Gender Variance and Identity Integration: The Influence of Social- and Neurocognitive Functions

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Master Thesis - Clinical Neuropsychology

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Abstract

Due to society's heteronormative views, gender variant individuals face stigma that can negatively affect the development of a coherent sense of self (Bonifacio & Rosenthal, 2015; Wells & Hansen, 2003). Indeed, poor identity integration has been associated with low psychosocial functioning and well-being (Erikson, 1968; Mitchell et al., 2021). As various social- and neurocognitive functions have been linked to identity development, this study proposes that individual differences in these functions predict well-being and that this relationship is moderated by identity integration. Moreover, the study proposes that individual differences in gender expression predict the level of identity integration and that social- and neurocognitive functions moderate this relationship. After a convenience sample ($N = 269$) filled out a questionnaire entailing multiple instruments (i.e., identity, well-being, cognitive functions), four hierarchical regression analyses were conducted to test the hypotheses. Whereas higher neurocognition functions were associated with higher well-being, social cognition was not. Identity integration did not moderate either relationship. Whereas a positive relationship between in-group identification and identity integration was found, neither tested cognitive function positively moderated this relationship. This study adds to research on how stigmatized identities might be integrated into the overall sense of self and is the first to investigate this in gender variant individuals. Although the expected moderation effects were not found, this study stimulates further research into investigating which other factors potentially contribute to identity integration. Therefore, this research should be considered as a first explorative study indicating potential implications and operational changes for future research on the topic.

Keywords: Identity Integration, Gender Variance, In-Group Identification, Social Cognitive Functions, Neurocognitive Functions

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"Who am I?" Although many people ask themselves this and other related questions throughout their lives, specifically the period of adolescence and young adulthood is characterized by questions concerning one's sense of self (e.g., Erikson, 1968; Marcia et al., 1993). Despite there being various accounts on how the term identity is best conceptualized and how it develops throughout life (e.g., Marcia, 1966; Loevinger, 1966; Erikson, 1968; Arnett, 2000), most theories propose that for an individual to develop a coherent self, they need to integrate different parts of their identity (Mitchell et al., 2021). This process, known as identity integration, is important for healthy psychological functioning, well-being, and adapting to changes in life (Adler et al., 2016; Erikson, 1968; Mitchel et al., 2021). A fundamental component of an individual's sense of self is their gender identity, or an intrinsic sense of identifying as male, female, or a third gender (Bonifacio & Rosenthal, 2015; Steensma et al., 2013a). Indeed, gender is often conceptualized as a social identity people adopt, an approach originating from research in social psychology and highlighting that identity is largely based on group identification (i.e., an individual's degree of identification with or sense of belonging to a group) and social interaction (Schmader & Block, 2015; Tajfel & Turner, 2004; Turner et al., 1987; Henry et al., 1999; Bartel, 2001). Due to society's heteronormative views though, the development of a coherent identity might be particularly difficult for gender variant individuals, in other words, those with gender expressions that differ from what is considered normative for their physical sex (Bonifacio & Rosenthal, 2015; Burgess, 2009; Kaltiala & Ellonen, 2022; Steensma et al., 2013a). As poor identity integration relates to low psychosocial well-being and increased clinical symptoms, it is important to consider whether certain factors might moderate an individual's ability to integrate their gender expression into a coherent sense of self (Adler et al., 2016; Mitchell et al., 2021). Although a vast amount of research highlights the

importance of social- and neurocognitive functions in the development of a coherent sense of self (e.g., Penner et al., 2019; Welsh & Schmitt-Wilson, 2013), an investigation of the relationship between these processes and identity integration is lacking. Therefore, this study investigates how potentially stigmatized identities (i.e., gender variance) can be effectively integrated into the overall sense of self and whether this process might be influenced by social- and neurocognitive functions.

Identity and Identity Integration

Whereas the period of adolescence is largely characterized by exploring (i.e., examining and evaluating identity alternatives) as well as committing (i.e., deciding on an identity) to various identities (Erikson, 1968; Luyckx et al., 2006; Marcia, 1966), a core feature of identity formation in emerging adulthood is the development of a coherent sense of self (Mitchell et al., 2021). This process, known as identity integration, involves integrating various components of the self (e.g., identities, social roles, capacities) into one coherent picture (Syed & McLean, 2016; van Hoof & Raaijmakers, 2003) and can largely affect an individual's psychosocial functioning and well-being (Adler et al., 2016; Erikson, 1968; Mitchell et al., 2021). For instance, the integration of negative life experiences and multicultural identities into the coherent sense of self has been associated with increased well-being and mental health, respectively (e.g., Both et al., 2019; Chen et al., 2013; King & Raspin, 2004; Pals, 2006; Yampolsky et al., 2016). In contrast, poor integration is associated with lower psychosocial well-being and is a concern in various psychiatric conditions, including borderline personality- and posttraumatic stress disorder (e.g., Brewin, 2011; Wilkinson-Ryan & Westen, 2000). To avoid the negative consequences associated with poor identity integration, individuals need to develop and maintain a coherent sense of self over time and place (Mitchell et al., 2021).

According to a framework developed by Mitchell and colleagues (2021), two mechanisms are required for establishing and sustaining an integrated identity. Maintenance

processes involve the commitment to various parts of identity as well as a continuous reflection and meaning-making of daily situations to make minor adjustments to identity over time and place. When individuals experience a disruption in their sense of self, reestablishment processes can be adapted to repair or restore an identity (Mitchell et al., 2021). These are of particular relevance during important life changes (e.g., becoming a parent, retirement, bereavement) that can challenge an individual's perceived roles and relationships (e.g., Berntsen & Rubin, 2004; Cowan & Cowan, 1992; Feldman & Beehr, 2011; van Scheppingen et al., 2018; Walter, 2003). To minimize the effects that these events can have on the coherent sense of self, individuals can adapt a wide range of techniques, like exploring identities in line with the changing circumstances, making meaning of these changes, and preserving the most critical parts of the old identity (Mitchell et al., 2021). For instance, parents who were able to make meaning out of their newly gained parenting role and integrate it into their coherent sense of self displayed higher levels of well-being and more confidence in their function as a parent (Dunlop et al., 2017; Laney et al., 2015). The successful implementation of both maintenance and reestablishment processes is therefore associated with developing a stable but flexible sense of self that can be adjusted to the ever-changing demands of an individual's environment (Mitchell et al., 2021).

In addition to successfully implementing the abovementioned processes, developing a coherent sense of self depends on the coordination between four dimensions (i.e., contextual, temporal, ego, and person-society) of identity integration (Syed & McLean, 2016). Although most identity research (e.g., Crone, 2021; Busacchi & Martini, 2021; Tajfel & Turner, 2004) proposes that individuals possess a variety of both personal (e.g., goals, habits, talents) and social (e.g., ethnic background, social class) identities, a particularly influential one that can constitute to both categories is a person's gender identity (Bonifacio & Rosenthal, 2015; Kroger, 2007; Steensma et al., 2013a). Indeed, this identity category can be used to conceptualize the aforementioned dimensions of identity integration. Whereas contextual

integration illustrates the coherence/harmony between different identity categories (e.g., gender and religion), temporal integration is concerned with the continuity of the self and an understanding of how identity (e.g., gender) developed and changed over time (Mitchell et al., 2021; Syed & McLean, 2016). The third dimension, known as person-society integration, depicts the alignment between an individual's identity and their sociocultural context, such as the acceptance of a person's gender expression in a given cultural or social background. Lastly, ego integration is concerned with an individual's overall feeling of wholeness, which is believed to develop with the awareness of how the various identity domains have formed coherence over time (Syed & McLean, 2016). Developing such a coherent identity might be particularly difficult for gender variant individuals, who face various stressors that can affect the process of identity integration and consequently their well-being (Burgess, 2009; Roberts et al., 2012; Kaltiala & Ellonen, 2022; Mitchell et al., 2021).

Gender Variance

Whereas for most individuals, gender expression will develop in line with their natal sex, some people display identities, behaviors, or appearances that differ from what is considered normative for their physical sex assigned at birth (Bonifacio & Rosenthal, 2015; Steensma et al., 2013a). Indeed, gender variance is an umbrella term used to describe a large group of individuals, highlighting that gender expression is not always correlated with a person's sex or gender identity (Bonifacio & Rosenthal, 2015). Specifically, the term differentiates between those that demonstrate an incongruence between their physical sex and gender (e.g., trans* and non-binary individuals) and those who identify as cisgender (i.e., congruency between sex and gender) but display behaviors and/or appearances that are typically associated with the other sex, such as performing in drag (Bonifacio & Rosenthal, 2015; Knutson et al., 2021). As most types of gender variance have been associated with internal and external stressors that can potentially affect the development of a coherent sense of self (e.g., Ehrensaft, 2012; Valentine & Shipherd, 2018), the current study will investigate

gender variance as an all-encompassing term and not differentiate types of variance in its analyses.

Many gender variant individuals face stigma, social exclusion, and violence that can affect the process of identity integration, decrease psychosocial well-being, and increase clinical symptoms (Baumeister et al., 1985; Bonifacio & Rosenthal, 2015; Ehrensaft, 2012; Haslam et al., 2021; Turner, 2010; Mitchell et al., 2021). For instance, gender variance was found to be associated with higher levels of childhood abuse and sexual harassment, which are both considered risk factors for poor identity integration (Kaltiala & Ellonen, 2022; Penner et al., 2019; Roberts et al., 2012). Further, a significant relationship exists between gender variance and homosexuality, which potentially imposes further stressors (e.g., structural stigma) on identity integration (Ferrari et al., 2021; Hatzenbuehler, 2014; Steensma et al., 2013b). Similar to the development of a homosexual orientation, many individuals display first signs of gender variance in childhood, with the associated stressors becoming especially apparent during adolescence. Specifically, the start of physical puberty makes sex differences more obvious and results in individuals being more explicitly treated like their natal sex (Steensma et al., 2011; Steensma et al., 2013a). These changes have been associated with increased isolation, shame, and confusion, further impeding identity integration (Burgess, 2009; Wells & Hansen, 2003).

Altogether, it can be said that the aforementioned internal and external stressors primarily arise from society's predominant heteronormative views (Burgess, 2009; Ferrari et al., 2021; Kaltiala & Ellonen, 2022; Roberts et al., 2012), which presume a dichotomous male-female schema and a strict coherence between biological sex and gender expression. In other words, many societies around the world expect everyone to behave and identify in line with their chromosomal sex and consider non-conformist expressions to be abnormal (Bem, 1974, 1981; Ferrari et al., 2021). This normative belief system values certain groups (i.e., gender conforming individuals) over others (i.e., gender variant individuals) and

consequently creates a societal hierarchy that fosters oppression and stigmatization toward gender diverse people and other individuals that display non-conforming behaviors (Ferrari et al., 2021; Halberstam, 1998). As a gender variant identity can often not be concealed in front of other people, many individuals are inevitably faced with aforementioned stressors that can negatively affect the process of identity integration (e.g., Bonifacio & Rosenthal, 2015; Ehrensaft, 2012; Haslam et al., 2021; Mitchell et al., 2021). Therefore, it is important to consider potential factors that can help these individuals to effectively integrate their gender variance into their complete sense of self.

Gender as a Social Identity

Although gender is commonly conceptualized regarding traits associated with being feminine or masculine, the current study depicts gender as a social identity people adopt (Schmader & Block, 2015; Wood & Eagly, 2015). This line of reasoning suggests that gender expression is partly based on group identification and proposes that retaining various and coherent social identities is important in the development of an integral sense of self (Tajfel & Turner, 2004; Turner et al., 1987; Conneely et al., 2021). Taking this into account, gender expression can be described as partly developing through the categorization with similar individuals and can consequently help a person to understand themselves in relation to others (Wood & Eagly, 2015). Indeed, this and other forms of group identification were found to provide individuals with a sense of belonging and meaning that can positively affect health and psychosocial well-being (Conneely et al., 2021; Haslam et al., 2021; Hetzel & Mann, 2021; Mead, 2002).

Especially the period of adolescence is characterized by a strong desire for this group identification and might be particularly difficult to achieve for gender variant individuals (e.g., Iudici & Orczyk, 2021; Schmader & Block, 2015; Tanti et al., 2011). Indeed, due to the aforementioned heteronormative views of many societies worldwide, gender is often perceived as a binary and oppositional (men versus women) social identity (Burgess, 2009;

Morgenroth & Ryan, 2021). As many gender variant individuals challenge these traditional beliefs by demonstrating identities, behaviors, or appearances that do not fit this binary distinction, they potentially struggle with the development of a clear social identity (Bonifacio & Rosenthal, 2015; Iudici & Orczyk, 2021; Steensma et al., 2013a). For instance, gender variant individuals might not identify with either category (e.g., non-binary individuals) or may identify with one of the categories but are not accepted by others as a member of that group (e.g., trans* people). The awareness of gender variance might therefore compromise positive or create negative social identities, which are often associated with stigma and confusion that can affect the process of identity integration (Baumeister et al., 1985; Burgess, 2012; Ehrensaft, 2021; Haslam et al., 2021; Turner, 2010; Wells & Hansen, 2003; Mitchell et al., 2021).

This stigma and confusion might moreover result in gender related identity conflicts that arise from an incompatibility between gender identity and other perceived social roles (Hirsh & Kang, 2016). Specifically, identity conflict can be considered the opposite of an integrated identity and describes an incongruence of behavioral norms due to incompatible social identities (Hirsh & Kang, 2016). Indeed, identity conflict can be conceptualized through the previously illustrated dimensions of identity integration (Syed & McLean, 2016). For instance, gender variant individuals might perceive an incongruence of norms and values between their gender identity and religion (i.e., contextual integration) or cultural background (i.e., person-society integration). As the presence of compatible group memberships appears to be important when adjusting to changes in life (e.g., coming out as trans* or non-binary), gender variant individuals might have less social support that can guide them through periods of uncertainty and conflict (Haslam et al., 2021).

However, when further considering the importance of social groups, research also highlights that reinforcing one's group membership can positively affect well-being and self-esteem. This even appears to be when the group of interest is stigmatized (Compas et al.,

2001; Miller & Kaiser, 2001; Outten et al., 2009; Bourguignon et al., 2020; Bat-Chava, 1994). Indeed, the positive relationship between well-being and in-group identification has been found among several groups, including sexual minorities and different ethnic groups (e.g., Doyle & Molix, 2014; Branscombe et al., 1999; Bourguignon et al., 2020). For instance, well-being in a sample of homosexual individuals was primarily protected by reduced self-distancing and an open and explicit identification with other gay people (Bourguignon et al., 2020). Ultimately, strong group identification might be of particular importance for gender variant individuals, who face many stressors that can negatively affect both well-being and identity integration (e.g., Kaltiala & Ellonen, 2022; Penner et al., 2019; Bonifacio & Rosenthal, 2015; Ehrensaft, 2012).

As poor identity integration, and consequently, high identity conflict are related to increased clinical symptoms and low levels of psychosocial functioning (Erikson, 1968; Mitchell et al., 2021), it is important to consider whether a strong group identification with people of the same gender can predict the level of identity integration. Moreover, it is of interest whether this potential relationship might be moderated by other factors, such as social- and neurocognitive functions.

Social- and Neurocognitive Functions

Current evidence highlights the importance of social- and neurocognitive functions in developing an integral identity and points toward these skills to mature during adolescences (e.g., Penner et al., 2019; Welsh & Schmitt-Wilson, 2013). Concerning neurocognitive mechanisms, specifically cognitive flexibility and information integration processes appear to be crucial for identity development. Particularly, these functions are important when individuals perceive the need to either resolve or navigate conflicting identities (Destin & Svoboda, 2018; Hirsh & Kang, 2016). For instance, many multiracial individuals were found to switch between their ethnic identities to maneuver the unique challenges imposed by their environment and avoid potential in- and outgroup problems (Gaither, 2015). Additionally,

the metacognitive components of executive functions were found to be associated with identity development, highlighting the role of working memory and planning abilities. Specifically, these skills were linked to successful identity exploration, commitment, achievement, and lower levels of identity diffusion (Welsh & Schmitt-Wilson, 2013).

Next to the aforementioned neurocognitive mechanisms, several social cognitive processes appear to be intrinsic for developing an integral identity (e.g., Both et al., 2019; Lysaker et al., 2011; Penner et al., 2019). For instance, self-reflection abilities and theory of mind provide individuals with input for the prior mentioned metacognitive processes, allowing for this input to be embedded into the broader sense of self (Kukla & Lysaker, 2020; Lysaker et al., 2011; Penner et al., 2019). Indeed, reflective abilities appear to be intrinsic to identity development and were also found to be beneficial in adaptively integrating traumatic experiences into the coherent sense of self (Both et al., 2019; Marin & Shkreli, 2019). Moreover, identity development appears to be related to the development of empathic abilities, with higher levels of identity development being associated with internalized moral control and non-egocentric thinking (Loevinger, 1976; Smits et al., 2011).

Although these findings highlight the association between cognition and identity, a thorough investigation of the relationship between social- and neurocognitive functions and identity integration is missing. Specifically, it is not clear whether social (i.e., reflective abilities, empathy) and neurocognitive (i.e., cognitive flexibility, metacognitive processes) functions can help an individual to integrate their gender identity and consequently improve that person's well-being. This might be particularly relevant when an individual's gender expression is considered variant by society.

Overview and Hypotheses

Therefore, this research aims to address the following questions: Do individual differences in social- and neurocognitive functions predict well-being, and are these respective relationships moderated by identity integration? To investigate this, the following

hypotheses will be tested. First, it is hypothesized that individuals with higher neurocognitive and social cognitive functions display higher levels of well-being. Second, it is hypothesized that these respective relationships are moderated by level of identity integration. Particularly, higher levels of identity integration are expected to increase the relationship between cognitive functions and well-being.

In addition, the current study aims to address the question: Do individual differences in gender expression predict the level of identity integration, and is this relationship moderated by social- and neurocognitive functions? To investigate this second research question, two further hypotheses will be tested. First, it is hypothesized that higher gender conforming individuals display higher levels of identity integration than lower-conforming individuals. Second, it is hypothesized that neurocognitive and social cognitive functions moderated this relationship. Particularly, it is assumed that the level of identity integration will be lower in individuals with lower social- and neurocognitive functions. Indeed, the relationship above might be especially important for low-conforming individuals, as it is expected that higher levels of social- and neurocognitive functions may help these individuals to integrate their potentially conflicting identities into their overall sense of self. In contrast, minimal conflict might make integrating an identity into the overall sense of self easier, thus potentially requiring fewer cognitive resources.

Method

Participants and Design

Participants were recruited as part of the master thesis course in the Clinical Neuropsychology master program of the University of Groningen (RUG). Individuals were sampled via the SONA platform (i.e., online system to manage studies and recruit student participants) and participated in the study in exchange for course credit (Leiden University, n.d.). Moreover, recruitment took place through various social media platforms (e.g., WhatsApp, Instagram). The latter participants did not receive any compensation for their

participation. Understanding the Dutch language was required for participation, as the current study was conducted in Dutch. To establish the minimum sample size needed to test the study's hypotheses, an a-priori power analysis was calculated through G*Power (Faul et al., 2007). Results indicated that a sample size of 77 participants was needed to achieve a power of .80 (f^2 = .15, α = .05). The current study follows a correlational between-subject design and initially recruited a convenience sample of 269 individuals (173 female, 57 male, 6 transmen, 3 transwomen, 11 non-binary, and 19 participants not indicating their gender). Therefore, the achieved sample size was sufficient (*power* = .99) to test the studies hypotheses. Of all participants, 231 were born between 1999 and 2005, and 18 individuals between 1989 and 1998 (data on year of birth was missing for 20 individuals). Whereas 143 participants finished higher level secondary education, 89 hold a university degree, and 19 finished average secondary education (data on level of education was missing for 18 individuals). The study was approved by the Ethics Committee of the Faculty of Behavioural and Social Sciences at the University of Groningen.

Procedure

Individuals could complete the current study online via a computer, tablet, or smartphone. Before participating, individuals were provided with information about the study and asked to provide informed consent. In the first part of the study, participants provided socio-demographic information (i.e., gender, year of birth, level of education) and rated themselves on two dimensional scales concerning how much they perceive themselves to be "feminine" and "masculine" based on societies gender roles and norms.

In the second part of the study, participants filled out several questionnaires presented to each individual in a randomized order. These questionnaires covered a wide range of topics, including measures of gender identity, in-group identification with people of the same gender, quality of life, self-esteem, mental health, as well as social- and neurocognitive functions (all included instruments are described in detail below). As several

questionnaires were unavailable in Dutch, they had to be translated and inspected for

equivalence to the original version. This was done by broadly adhering to Brislin's (1970)

method. First, the original versions of the instruments were translated from English into

Dutch. These translations were conducted by the program "DeepL" and subsequently

approved by a native Dutch speaker. In the second step, the questionnaires were translated

back into English and approved by a native English speaker. After comparing both versions,

no significant differences were found in meaning or content as per the judgment of the

author, the supervisor of this project, and a third person, fluent in Dutch and English. After

completing the questionnaires, participants were thanked for participating in the study, and

credits were rewarded where applicable.

Measures

Gender and Identity

Identity Integration. To assess the integration between participants' gender and their

biological sex, the Gay-Male Identity Integration Scale was adapted (Koc &Vignoles, 2016).

The English version of this questionnaire was translated into Dutch. The administered scale

consists of two bipolar dimensions, mainly "compartmentalization versus blendedness" and

"conflict versus harmony". The present study reconceptualized the scale by Koc and

Vignoles (2016) with the categories "gender" and "biological sex". Although no prior

psychometric properties for the administered version of the scale exist, the current adaption

was found to have good internal consistency ($\alpha = .89$). Koc and Vignole's (2016) version

was also judged as a valid and reliable instrument. Indeed, the original author of the scale

proposed that his framework can be applied to various identity categories (Huynh et al.,

2011). Participants had to rate themselves on 14 statements that were part of the

"compartmentalization versus blendedness" (six items: e.g., "I find it difficult to combine

my gender identity with the identity I perceive concerning my biological sex", $\alpha = .75$) and

"conflict versus harmony" dimensions (eight items: e.g., "Being both my gender and biological sex means having two identities pulling me in different directions", α = .86), using a seven-point scale ranging from "strongly disagree" (1) to "strongly agree" (7). After reverse coding seven items (e.g., "I do not blend my gender and biological sex identities"), all items were collapsed into one composite. Overall, higher total scores indicated higher levels of integration between gender identity and the identity participants perceived concerning their biological sex. Thus, it suggested less conflict between both identities (Koc & Vignoles, 2016).

In-Group Identification. To assess the in-group identification of participants with other individuals of the same gender, the In-Group Identification Scale was adapted (Leach et al., 2008). According to its authors, the scale is a valid instrument for assessing identification with a group of interest (Leach et al., 2008). The English version of this questionnaire was translated into Dutch. As the original scale leaves it to the user to define the in-group, the present study applied the category/in-group of "gender". Participants had to rate themselves on 14 items (e.g., "I feel a bond with people of my gender", "I think that people of my gender have a lot to be proud of", α = .87) using a seven-point scale that ranged from "strongly disagree" (1) to "strongly agree" (7). Overall, higher total scores indicated higher in-group identification with people of the same gender (Leach et al., 2008).

Well-Being

Quality of Life. To assess participants' overall life satisfaction, the Dutch version of the Manchester Short Assessment of Quality of Life (MANSA) was administered (Priebe et al., 1999; van Nieuwenhuizen et al., 2000). According to its translators, the Dutch version was found to be a valid measurement in assessing self-perceived quality of life (van Nieuwenhuizen et al., 2000). Participants had to rate themselves on 16 items. The first 12 items of the questionnaire were labeled as "subjective" (e.g., "How satisfied are you with your mental health?" α = .68) and had to be rated on a seven-point scale ranging from

"couldn't be worse" (1) to "couldn't be better" (7). Overall, higher total scores on the "subjective" subscale indicated higher life satisfaction and well-being. Additionally, four items were labeled as "objective". These were further categorized into the domains of "friends" (two items: e.g., "Do you have anyone who you would call a close friend?") as well as "crime" (two items: e.g., "In the past year have you been accused of a crime?") and had to be answered with "yes" or "no". Whereas answering the first two questions of the "objective" subscale with "yes" indicated something positive (i.e., the existence of close friends; having seen a friend in the last week), answering the latter two with "yes" indicated something negative, mainly being accused of a crime and/or having been a victim of physical violence (Priebe et al., 1999). The additional four items of the "objective" subscale did not contribute to the total score of the "subjective" subscale (van Nieuwenhuizen et al., 2000).

Self-Esteem. To assess participants' self-esteem, the Dutch version of the Self-Esteem Rating Scale-Short Form (SERS-SF) was administered (Lecomte et al., 2006). Although no psychometric properties of the Dutch translation were found, the instrument was found to have good internal consistency in the present study (α= .92). Additionally, the original measure appears to be a reliable and valid instrument for assessing an individual's self-esteem (Lecomte et al., 2006). Participants had to rate themselves on 20 items, which were categorized into a "positive" (ten items: e.g., "I feel that people really like to talk to me", α = .91) and a "negative" dimension (ten items: e.g., "I wish that I were someone else", α = .90). All questions were rated on a seven-point scale, ranging from "strongly disagree" (1) to "strongly agree" (7). Whereas higher scores on the "positive" dimension indicated higher levels of self-esteem, higher scores on the "negative" dimension indicated lower levels of self-esteem (Lecomte et al., 2006). After reverse coding the items of the "negative" dimension (e.g., "I wish that I were someone else"), all items were collapsed into one composite score. Overall, higher scores indicated higher self-esteem.

Depressive Symptoms. To assess the degree that participants experience depressive symptoms, the Dutch version of the Major Depression Inventory (MDI) was administered (Bech & Wermuth, 1998; Meetinstrumenten in de zorg, 2021). Although no psychometric properties of the Dutch translation were found, the instrument was found to have good internal consistency in the present study ($\alpha = .91$). Additionally, the original measure appears to be a reliable and valid instrument to assess symptoms of depression (Bech & Wermuth, 1998). Participants had to rate themselves on 13 items (e.g., "Have you felt low in spirits or sad?", "Have you lost interest in your daily activities?"), using a six-point scale ranging from "at no time" (0) to "all the time" (5). After reverse coding all items, lower scores indicated higher levels of depressive symptoms (Bech & Wermuth, 1998).

Anxiety. To assess the degree that participants experience symptoms of anxiety, the Dutch version of the State-Trait Anxiety Inventory (STAI) was administered (Spielberger & Gorsuch, 1983; van der Ploeg, 1980). The Dutch translation of the questionnaire was found to be a reliable and valid measurement to assess both state and trait anxiety (van der Ploeg, 1980). Participants had to rate themselves on 40 items which were further categorized into 20 items measuring state anxiety (e.g., "I feel calm", "I feel secure", "I am tense", $\alpha = .94$) and 20 items measuring trait anxiety (e.g., "I feel like a failure", "I feel rested", "I am content", $\alpha = .92$). Whereas items measuring state anxiety were rated on a four-point scale ranging from "not at all" (1) to "very much so" (4), items measuring trait anxiety were rated on a four-point scale ranging from "almost never" (1) to "almost always" (4). Higher scores on both scales were positively correlated with higher state or trait anxiety levels, respectively (Spielberger & Gorsuch, 1983).

Neurocognition

Cognitive Flexibility. To determine the participants' self-perceived cognitive flexibility, the Cognitive Flexibility Inventory (CFI) was administered (Dennis & Vander

Wal, 2010). The English version of this questionnaire was translated into Dutch. Although no psychometric properties of this translated version exist, the instrument was found to have good internal consistency in the present study (α = .85). Moreover, the original instrument was found to be a reliable and valid measure of cognitive flexibility (Dennis & Vander Wal, 2010). Participants had to rate themselves on 20 items that were further categorized into the subdomains "alternatives" (13 items: e.g., "I consider multiple options before making a decision", α = .81) and "control" (seven items: e.g., "I have a hard time making decisions when faced with difficult situations", α = .77), using a seven-point scale ranging from "strongly disagree" (1) to "strongly agree" (7). After reverse coding six items (e.g., "I feel I have no power to change things in difficult situations"), all items were collapsed into one composite. Whereas higher scores were indicative of higher cognitive flexibility, lower scores indicated higher cognitive rigidity (Dennis & Vander Wal, 2010).

Metacognitive Abilities. To determine the participants' self-perceived metacognitive abilities, the Metacognitive Awareness Inventory (MAI) was administered (Schraw & Dennison, 1994). The English version of this questionnaire was translated into Dutch. Although in the original instrument, individuals have to answer 52 items with either "false" (0) or "true" (1), the current study accidentally applied a seven-point scale ranging from "strongly disagree" (1) to "strongly agree" (7). Whereas the correct version was found to be a reliable and valid measurement of perceived metacognitive abilities, the psychometrics for the applied version cannot be guaranteed (Schraw & Dennison, 1994). Nevertheless, the current adaptation of the scale was found to have good internal consistency (α = .92). All items were further categorized into those assessing "knowledge about cognition" (17 items: e.g., "I am good at remembering information", α = .84) and those measuring "regulation of cognition" (35 items: e.g., "I ask others for help when I don't understand something", α = .88). After collapsing all items into one composite, higher scores were indicative of higher

self-perceived metacognitive abilities (Schraw & Dennison, 1994).

Social Cognition

  Self-Reflection. To assess participants' level of self-reflection and insight, the Dutch version of the Self-Reflection and Insight Scale (SRI-S) was administered (Grant et al., 2002). Although no psychometric properties of the Dutch translation were found, the instrument was found to have good internal consistency in the present study ($\alpha = .90$). Additionally, the original instrument was found to be a reliable and valid measure of an individual's self-reflection skills (Sauter et al., 2010). Participants had to rate themselves on 20 items which were further categorized into three subdimensions, including "engagement in self-reflection" (six items: e.g., "I frequently examine my feelings", $\alpha = .85$), "need for self-reflection" (six items: e.g., "It is important for me to evaluate the things that I do", $\alpha = .88$), and "insight" (eight items: e.g., "I am usually aware of my thoughts", $\alpha = .87$), using a six-point scale ranging from "strongly disagree" (1) to "strongly agree" (6). After reverse coding nine items (e.g., "I don't often think about my thoughts"), all items were collapsed into one composite. Overall, higher scores were indicative of higher levels of self-reflection and insight (Grant et al., 2002).

  Empathy. To assess participants' empathetic tendencies, the Dutch version of the Interpersonal Reactivity Index (IRI) was administered (Davis, 1980; De Corte, 2007). The Dutch translation of the questionnaire was found to be a reliable and valid measurement to assess self-perceived empathic tendencies (De Corte, 2007). Participants had to rate themselves on 28 items which were further divided into four domains, including "fantasy" (seven items: e.g., "I really get involved with the feelings of the characters in a novel", $\alpha = .60$), "perspective-taking" (seven items: e.g., "I believe that there are two sides to every question and try to look at them both", $\alpha = .49$) "empathic concern" (seven items: e.g., "I would describe myself as a pretty soft-hearted person", $\alpha = .11$), and "personal distress"

(seven items: e.g., I tend to lose control during emergencies", α = .51), using a five-point

scale, ranging from "does not describe me well" (1) to "describes me very well" (5). After

reverse coding nine items (e.g., "I sometimes find it difficult to see things from the "other

guy's" perspective"), all items were collapsed into one composite (α = .59). Overall, higher

scores were indicative of higher empathetic abilities (Davis, 1980).
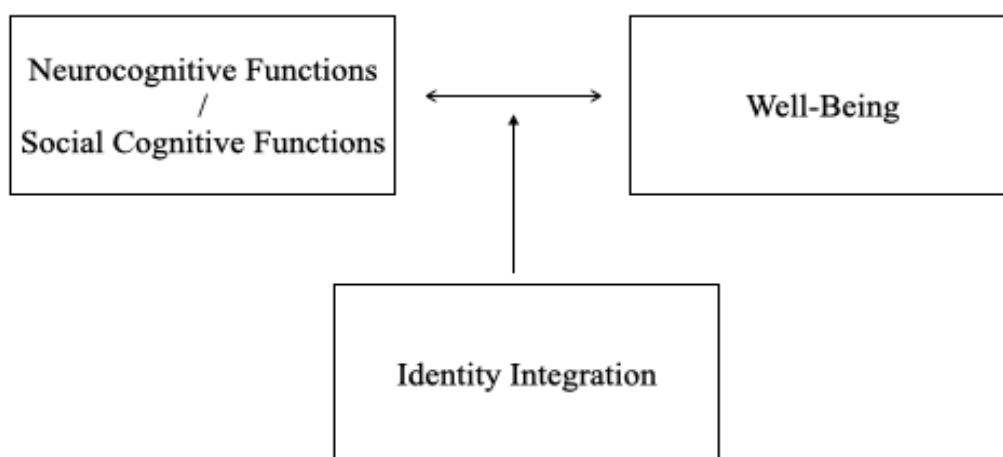
Statistical Analysis Plan

In order to investigate the two research questions of interest, a step-wise analysis was

conducted using IBM SPSS Statistics Version 27 (IBM Corp, 2020). First, the descriptive

statistics (i.e., mean, standard deviation, range, minimum, maximum) of the applied

instruments were calculated to gain a better understanding of how the data is distributed in the

current sample. After reverse coding several items (see Measures), all instruments' total

scores were standardized and collapsed into three composite scores (i.e., well-being,

neurocognitive functions, social cognitive functions). To create the variable well-being,

results from the MANSA, SERS-SF, MDI, and STI were aggregated by summing up the

means of the standardized scores from these instruments. After that, the mean for the newly

created well-being variable was calculated. This procedure was repeated for the variables of

neurocognitive functions (including the means of the standardized scores from the MAI and

CFI) and social cognitive functions (including the means of standardized scores from the SRI-

S and IRI). All measures within the respective composite sores were thereafter correlated

using Pearson's correlation coefficient to determine whether the grouping of instruments was

justified. In the following, the three composite scores and the variables for identity integration

and in-group identification were all correlated with one another. In the last step, two

hierarchical linear regression analyses were conducted for each research question and

thereafter checked for their assumptions (i.e., linear relationship, multivariate normality,

homoscedasticity, multicollinearity, autocorrelation).

Research Question 1

Two moderation analyses were conducted using hierarchical regression analysis to answer the first research question. Specifically, this question investigated whether individual differences in social- and neurocognitive functions predict well-being and if these respective relationships are moderated by identity integration. For the first analysis, neurocognitive functions was used as a predictor, the interaction term between neurocognitive functions and identity integration as a moderator, age group and level of education as covariates, and the well-being composite as the dependent variable (see Figure 1). Similarly, for the second analysis, social cognitive functions was used as a predictor, the interaction term between social cognitive functions and identity integration as a moderator, age group and level of education as covariates, and the well-being composite score as the dependent variable (see Figure 1). Scatterplots were plotted to visualize the moderation effects of significant results using Jamovi Version 2.3 (The Jamovi Project, 2020).

Figure 1

Expected Moderation Effect of Identity Integration on the Relationship Between Cognitive Functions and Well-Being
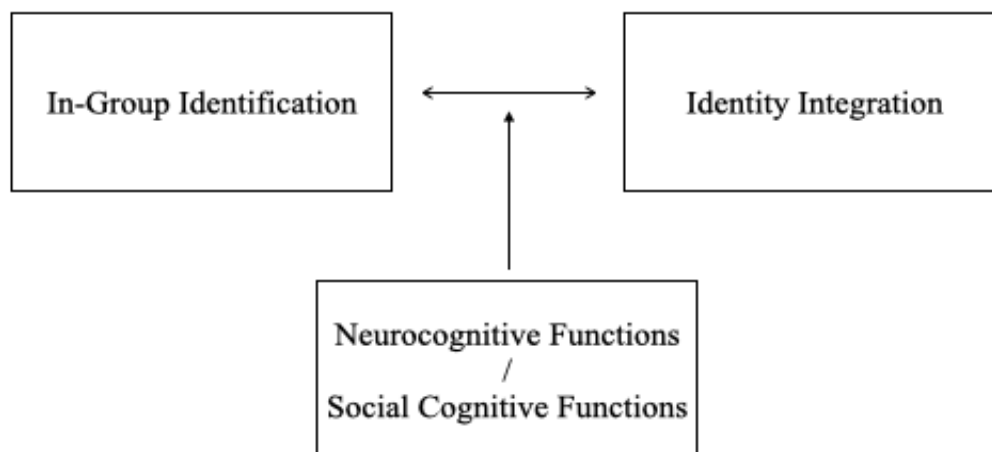

Research Question 2

In order to investigate the second research question of interest, two additional moderation analyses were conducted using hierarchical regression analysis. Specifically, this

question investigated whether individual differences in gender expression predict the level of

identity integration and if this relationship is moderated by social- and neurocognitive

functions. For the first analysis, in-group identification was used as a predictor, the interaction

term between in-group identification and neurocognitive functions as a moderator, age group

and level of education as covariates, and identity integration as the dependent variable (see

Figure 2). Similarly, for the second analysis, in-group identification was used as a predictor,

the interaction term between in-group identification and neurocognitive functions as a

moderator, age group and level of education as covariates, and identity integration as the

dependent variable (see Figure 2). Scatterplots were plotted to visualize the moderation

effects of significant results using Jamovi Version 2.3 (The Jamovi Project, 2020).

Figure 2

Expected Moderation Effect of Cognitive Functions on the Relationship Between In-Group

Identification and Identity Integration

Results

Descriptive Statistics

A total number of 269 individuals completed the full assessment. Descriptives and

the total number of people who completed each questionnaire are presented in Table 1.

Table 1

Descriptive Statistics of Applied Instruments

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Identity Integration	239	62.00	36.00	98.00	83.32	12.31
In-Group Identification	240	67.00	31.00	98.00	73.40	10.70
Quality of Life Subjective	233	47.00	32.00	79.00	61.04	8.12
Self-Esteem	237	89.00	49.00	138.00	100.49	17.65
Depression	241	51.00	14.00	65.00	47.23	11.69
State Anxiety	238	55.00	25.00	80.00	59.99	11.16
Trait Anxiety	235	54.00	25.00	79.00	57.82	10.03
Self-Reflection	236	66.00	54.00	120.00	90.90	13.42
Interpersonal Reactivity	236	36.00	69.00	105.00	84.20	6.52
Cognitive Flexibility	238	75.00	64.00	139.00	99.90	12.57
Metacognitive Awareness	226	160.00	155.00	315.00	253.59	29.73

Identification with Male and Female Gender Roles

Ciswomen were the participants that, on average identified the most with female gender roles ($N = 173$, $M = 91.75$, $SD = 9.30$) and the least with male ones ($N = 176$, $M = 7.63$, $SD = 9.00$). Similarly, cismen on average, were found to identify the most with male gender roles ($N = 58$, $M = 93.67$, $SD = 9.33$) and the least with female ones ($N = 49$, $M = 9.22$, $SD = 10.81$). Whereas transwomen indicated to identify more with female ($N = 3$, $M = 76.67$, $SD = 23.18$) than with male gender roles ($N = 3$, $M = 22.67$, $SD = 12.70$), transmen were found to identify more strongly with male ($N = 5$, $M = 88.20$, $SD = 12.70$) than female gender roles ($N = 4$, $M = 14.75$, $SD = 17.42$) on average. Non-binary individuals registered as female at birth slightly identified more with female ($N = 7$, $M = 29.00$, $SD = 25.70$) than male gender roles ($N = 6$, $M = 20.17$, $SD = 19.96$) on average. In contrast, non-binary individuals registered as male at birth identified more strongly with male ($N = 3$, $M = 50.00$, $SD = 17.42$) than female gender roles ($N = 43$ $M = 30.00$, $SD = 17.32$).

Correlations Between Composite Scores, Identity Integration, and In-Group Identification

A significant correlation between social- and neurocognition was found. Moreover, a significant correlation was found between neurocognition and well-being. A further significant correlation was found between well-being and in-group identification, as well as identity integration and in-group identification. These findings are depicted in Table 2.

Table 2

Correlations Between Composite Scores, Identity Integration, In-Group Identification

		Social Cognition	Neurocognition	Well-Being	Identity Integration	In-Group Identification
Social Cognition	Pearson Correlation	1	.253**	-.096	.079	.040
	N	229	211	203	226	226
Neurocognition	Pearson Correlation	.253**	1	.406**	.098	.104
	N	211	220	197	218	217
Well-Being	Pearson Correlation	-.096	.406**	1	.123	.189**
	N	203	197	215	212	212
Identity Integration	Pearson Correlation	.079	.098	.123	1	.369**
	N	226	218	212	239	236
In-Group Identification	Pearson Correlation	.040	.104	.189**	.369**	1
	N	226	217	212	236	240

**Correlation is significant at the 0.01 level (2-tailed).

Correlations Between Individual Measures Within Composite Scores

Significant correlations were found between all four measures (i.e., MANSA, SERS-SF, MDI, STAI) that were aggregated to create the well-being composite score (see Table 3). A significant positive correlation was also found between the standardized scores of both instruments (i.e., MAI, CFI) that were aggregated to create the neurocognition composite score, $r(220) = .44$, $p < .001$. For the variable social cognitive functions, no significant correlation was found between the SRI-S and the IRI, $r(229) = -.05$, $p < .473$.

Table 3

Correlations Between Measures of Well-Being

		STAI (Trait)[a]	STAI (State)[b]	MDI[c]	SERS-SF[d]	MANSA[e]
STAI (Trait)[a]	Pearson Correlation	1	.81**	.71**	.67**	.73**
	N	235	231	232	230	226
STAI (State)[b]	Pearson Correlation	.81**	1	.65**	.56**	.65**
	N	231	238	235	233	229
MDI[c]	Pearson Correlation	.71**	.65**	1	.53**	.63**
	N	232	235	241	234	230
SERS-SF[d]	Pearson Correlation	.67**	.56**	.53**	1	.62**
	N	230	233	234	237	229
MANSA[e]	Pearson Correlation	.73**	.65*	.63**	.62**	1
	N	226	229	230	229	233

**Correlation is significant at the 0.01 level (2-tailed).
[a] Abbreviation for the State-Trait Anxiety Questionnaire (Trait Subscale)
[b] Abbreviation for the State-Trait Anxiety Questionnaire (State Subscale)
[c] Abbreviation for the Major Depression Inventory
[d] Abbreviation for the Self-Esteem Rating Scale-Short Form
[e] Abbreviation for the Manchester Short Assessment of Quality of Life

Relationship Between Neurocognitive Functions and Well-Being with Identity Integration as a Moderator

Whereas demographic variables (i.e., education, age group) did not significantly predict well-being in model 1, adding neurocognitive functions in model 2 significantly improved the predictive value and increased the explained variance (see Table 4). In this model, neurocognitive functions was the only variable significantly contributing to the predictive effect. Adding the interaction between neurocognitive functions and identity integration in model 3 improved the overall predictive value (see Table 4). However, the additional explained variance was not significant. Thus, the interaction did not significantly contribute to the model predicting well-being

Table 4

Hierarchical Linear Regression Analyses Between Neurocognition & Well-Being with Identity Integration as a Moderator (N = 193)

Model	df	p	F	R	R^2	P change	F change	R^2 change	ß Education	ß Age	ß Neuro	ß Interaction	ß Identity
(1)													
+ Education	191	.348	1.06	.11	.01	.348	1.06	.01	.10	-	-	-	-
+ Age Group									-	-.05	-	-	-
(2)													
+ Neurocognitive Functions	190	<.001	14.54	.43	.19	<.001	41.05	.18	.09	-.05	.42*	-	-
(3)													
+ Interaction Neurocognitive Functions & Identity Integration	188	<.001	9.88	.46	.21	.082	2.53	.02	.10	-.06	.41*	.04	-
+ Identity Integration													.15*

*Significant at $p < .05$, two tailed

Relationship Between Social Cognitive Functions and Well-Being with Identity

Integration as a Moderator

Demographic variables (i.e., education, age group) did not significantly predict well-being in model 1, nor did adding social cognitive functions in model 2 significantly improve its predictive value (see Table 5). Adding the interaction between social cognitive functions and identity integration in model 3 did improve the overall predictive value, with the additional explained variance being significant (see Table 5). In this model, the interaction was the only variable significantly contributing to the predictive effect. Indeed, identity integration negatively moderated the relationship between social cognitive functions and well-being (see Figure 3).

Specifically, the simple slope analysis showed that at low levels of identity integration, the relationship between well-being and social cognition is almost the same. At high levels of identity integration, the relationship between well-being and social cognitive functions is different. The graph shows that high identity integration is especially helpful for people who have low levels of social cognitive functions. Their well-being is depicted as the highest (see Figure 3).

Figure 3

Scatterplot Depicting Relationship Between Social Cognitive Functions (X-Axis) & Well-Being (Y-Axis) with Identity Integration as a Moderator
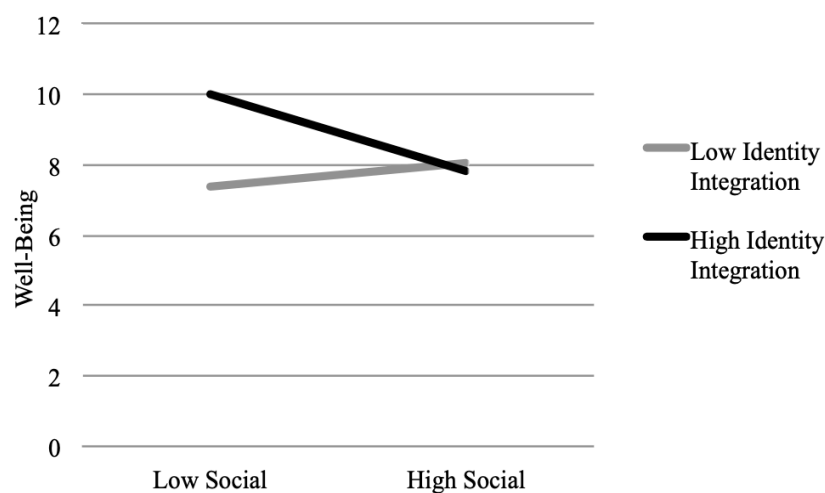
Table 5

Hierarchical Linear Regression Analysis Between Social Cognition & Well-Being with Identity Integration as a Moderator (N = 198)

Model	df	p	F	R	R^2	P change	F change	R^2 change	ß Education	ß Age	ß Social	ß Interaction	ßIdentity
(1) + Education	196	.546	0.61	.08	.01	.546	0.61	.01	.07	-	-	-	-
+ Age Group									-	.02	-	-	-
(2) + Social Cognitive Functions	195	.420	0.95	.12	.01	.205	1.62	.01	.07	.03	-.09	-	-
(3) + Interaction Social Cognitive Functions & Identity Integration	193	.016	2.87	.26	.07	.004	5.68	.06	.06	.03	-.09	-.17*	-
+ Identity Integration													.14

*Significant at $p < .05$, two tailed

The Relationship Between In-Group Identification and Identity Integration with Neurocognitive Functions as a Moderator

Whereas demographic variables (i.e., education, age group) did not significantly predict identity integration in model 1, adding the variable in-group identification in model 2 significantly improved its predictive value and increased the explained variance (see Table 6). In this model, in-group identification was the only variable significantly contributing to the predictive effect. Adding the interaction effect between in-group identification and neurocognitive functions in model 3 improved the overall predictive value (see Table 6). However, the additional explained variance was not significant. Thus, the aforementioned interaction did not significantly contribute to the model predicting identity integration.

Table 6

Hierarchical Linear Regression Analysis Between Group Identification & Identity Integration with Neurocognition as a Moderator (N = 212)

Model	df	p	F	R	R^2	P change	F change	R^2 change	ß Education	ß Age	ß In-Group	ß Interaction	ß Neuro
(1) + Education	210	.362	1.02	.10	.01	.362	1.02	.01	-.08	-	-	-	-
+ Age Group									-	-.04	-	-	-
(2) + In-Group Identification	209	<.001	10.49	.36	.13	<.001	29.14	.12	-.07	-.02	.35*	-	-
(3) + Interaction In-Group Identification & Neurocognitive Functions	208	<.001	6.56	.37	.14	.495	0.71	.01	-.08	-.02	.35*	-.06	-
+ Neurocognitive Functions													.05

*Significant at $p < .05$, two tailed

The Relationship Between In-Group Identification and Identity Integration with Social Cognitive Functions as a Moderator

Whereas similar patterns to the previous analysis were observed for models 1 and 2, adding the interaction between in-group identification and social cognitive functions in model 3 improved the overall predictive value, with the additional explained variance being significant (see Table 7) Thus, the aforementioned interaction significantly contributed to the model predicting identity integration. Indeed, social cognitive functions negatively moderated the relationship (Figure 4).

Specifically, the simple slope analysis showed that for individuals with high social cognitive functions, in-group identification is linked to well-being similarly. For those with lower social cognitive functions, the graphs shows that if individuals have low in-group identification, then identity integration is also low. Moreover, for those with lower social cognitive functions, the graph illustrates that if people have higher in-group identification, then identity integration is also high (see Figure 4).

Figure 4

Scatterplot Depicting Relationship Between In-Group Identification (X-Axis) and Identity Integration (Y-Axis) with Social Cognitive Functions as a Moderator
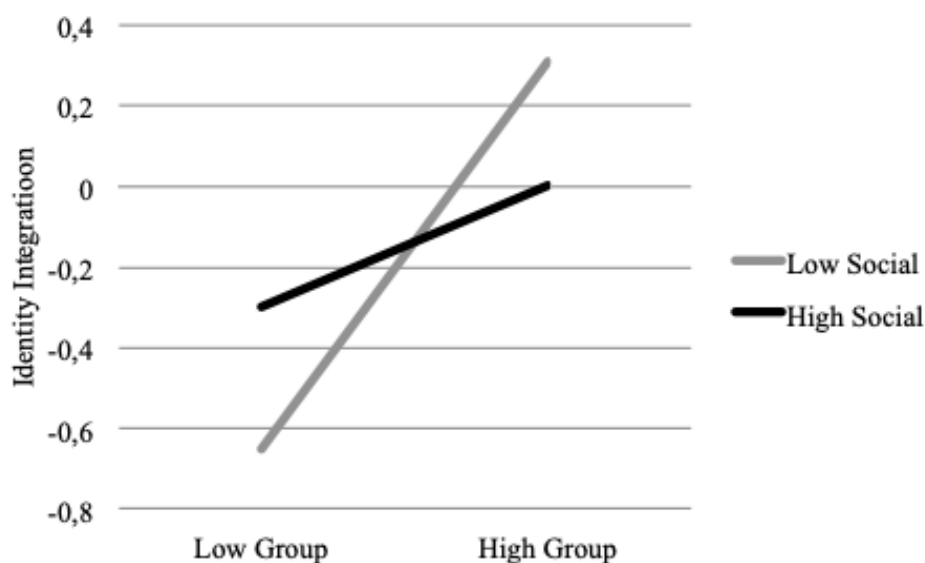
Table 7

Hierarchical Linear Regression Analysis Between Group Identification & Identity Integration with Social Cognition as a Moderator (N = 220)

Model	df	p	F	R	R^2	P change	F change	R^2 change	ß Education	ß Age	ß In-Group	ß Interaction	ß Social
(1) + Education	218	.403	0.91	.09	.01	.403	0.91	.01	-.04	-	-	-	-
+ Age Group									-	-.07	-	-	-
(2) + In-Group Identification	217	<.001	11.97	.38	.14	<.001	33.81	.13	-.04	-.05	.37*	-	-
(3) + Interaction In-Group Identification & Social Functions	215	<.001	8.19	.40	.16	.103	2.30	.02	-.05	-.06	.36*	-.13*	-
+ Social Cognitive Functions													.06

*Significant at $p < .05$, two tail

Post Hoc Analyses

Relationship Between Self-Reflection/Insight and Well-Being

Previous research suggests that only the SRI-S's subscale of insight was able to successfully predict well-being (e.g., Harrington & Loffredo, 2010). Therefore, all three subscales of the aforementioned questionnaire (i.e., engagement in self-reflection, need for self-reflection, and insight) were individually correlated with well-being to determine whether similar patterns can be observed in the present study. Indeed, scores on the engagement (*r* (212) = .06, *p* = .371) and need for self-reflection (*r* (215) = -.01, *p* = .891) subscale were not found to significantly correlate with the participants' well-being. In contrast, a positive significant correlation between scores on the insight subscale and well-being was found (*r* (215) = .45, *p* = < .001).

Individual Influence of Social- and Neurocognitive Instruments

Whereas for the main analyses, different cognitive measures were aggregated to create composite scores for both social- and neurocognitive functions, there was further interest in investigating the influence of each of these variables separately. Therefore, three post-hoc analyses were conducted for each of the two research questions of interest. Due to the low internal consistency of the IRI (α = .59), no separate analyses were conducted for this construct.

Research Question 1. Instead of using the composite scores for social- and neurocognitive functions, three hierarchical regressions were administered in which the standardized total scores of the CFI, MAI, and SRI-S served as predictors, respectively. Whereas identity integration was used as a moderator, well-being was the dependent variable of interest. Thereafter, the same steps as in the main analysis administered for the first research question were taken.

While demographic variables (i.e., education, age group) did not significantly predict well-being, the respective predictors significantly predicted well-being in models 1.2, 2.2, and

3.2 (see Table 8). Indeed, all three predictors were the only variables significantly contributing to the predictive effects of their respective models. Adding the interactions between the three respective predictors and identity integration improved the overall predictive values of model 1.3, 2.3, and 3.3 (see Table 8). However, the additional explained variance was insignificant in any model. Thus, neither interaction significantly contributed to the models predicting well-being (see Table 8).

Table 8

Linear Regression Analyses Investigating Relationship Between Individual Cognitive Functions & Well-Being with Identity Integration as a Moderator

Model	df	*p*	F	*R*	R^2	*P* change	*F* change	R^2 change	ß Education	ß Age	ß CogFlex	ß Interaction	ß Identity
Cognitive Flexibility as Predictor (*N* = 204)													
(1.1) + Education	202	.399	0.92	.10	.01	.399	0.92	.01	.10	-	-	-	-
+ Age Group									-	-.02	-	-	-
(1.2) + Cognitive Flexibility	201	<.001	20.16	.48	.23	<.001	58.12	.23	.10	-.05	.43*	-	-
(1.3) + Interaction Cognitive Flexibility & Identity Integration	199	<.001	12.62	.49	.24	.292	1.24	.01	.10	-.04	.46*	.26	-
+ Identity Integration													.10

*Significant at *p* < .05, two tailed

Metacognitive Awareness as Predictor ($N = 198$)

Model	df	p	F	R	R^2	P change	F change	R^2 change	ß Education	ß Age	ß Metacog	ß Interaction	ß Identity
(2.1)													
+ Education	196	.336	1.10	.11	.01	.336	1.10	.01	.10	-	-	-	-
+ Age Group									-	-.05	-	-	-
(2.2)													
+ Metacognitive Awareness	195	<.001	6.50	.30	.09	<.001	17.10	.08	.09	-.07	.28*	-	-
(2.3)													
+ Interaction Metacognitive Awareness & Identity Integration	193	<.001	5.29	.35	.12	.041	3.25	.03	.10	-.06	.28*	.06	-
+ Identity Integration													.16*

Significant at $p < .05$, two tailed

Self-Reflection/Insight as Predictor ($N = 204$)

Model	df	p	F	R	R^2	P change	F change	R^2 change	ß Education	ß Age	ß SelfReflec	ß Interaction	ß Identity
(3.1)													
+ Education	202	.478	0.74	.09	.01	.478	0.74	.01	.08	-	-	-	-
+ Age Group									-	.02	-	-	-
(3.2)													
+ Self-Reflection/Insight	201	.001	5.60	.28	.08	<.001	15.22	.07	.08	.00	.27*	-	-
(3.3)													
+ Interaction Self-Reflection/Insight & Identity Integration	199	<.001	4.44	.32	.10	.080	2.56	.02	.08	.00	.25*	-.11	-
+ Identity Integration													.09

Significant at $p < .05$, two tailed

Research Question 2. Instead of using the composite scores for social- and neurocognitive functions, three hierarchical regressions were administered in which the standardized total scores of the CFI, MAI, and SRI-S served as the moderator variables, respectively. Whereas in-group identification was used as the independent variable, identity integration was the dependent variable of interest. Thereafter, the same steps as in the analysis administered for the second research question were taken.

While demographic variables (i.e., education, age group) did not significantly predict identity integration, in-group identification did significantly predict identity integration in models 1.2, 2.2, and 3.2 (see Table 9). Indeed, in-group identification was the only variable in the three models that significantly contributed to the predictive effects of the respective models. When adding the moderators to the individual models, the overall models remained significant. Adding the interactions between in-group identification and the three respective moderators improved the overall predictive values of models 1.3, 2.3, and 3.3 (see Table 9). However, the additional explained variance was insignificant in any of the models. Thus, neither of the interaction significantly contributed to the models predicting identity integration (see Table 9).

Table 9

Linear Regression Analyses Investigating Relationship Between In-Group Identification and Identity Integration with Individual Cognitive Functions as Moderators

Model	df	p	F	R	R^2	P change	F change	R^2 change	ß Education	ß Age	ß In-Group	ß Interaction	ß CogFlex
						Cognitive Flexibility as Moderator ($N = 226$)							
(1.1) + Education	224	.425	0.86	.09	.01	.425	0.86	.01	-.05	-	-	-	-
+ Age Group									-	-.06	-	-	-
(1.2) + In-Group Identification	223	<.001	11.36	.36	.13	<.001	32.13	.13	-.05	-.03	.35*	-	-
(1.3) + Interaction In-Group Identification & Cognitive Flexibility	221	<.001	7.70	.39	.15	.133	2.04	.02	-.06	-.03	.36*	-.08	-
+ Cognitive Flexibility													.10

Significant at $p < .05$, two tailed

Metacognitive Awareness as Moderator ($N = 218$)

Model	df	p	F	R	R^2	P change	F change	R^2 change	ß Education	ß Age	ß In-Group	ß Interaction	ß Metacog
(2.1)													
+ Education	216	.292	1.24	.11	.01	.292	1.24	.01	-.10	-	-	-	-
+ Age Group									-	-.03	-	-	-
(2.2)													
+ In-Group Identification	215	<.001	11.71	.38	.14	<.001	32.29	.13	-.08	-.02	.36*	-	-
(2.3)													
+ Interaction In-Group Identification & Metacognitive Awareness	214	<.001	7.00	.38	.14	.923	0.08	.00	-.09	-.02	.36*	-.02	-
+ Metacognitive Awareness													-.02

*Significant at $p <$. .05, two tailed

Self-Reflection/Insight as Moderator ($N = 227$)

Model	df	p	F	R	R^2	P change	F change	R^2 change	ß Education	ß Age	ß In-Group	ß Interaction	ß SelfRefl
(3.1) + Education	225	.313	1.17	.10	.01	.313	1.17	.01	-.06	-	-	-	-
+ Age Group									-	-.07	-	-	-
(3.2) + In-Group Identification	224	<.001	12.56	.38	.14	<.001	34.98	.13	-.05	-.06	.37*	-	-
(3.3) + Interaction In-Group Identification & Self-Reflection/Insight	223	<.001	8.67	.40	.16	.080	2.57	.02	-.06	-.06	.36*	-.09	-
+ Self-Reflection/Insight													.10

*Significant at $p < .05$, two tailed

Discussion

The present study addressed two main research questions. First, the study aimed to investigate whether individual differences in social- and neurocognitive functions predict well-being and if identity integration moderates these respective relationships. Second, it was investigated whether individual differences in gender expression predict level of identity integration and whether social- and neurocognitive functions moderate this relationship.

Concerning the first research question, support was found for the hypothesis proposing that individuals with higher neurocognitive functions display higher levels of well-being. The post-hoc administered explorative analysis further revealed that cognitive flexibility and metacognitive awareness were both positively associated with well-being. In contrast, no support was found for the hypothesis stating that individuals with higher social cognitive functions display higher levels of well-being. Furthermore, no support was found for the hypothesis proposing that the relationship between cognitive functions and well-being is *positively* moderated by level of identity integration. Whereas identity integration did *not* moderate the relationship between neurocognitive functions and well-being, its moderation effect on the relationship between social cognitive functions and well-being was slightly *negative*. The post-hoc administered explorative analysis of the individually tested cognitive domains further revealed no moderation effect of identity integration on the relationship between well-being and cognitive flexibility, metacognitive awareness, or self-reflection, respectively. Lastly, no effect of educational level or age group was found on the relationship.

Concerning the second research question, support was found for the hypothesis that higher gender conforming individuals (measured as in-group identification) display higher levels of identity integration. In contrast, no support was found for the hypothesis stating

that the aforementioned relationship is *positively* moderated by social- and neurocognitive functions. Whereas neurocognitive functions did *not* moderate this relationship, the moderation effect for social cognition was slightly *negative*. The post-hoc administered explorative analysis further revealed no moderation effect of either explored cognitive domain (i.e., cognitive flexibility, metacognitive awareness, self-reflection/insight). Also, no effect of educational level or age group was found on the relationship between in-group identification and identity integration.

Theoretical Implications

The Relationship Between (Social) Cognitive Functions and Well-Being

Like previous research, the current findings imply a positive relationship between neurocognitive functions and well-being (e.g., Llewellyn et al., 2008; Falzarano et al., 2020). Specifically, previous studies suggest that global cognition and performance in individual domains are associated with higher levels of psychosocial well-being (Llewellyn et al., 2008). Although the direction of this relationship is unclear, several explanations have been laid out. On the one hand, higher well-being might increase the likelihood of engaging in social and physical activities, that both were found to improve neural efficiency (Llewellyn et al., 2008; Isaacowitz & Smith, 2003). On the other hand, engaging in these neuroprotective behaviors may improve well-being through mechanisms like increased social contact (Llewellyn et al., 2008; Sandstrom & Dunn, 2014). The current findings further imply that both explored neurocognitive domains (i.e., cognitive flexibility, metacognitive awareness) are associated with psychosocial well-being. This is in line with previous studies, which found that both metacognitive awareness and cognitive flexibility can help individuals deal with stressors effectively by thinking more flexibly and positively remodeling their frame of mind (Yousefi & Hasani, 2022; Cañas et al., 2003; Burton et al., 2010; Kiaei, 2015; Kiaei & Reio, 2014).

Although previous research suggests a positive relationship between social cognitive functions and well-being, such an association was not found in the present study. For instance, these studies showed a positive association between life satisfaction and different social cognitive variables (e.g., self-efficacy), as well as that deficits in these domains can negatively affect well-being (e.g., Yogarajah & Mula, 2019 Lent et al., 2005). There are several possible reasons for the discrepancy with previous research findings. One of these might be the low internal consistency of the Interpersonal Reactivity Index, which could have confounded the current findings. Nonetheless, when only accounting for the results of the Self-Reflection and Insight Scale, still no significant relationship was observed between this variable and well-being. This might be explained from an interactionistic standpoint (Hixon, 1993; Hoyer & Klein, 2000), which suggests that the association between well-being and self-reflection might not depend on the overall amount of self-reflection but more on the particular aspects (positive versus negative) an individual focuses on. Specifically, this line of reasoning argues that how self-reflection affects an individual's well-being cannot be explained by a general effect but rather depends on factors like the content of the reflection or the situation in which it occurs (Hixon, 1993; Hoyer & Klein, 2000). Future studies may adapt this interactionistic standpoint and investigate self-reflection from a more nuanced perspective, such as by considering the content of the reflection. A further study investigating the Self-Reflection and Insight Scale additionally found that only the administered subscale of insight was able to successfully predict well-being in a sample of university students (Harrington & Loffredo, 2010). Indeed, a post-hoc analysis conducted in the current study found similar results, with only the insight subscale significantly positively correlating with well-being. Based on previous research, these findings might be explained by a positive association between levels of insight and engagement in problem-solving behaviors (e.g., Davidson, 2003; Lyke et al., 2009). Specifically, insight was found to

provide individuals with a sense of subjective understanding that can help people to navigate complex situations and consequently make sense of them. These processes might then facilitate improvements in well-being (Davidson, 2003; Lyke et al., 2009). For instance, insight has been considered an essential component in psychotherapy that can aid patients in detecting and understanding maladaptive behaviors and thoughts (e.g., Brinegar et al., 2006; Lyke et al., 2009). Moreover, research highlights a positive association between insight and self-acceptance, a further characteristic that has been connected to levels of well-being (Harrington & Loffredo, 2010). Tracing these findings back to the SRI-S leads to the question of whether future studies may apply measures of social cognition that have a more clear and linear relationship with well-being. Lastly, it is important to highlight that the construct of social cognition is complex and includes a lot of different domains that were not measured in the present study. Indeed, other domains like theory of mind, emotional regulation, or moral judgment have been linked to well-being in the past (Giovagnoli, 2014; Koelkebeck et al., 2017; Marroquín et al., 2017; Qizilbash, 1998). As they were not considered in the present study, no inferences about them or the relationship between an individual's overall social cognitive functioning and well-being can be drawn.

The Moderation Effect of Identity Integration. Contrary to what was expected, no moderation effect of identity integration on the relationship between neurocognitive functions and well-being was found. Moreover, a *negative* moderation effect of identity integration on the relationship between social cognition and well-being was observed. However, the latter effect was only present when including the measurement of empathetic tendencies and therefore needs to be interpreted with caution. A *positive* moderation effect was expected for both social- and neurocognitive functions, as previous studies propose that an integrated identity can positively affect psychosocial functioning and well-being (Adler et al., 2016; Erikson, 1968; Mitchell et al., 2021). As described in the previous section, these

constructs have been associated with neuroprotective mechanisms that can potentially enhance cognitive functioning (Llewellyn et al., 2008; Isaacowitz & Smith, 2003). Indeed, much previous research highlights the importance of several cognitive functions in developing an integral identity (e.g., Both et al., 2019; Welsh & Schmitt-Wilson, 2013).

There are several potential reasons for the lack of a *positive* moderation effect. First, it is possible that such an effect does not exist in the true population. Indeed, no significant correlation between identity integration and well-being was found. However, these findings differ from previous studies, which found a positive relationship between identity integration and well-being (e.g., Adler et al., 2016; Erikson, 1968; Mitchel et al., 2021). This leads to the question of why such an association was not found in the present study and highlights the need for more research on the topic. Moreover, no positive correlation was found between social- and neurocognitive functions and identity integration. As the present study appears to be the first to investigate this relationship, further research is needed to determine whether the lack of an association is due to methodological errors or a true lack of a positive relationship between identity integration and cognitive functions. Second, interindividual differences in metacognition may have affected the validity of the administered cognitive self-report instruments. Namely, accurate answering on self-report questionnaires requires adequate levels of metacognition (e.g., Gomes & Golino, 2014), whereas metacognitive awareness is one of the elements investigated in this research. Thus, potential differences in metacognitive abilities might have confounded the results. Lastly, an interesting pattern emerged in the current moderation analysis. Namely, identity integration had a significant main effect on well-being while controlling for neurocognitive but not for social cognitive functions. This indicates that social cognition and identity integration share variance, whereas neurocognition and identity integration may have distinct relationships with well-being. As there appears to be no research on this topic, this observed pattern

warrants future investigation with more thorough measurements.

The Relationship Between In-Group Identification and Identity Integration

In line with what was expected, the current findings imply that individuals who strongly conform with people of their gender (i.e., high in-group identification) display a higher level of identity integration than lower-conforming individuals. These findings might be explained by previous studies, which highlight the importance of in-group identification (Bourguignon et al., 2020). Indeed, a strong sense of in-group identification also appears to be important for stigmatized individuals (e.g., gender variant people). Here, the group belonging can help a stigmatized person to deal with the discrimination in two opposite ways (Bourguignon et al., 2020). Specifically, individuals might either distance themselves from the target group or reinforce their membership (e.g., Derks et al., 2011; Derks et al., 2016; Tajfel & Turner, 2010). Notably though, distancing oneself from the target group has been associated with decrements in well-being. Indeed, hiding essential facets of the self was found to result in inauthenticity, rumination, and shame that all can affect the process of identity integration (Riggle et al., 2017; Smart & Wegner, 2000; Burgess, 2009; Wells & Hansen, 2003; Mitchell et al., 2021). In contrast, a strong sense of in-group identification has been found to positively affect self-esteem and well-being (Compas et al., 2001; Miller & Kaiser, 2001; Outten et al., 2009; Bourguignon et al., 2020; Bat-Chava, 1994). As mentioned before, such a positive relationship has been found among several stigmatized groups, including sexual minorities and different ethnic groups (e.g., Doyle & Molix, 2014; Branscombe et al., 1999; Bourguignon et al., 2020).

Ultimately, strong in-group identification might be of particular importance for gender variant individuals, who face many stressors that can negatively affect both well-being and identity integration (e.g., Kaltiala & Ellonen, 2022; Penner et al., 2019; Bonifacio & Rosenthal, 2015; Ehrensaft, 2012). Relating these findings to the current study, a reduction in

self-distancing and a clear identification with other gender variant individuals might help this group of people to perceive their group membership as something positive and potentially promote the process of identity integration (Bourguignon et al., 2020; Villicana et al., 2018).

The Moderation Effect of Social- and Neurocognition. Contrary to what was expected, neurocognition was *not* found to moderate the relationship between in-group identification and identity integration. Moreover, a *negative* moderation effect of social cognition was found. A *positive* moderation effect for both social- and neurocognition was expected, as several cognitive functions (e.g., cognitive flexibility, empathy, self-reflection) were previously found to be important for both identity development and effective group behavior (e.g., Welsh & Schmitt-Wilson, 2013; Destin & Svoboda, 2018; Eres, 2022; Rania et al., 2021).

There are several potential reasons for the lack of a *positive* moderation effect. First, it is possible that such an effect does not exist in the true population. Indeed, no significant correlation was found between social- and neurocognitive function and identity integration, as well as between cognitive functions and in-group identification. As the present study appears to be the first to investigate these respective relationships, further research is needed to determine whether the lack of the associations above is due to methodological errors or a genuine lack of such positive relationships. Second, most participants in the current study categorized as cisgender and strongly identified with male and female gender roles, respectively. In-group identification might therefore occur more automatically for these individuals and not require cognitive effort to apply coping mechanisms (e.g., self-distancing, group affirmation) that can enhance well-being and level of identification (Piekny et al., 2017; Bourguignon et al., 2020). Similarly, dichotomous gender identities are associated with less stigma and oppression (Ferrari et al., 2021; Halberstam, 1998), making the integration of these identities less difficult (Mitchell et al., 2021; Syed & McLean, 2016) and potentially less

dependent on cognitive factors. A final reason for the absence of a *positive* moderation effect might be that most participants indicated high levels of cognitive functions on the administered test. Indeed, this points toward a potential ceiling effect, making it more challenging to determine a clear moderation effect of both social- and neurocognitive functions.

The additional finding of a *negative* moderation effect of social cognition might be explained by previous research. For instance, a recent study suggests that high levels of insight and self-reflection in stigmatized individuals are associated with self-stigma and stereotype endorsement (Sportel et al., 2023). Moreover, studies indicate a positive relationship between self-reflection/awareness and empathy (Gerace et al., 2017; Eckland, 2018; MacDonald &Price, 2017). Therefore, it can be assumed that people with high empathy scores are also highly capable of self-reflection. This can explain the previously described relationship between self-reflection and self-stigmatization also for people with high empathy. However, more thorough research is needed on this topic. Overall, these factors might therefore make it more difficult for stigmatized individuals to perceive the benefits of the group and consequently create negative social identities, which are often associated with stigma and confusion that can affect the process of identity integration (Baumeister et al., 1985; Burgess, 2012; Ehrensaft, 2021; Haslam et al., 2021; Turner, 2010; Wells & Hansen, 2003; Mitchell et al., 2021).

Contributions

The current study has several strengths. Although previous research has been performed on the relationship between identity integration and cognition, this appears to be the first study to investigate the association between specific social- and neurocognitive functions and the process of identity integration. Moreover, this research is the first to investigate this process in individuals with a gender variant identity. Therefore, this study

can be considered a first exploration into this topic and consequently opens the door for future research to learn from this investigation's strengths and weaknesses. Although also considered a potential limitation, the homogeneity in age and education of participants in the present study increases the likelihood that the found effects are related to the variables of interest rather than to these potential covariates. A final strength of the present study is its large sample size and excellent power. Indeed, these factors positively affect the study's reliability and make the findings more meaningful.

Limitations and Future Research

The present study also has several limitations to consider when interpreting the findings. First, the current study mainly conceptualized the term gender variance as an incongruence between physical sex and gender identity (i.e., trans* or non-binary people) but rarely accounted for those that identify as cisgender but display behaviors and/or appearances that are typically associated with the other sex (Bonifacio & Rosenthal, 2015; Knutson et al., 2021). Therefore, there is a possibility that not all participants were accurately represented in the current study. This is of importance, as these individuals also challenge heteronormative views and therefore deal with stressors that can potentially affect identity integration (Baumeister et al., 1985; Bonifacio & Rosenthal, 2015; Ehrensaft, 2012; Haslam et al., 2021 Turner 2010). Indeed, inclusion of these criteria (e.g., "I am a cisman who displays many behaviors and/or appearances that are typically associated with the other sex") in future studies might increase the representation of gender variant individuals and additionally decrease the large difference between cisgender *(n = 230)* and gender non-conforming (*n = 20*) participants.

Although also considered a potential strength, the low variability in age and education restricts the current findings to a small group of individuals. Specifically, most participants had a background in higher education and were aged between 18 and 23. As involvement in

higher education has often been associated with higher cognition, the current study is confined to a small variability in social- and neurocognitive functions (Lövdén et al., 2020). Including a more diverse sample in terms of educational level would increase the variability in cognitive functions and consequently ensure a better insight into its potential moderation effect on the relationship between in-group identification and identity integration. Furthermore, as gender variance has more commonly been observed in younger individuals (Nolan et al., 2019), it would have been interesting to see whether similar age effects exist in the current study. Future studies should therefore include a sample more representative of various age groups.

Third, the instrument that was applied to determine the participants' self-perceived levels of empathy (i.e., Davis, 1980; De Corte, 2007) was judged to have questionable internal consistency in the current study ($\alpha = .59$). As it therefore cannot be determined whether the aforementioned instrument was able to measure empathetic tendencies correctly, the validity and accuracy of the current study are decreased. Although two outliers were detected, these usually inflate the internal consistency of a questionnaire and, therefore, cannot be considered the reason for the low Cronbach's alpha value (Liu & Zumbo, 2007; Liu et al., 2010). Moreover, as the Dutch version of the Interpersonal Reactivity Index was validated on healthy and normal functioning adults (De Corte, 2007) and therefore administered to similar individuals as in the current study, a specific reason for the unsuccessful conceptualization of empathetic tendencies cannot be determined. Ultimately, future research investigating this topic needs to further look into the potential reasons for the failed conceptualization or administer other instruments of empathic tendencies. Moreover, it is important to note that although the wrong scaling was used for the MAI (see Method section), the instrument was found to have good internal consistency ($\alpha = .92$). Still, future studies investigating this topic should change the scaling to its original, in order to ensure that the construct is measured as it

was intended to. Although the MAI, CFI, and SRI-S were all found to be reliable instruments in the assessment of subjective cognitive functions (Schraw & Dennison, 1994; Dennis & Vander Wal, 2010; Grant et al., 2002), interferences about overall cognition are difficult to draw from only these subjective instruments. Therefore, future studies might additionally complement these scales with other objective measures of cognition to receive a more comprehensive overview of functioning.

As a final remark, a potential reason for the lack of a moderation effect is that the investigated relationships might be better conceptualized as a mediation model. Specifically, it was expected that social- and neurocognitive functions predict levels of identity integration and that an individual's level of identity integration predicts their well-being. Essentially, the link between social- and neurocognitive functions and well-being was tried to be explained through identity integration. Therefore, future studies should first theoretically investigate whether the relationship of interest can be approached as a mediation model. If that is the case, the present study should be reconceptualized and empirically tested through such an approach.

Conclusion

The present study adds to the growing body of research on how stigmatized identities might be integrated into the coherent sense of self and is the first to investigate this topic in gender variant individuals. Indeed, this research emphasizes the large diversity associated with the term gender variance and highlights that in-group identification largely varies between non-conforming individuals and, therefore, can hardly be generalized. Still, a strong sense of in-group identification can potentially help with the process of identity integration, even when the group of interest is stigmatized (Bourguignon et al., 2020; Bat-Chava, 1994). Although the current study found no positive moderation effect of social- and neurocognitive functions, it further stimulates the question about the factors that might contribute to the

development of an integrated identity. Nonetheless, a potential influence of cognitive functions may not be disregarded in future research. Mainly, this research should be seen as a first explorative study that opens the door to this highly interesting topic and provides important indications concerning potential implications as well as operational changes that need to be made in the future.

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