when I'm having a hard time" (Self-Kindness).
Total Self-Compassion (SC)	A global measure of self-compassion that is comprised of the scores of the three positive elements of self-compassion added to the inverse total of the three negative elements. Possible scores range from 17 to 85.
Meaning in Life Questionnaire (MLQ; Steger et al., 2006)	A 10-item Likert-style self-report measure of search for meaning in life and presence of meaning in life, for use with people of any age. There are no official cut-off scores that indicate problematic or pathological functioning.
Search for Meaning (SM)	A measure of respondents' level of engagement and motivation for finding or deepening a sense of meaning in their lives. E.g., "I am always looking to find my life's purpose." Possible scores range from 5 to 30.
Presence of Meaning (PM)	A measure of respondents' level of subjective experience that their life is meaningful. E.g., "I understand my life's meaning." Possible scores range from 5 to 30.

Search – Presence Discrepancy (SPD)	Discrepancy score of MLQ Presence of Meaning subtracted from MLQ Search for Meaning. Possible scores range from -25 to 25.

Wechsler Intelligence Scale for Children, 5th Edition (WISC-V; Wechsler, 2014).	A norm-referenced cognitive assessment of intellectual ability in children ages 6–16. The WISC-V assesses five domains of ability: verbal comprehension, fluid reasoning, visual-spatial, processing speed, and working memory. Results are reported with standard scores ($M = 100$; $SD = 15$).
Full-Scale Intelligence Quotient (FSIQ)	An overall measure of a child's intellectual functioning relative to other children their age. The FSIQ is computed based on a child's performance on seven subtests from all five domains of cognitive ability.
General Ability Index (GAI)	A measure of a child's intellectual functioning relative to other children their age. The GAI is similar to the FSIQ, but places less emphasis on a child's abilities in two domains: processing speed and working memory. It is an estimate of a child's combined aptitude in verbal comprehension, fluid reasoning, and visual-spatial ability.
Verbal Comprehension Index (VCI)	A measure of a child's ability to understand and utilize verbal knowledge. Questions assess acquisition/communication of word knowledge, retrieval of verbal information, and verbal problem-solving. E.g., "how are morning and afternoon alike?"
Fluid Reasoning Index (FRI)	A measure of a child's ability to detect and understand patterns, conceptual relationships between objects, and apply reasoning. E.g., viewing a scale with a missing "weight" and selecting a response that balances the scale.
Verbal-Fluid Discrepancy (VFD)	A child's FRI score subtracted from their VCI score. Represents the discrepancy between a child's verbal intelligence and fluid intelligence.

Appendix C

Strengths and Difficulties Questionnaire

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain . Please give your answers on the basis of how things have been for you over the last six months.

	Not True	Somewhat True	Certainly True
I try to be nice to other people. I care about their feelings	☐	☐	☐
I am restless, I cannot stay still for long	☐	☐	☐
I get a lot of headaches, stomach-aches or sickness	☐	☐	☐
I usually share with others, for example CD's, games, food	☐	☐	☐
I get very angry and often lose my temper	☐	☐	☐
I would rather be alone than with people of my age	☐	☐	☐
I usually do as I am told	☐	☐	☐
I worry a lot	☐	☐	☐
I am helpful if someone is hurt, upset or feeling ill	☐	☐	☐
I am constantly fidgeting or squirming	☐	☐	☐
I have one good friend or more	☐	☐	☐
I fight a lot. I can make other people do what I want	☐	☐	☐
I am often unhappy, depressed or tearful	☐	☐	☐
Other people my age generally like me	☐	☐	☐
I am easily distracted, I find it difficult to concentrate	☐	☐	☐
I am nervous in new situations. I easily lose confidence	☐	☐	☐
I am kind to younger children	☐	☐	☐
I am often accused of lying or cheating	☐	☐	☐
Other children or young people pick on me or bully me	☐	☐	☐
I often offer to help others (parents, teachers, children)	☐	☐	☐
I think before I do things	☐	☐	☐
I take things that are not mine from home, school or elsewhere	☐	☐	☐
I get along better with adults than with people my own age	☐	☐	☐
I have many fears, I am easily scared	☐	☐	☐
I finish the work I'm doing. My attention is good	☐	☐	☐

Appendix D

Self-Compassion Scale for Youths

Please circle the answer that best describes how you act towards yourself in difficult times. Please read each sentence carefully and answer honestly. Thank you.

1 Almost never   2 Not very often   3 Sometimes   4 Very often   5 Almost always

1. I try to be kind and supportive to myself when I'm having a hard time.
2. When I feel sad or down, it seems like I'm the only one who feels that way.
3. When I notice things about myself that I don't like, I get really frustrated.
4. When I feel I'm not "good enough" in some way, I try to remind myself that other people sometimes feel this way too.
5. When I feel frustrated or disappointed, I think about it over and over again.
6. When something upsetting happens I try to see things as they are without blowing it out of proportion.
7. I get mad at myself for not being better at some things.
8. When I'm sad or unhappy, I remember that other people also feel this way at times.
9. I'm kind to myself when things go wrong and I'm feeling bad.
10. When I feel bad or upset, I tend to feel most other people are probably happier than I am.
11. When something difficult happens, I try to see things clearly without exaggerations.
12. I'm really hard on myself when I do something wrong.
13. When things aren't going well, I keep in mind that life is sometimes hard for everyone.
14. When I'm feeling bad or upset, I can't think of anything else at the time.
15. I try to be understanding and patient with myself even when I mess up.
16. When I'm really struggling, I tend to feel like other people are probably having an easier time of it.
17. When something upsets me, I try to notice my feelings and not get carried away by them.

Appendix E

Meaning in Life Questionnaire

Please take a moment to think about what makes your life feel important to you. Please respond to the following statements as truthfully and accurately as you can, and also please remember that these are very subjective questions and that there are no right or wrong answers. Please answer according to the scale below:

Absolutely Untrue 1	Mostly Untrue 2	Somewhat Untrue 3	Can't Say True or False 4	Somewhat True 5	Mostly True 6	Absolutely True 7

1. _____ I understand my life's meaning.

2. _____ I am looking for something that makes my life feel meaningful.

3. _____ I am always looking to find my life's purpose.

4. _____ My life has a clear sense of purpose.

5. _____ I have a good sense of what makes my life meaningful.

6. _____ I have discovered a satisfying life purpose.

7. _____ I am always searching for something that makes my life feel significant.

8. _____ I am seeking a purpose or mission for my life.

9. _____ My life has no clear purpose.

10. _____ I am searching for meaning in my life.

Appendix F

Invitation Letter

Hello,

My name is Jennifer Boey, and I am a MSc student working under the supervision of Dr. Kelly Schwartz in the School and Applied Child Psychology program at the University of Calgary. I am reaching out to you because you previously indicated that you would be willing to be contacted for research purposes through the Integrated Services in Education clinic. I am hoping that you would be interested in participating in my thesis study, which involves exploring the emotional and social needs of highly intelligent adolescents.

Participation would involve your child completing a series of 4 short questionnaires, which would be delivered to them by email or mail, as they prefer. Questionnaires will take about 15-20 minutes to complete.

As a token of appreciation, your child will be provided with a $5 Tim Hortons gift card upon return of the questionnaires.

This study has been reviewed and received ethics clearance through the University of Calgary Research Ethics Board (REB 21-1015).

Please let me know if you are interested, and if so, I will contact you with further information.

(redacted personal information).

Thank you for your time,

Jennifer Boey
MSc student, School and Applied Child Psychology
University of Calgary
Werklund School of Education

Appendix G

Consent Form

Name of Researcher, Faculty, Department, Telephone & Email:
Jennifer Madeline Boey, School and Applied Child Psychology (redacted contact information)

Supervisor:
Dr. Kelly Dean Schwartz, School and Applied Child Psychology

Title of Project: Big Questions: The relation of cognitive profile to sense of meaning in life, self-compassion, and subjective well-being among highly intelligent adolescents

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This consent form, a copy of which has been given to you, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The University of Calgary Conjoint Faculties Research Ethics Board has approved this research study.

Participation is completely voluntary and confidential.

Purpose of the Study
Highly intelligent adolescents face unique challenges despite their skills. Youth with a large difference between abilities (e.g., higher verbal abilities than perceptual reasoning) may have more emotional struggles than those with a more consistent profile. The purpose of this research study is to investigate whether certain intellectual profiles may be associated with increased risk for emotional disturbances (including anxiety and depression), lower sense of meaning in life, lower self-compassion, or lower sense of overall well-being.

You were identified as a possible participant in this study because while at the Integrated Services in Education clinic, you consented to being contacted for further research. Your child's assessment data was selected for analysis, and we are reaching out to you for further information to compare with this data.

What Will I Be Asked To Do?
Have a short phone/Zoom/email conversation with the researcher to ensure you understand the potential risks and benefits of this research. Your child will then be contacted to ensure they also understand the risks/benefits and to obtain their agreement to participate.
1. The researcher will then send your child three questionnaires to fill out and return. Depending on preference, these could be mailed or emailed. If they request mailed copies, a stamped envelope will be provided for return. The questionnaires will take approximately 20 minutes to complete. Responses will be numbered/circled only and will not require any additional writing. The questionnaires will include questions about:

    - Positive things in your child's life (e.g., do they enjoy school? Do they have satisfying friendships?)

- About your child's strengths and difficulties (e.g., do they worry a lot?)

- How your child acts toward themself in difficult times (e.g., do they get mad at themself for not being good at something?)

- What make your child's life feel important to them (e.g., do they feel that they have a good sense of what makes their life meaningful?)

2. Once the questionnaires are returned, the researcher will reach out to answer any questions or respond to any concerns you or your family have (unless you decline this further contact at time of consent). **We will not be able to share your child's responses with you,** but your child may.

3. Your child will be provided with a $5 Tim Hortons gift card within one month of return of the questionnaires.

Participating is completely voluntary, and your family may refuse to participate altogether, may refuse to participate in parts of the study, may decline to answer any and all questions, and may withdraw from the study at any time.

What Type of Personal Information Will Be Collected?
Only necessary data will be collected from the Integrated Services in Education clinic (including name, contact information, date of birth, and assessment data). Questionnaire data will also be collected.

Are there Risks or Benefits if I Participate?
Some of the questions will be of a sensitive nature and it is possible your child will become more aware of any distressing thoughts or feelings that lead them to answer an item a certain way. This awareness may prompt a negative emotional or physical response. If this is the case, you or your child may reach out to the researcher or her supervisor to discuss how to help your child and ensure they have supports they need. You will be notified in the event of a concerning response from your child (e.g., indication of violence, dangerous substance use, or feeling unsafe at school/home). Furthermore, if it becomes evident that someone is in danger, the researcher has a legal responsibility to notify appropriate authorities (e.g., 911 if a participant is actively suicidal). There will be no direct benefit to you from participating in this study. However, this study may help the researchers learn more about the unique struggles of highly intelligent adolescents like your child. After your child's questionnaires have been returned, the researcher will provide scoring keys and an info sheet so that if they want to, your child can learn about their scores for two of the questionnaires.

What Happens to the Information I Provide?
No one except the researcher and her supervisor will be allowed to see any of the answers to the questionnaires. There are no names on the questionnaires. Personal information that will directly link you to study data will be replaced with a code unique to you. A master list linking the code and your identifiable information will be kept separate from the research data. The researcher's private personal laptop (secured with password and fingerprint) will be the only device to access your data, which will be stored in the University of Calgary's OneDrive account and encrypted. This account requires fingerprint via researcher's cell phone to gain access. Any hardcopy documents with your information will be stored in a locked cabinet only accessible to the researcher. and encrypted. This account requires fingerprint via researcher's cell phone to gain access.

Participants are free to withdraw until 2 weeks after questionnaires have been returned to the researcher. If you decide to withdraw, any data you have contributed to the study will be destroyed.

The researchers intend to keep the research data and records for at least five years. Data will be held securely within the Social Development Research Team's storage space. Data will be de-identified but the master list connecting your information to your unique code will be stored as well. All identifying documents will be digitally encrypted. Any future use of this research data is required to undergo review by a Research Ethics Board.

Would you like to receive a summary of the study's results?   Yes: ___ No: ___
If yes, please provide your contact information (e-mail address, or phone number)

_____

Signatures
Your signature on this form indicates that 1) you understand to your satisfaction the information provided to you about your participation in this research project, and 2) you agree to participate in the research project.

In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from this research project at any time. You should feel free to ask for clarification or new information throughout your participation.

Participant's Name: (please print) _____

Participant's Signature: _____ Date: _____

Researcher's Name: (please print) _____

Researcher's Signature: _____ Date: _____

Questions/Concerns
If you have any further questions or want clarification regarding this research and/or your participation, please contact:

Ms. Jennifer Boey
School and Applied Child Psychology, Werklund School of Education
(redacted contact information)
and Dr. Kelly Schwartz, School and Applied Child Psychology,
(redacted contact information)

If you have any concerns about the way you've been treated as a participant, please contact the Research Ethics Analyst, Research Services Office, University of Calgary at 403.220.6289 or 403.220.8640; email cfreb@ucalgary.ca. A copy of this consent form has been given to you to keep for your records and reference. The investigator has kept a copy of the consent form.

Appendix H

Scatter Plots, Primary Data Analysis