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Gender differences in surgency: A study among children in Sweden

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Abstract

The temperament factor of surgency has a biological basis, however it can also be influenced by the external environment. Sweden is an interesting environment to study gender differences in surgency since it is an individualistic society characterized as fostering gender equality. The study explored gender differences in surgency in 62 children (36 boys, 26 girls) at the age of 9 years old ($M= 9$ years, 5 months). The study took place in the southern part of Sweden and the children were tested using a caregiver report (TMCQ) and a performance task (ARB-C). Independent sample t -tests were conducted on a total of 8 variables measuring surgency. No statistically significant gender differences were found at $p < .05$, however some discrete tendencies for differences between boys and girls were present. The results were viewed in regards to important features in the Swedish environment that could be influencing the lack of gender differences. Due to limitations and issues of power the study does not draw any final conclusions or make generalizations, rather it stresses the need for additional work.

Keywords: Gender differences; Surgency; Temperament; Sweden; Cross cultural research

Introduction

From early on in life individual differences in children are noticeable. These differences can be further highlighted when comparing boys and girls. It may be that one child is very active and stimulated by novelty, whereas another child is more cautious and restrained. These differences can relate to the temperament factor of surgency. While temperament in general refers to differences that are biological in nature and in turn contribute to variability in behaviour, surgency is a specific component of temperament that is characterized by a disposition of activity, positive emotionality and high approach tendencies (Rothbart, 2011). Although temperament has a biological basis it is also malleable by external factors in the environment. Therefore, studying patterns of temperament such as surgency across diverse settings and cultures can shed light on the dynamic relationship that temperament has with biology and the environment.

Several gender differences have been found in surgency. However, studies also convey that these can be both consistently and inconsistently determined across cultures, many of which have been studied outside of Sweden. Sweden is an individualistic country, characterized by laws that promote gender equality in many forms including in schools and in the workforce. Despite these actions different sources also express that the implementation of these actions is lacking in practice. This makes for an interesting environment to study gender differences in surgency. If prominent gender findings are obtained in Sweden as has been demonstrated elsewhere it speaks to some consistency of this temperament factor. However, if other results are found this provides support that features in the Swedish environment may be strong contributors to influencing surgency.

This topic has significant links with a child's development and functioning, particularly with personality and psychopathology. Temperament is viewed as the core upon which personality later develops from and surgency is related to the personality factor of extraversion (Rothbart, 2011). This makes it a suitable aspect to study in order to understand individual differences in personality. The importance of understanding gender differences in surgency also has clear implications in the gender differences seen in psychopathologies later on in life, especially in the form of externalizing problems.

The present study was conducted within a larger ongoing research project at Lund University that focuses on temperament as it relates to learning styles. The aim was to explore gender differences in the temperament factor of surgency in third grade children at the age of 9 years old in Sweden. Gender differences were measured on both a questionnaire and

a performance task. The study hoped to highlight the role of biology and environmental factors in shaping gender differences in surgency.

Temperament

In general, temperament is considered to be differences in behaviours that stem from a biological basis, which are both evident early in development and to some degree considered to remain stable. The concept of temperament stems from the work of Thomas, Chess and colleagues and their well known New York Longitudinal Study (Thomas & Chess, 1977). This landmark work aimed to study differences in children's reactions in daily activities, since the researchers believed that variability was attributable to an interaction of factors. They interviewed parents and analyzed the collected data, which resulted in establishing nine dimensions of temperament: activity level, rhythmicity, approach versus withdrawal, adaptability, threshold, intensity, mood, distractibility, and attention span/persistence. These dimensions also led to creating three types for which children could be categorized as "difficult", "easy" and "slow-to-warm-up". This early work contributed significantly to the field and led Thomas and Chess to expand to other similar studies. At the same time various issues were pointed out with the original New York sample. These included the age differences of children between 2 and 6-months-old when the assessments started and the lack of variability in the sample's social, economic and ethnic factors (Rothbart & Derryberry, 1981). Nevertheless, it was the beginning of multiple models and conceptualizations of temperament that were to follow.

Definition and Structure

Through a long line of work Rothbart along with various colleagues have studied temperament. These researchers have framed temperament in terms of differences in reactivity and regulation. This means that individuals have varying tendencies of reaction patterns to stimuli and these can be moderated through regulative abilities such as dispositions of approach or withdrawal (Rothbart & Derryberry, 1981). The following definition of temperament by Rothbart and Derryberry (1981) is what the present study refers to, which states that temperament is:

constitutional differences in reactivity and self-regulation, with "constitutional" seen as the relatively enduring biological makeup of the organism influenced over time by heredity, maturation, and experience. By "reactivity" we refer to the characteristics of the individual's reaction to changes in the environment, as

reflected in somatic, endocrine, and autonomic nervous systems. By “self-regulation” we mean the processes functioning to modulate this reactivity e.g., attentional and behavioral patterns of approach and avoidance. (p.37).

Rothbart and colleagues have composed a well known model of temperament that consists of three broad factors. These factors are termed effortful control, negative affectivity and surgency, and have slight differences when applied to different age groups such as in infants the effortful control factor is replaced by an orienting/regulating factor instead (Rothbart, 2011). As described by Rothbart (2011), the factor of negative affectivity consists of negative emotionality such as fear and anger, and effortful control is to exert control over ones behavior and responses. The third factor of surgency is characterized by positive emotionality, high approach tendencies, activity and sensitivity to rewards. The questionnaires that are used to assess these factors have been adapted to fit various age groups ranging from infancy to adulthood. Moreover, the factors have been studied at diverse points in development and across settings. They have consistently been determined through factor analysis of items (Ahadi, Rothbart & Ye, 1993; Putnam, Gartstein & Rothbart, 2006; Rothbart, Ahadi, Hershey & Fisher, 2001). All three broad factors are composed of several dimensions. Factor analysis has shown that surgency includes four dimensions of activity level, impulsivity, high intensity pleasure and shyness (reversed).

Biological Models

Temperament and its biological basis are thought to have its roots in underlying systems. A major theory called the Reinforcement Sensitivity Theory of Personality (RST) proposed by J.A Gray (1982), suggested three neurobiological systems that regulate behaviour. The differences that individuals display in behaviours are the products of variability in emotion and motivation (Colder et al., 2011), which in turn are governed by these three neurobiological systems. In the original theory Gray specified three systems. The first system called the Behavioural Activation System (BAS), also referred to as the appetitive system, responds to rewards stimuli and reactivity in this system will elicit sensitivity to rewards, strong approach tendencies and positive emotions (Colder et al., 2011; Derryberry, Reed & Pilkenton-Taylor, 2003). The second system called the Behavioural Inhibition System (BIS), also referred to as the defensive system, responds to cues of punishments and reactivity in this system will elicit sensitivity to punishment, strong inhibition tendencies and emotions of anxiety (Colder et al., 2011; Derryberry et al., 2003). The third system called the Fight/

Flight System (FFS) responds to aversion leading to behaviours and reactions of fear and fleeing (Colder et al., 2011). Gray's theory was revised in 2000 where some important changes were made. As described by Corr (2008), the BAS remained the same except that now it was considered to be sensitive to all types of reward cues. The FFS was changed to the Fight Flight Freeze System (FFFs) and now was sensitive to all types of aversion and punishment signals. Finally, the BIS as opposed to responding to cues of punishment now dealt with conflict between the other systems. These systems are thought to vary in their reactive strengths across individuals and thereby give rise to differences in behaviours. For example, having a stronger BIS is thought to be evident in introverted individuals while a stronger BAS is seen in extroverted individuals (Rothbart, 1989).

Temperament and the RST are related. The BAS that emphasizes approach corresponds with characteristics of surgency. At the neural level, the BAS is thought to have its origin in areas with high levels of dopamine and its overall system encompasses several regions ranging from the frontal and limbic areas to the striatal region and the brainstem (Pickering & Smillie, 2008; Derryberry et al., 2003). When reward stimuli activate this system it propels behaviour. These behaviours in turn initiate approach and actions towards rewards (Pickering & Smillie, 2008). The BAS also relates to aspects of positive emotionality. In particular, in a sample of undergraduates Carver and White (1994) found that scales that measured BAS were linked to levels of happiness when reward cues were present. These descriptions of BAS bear similarities to the concept of surgency. The association between surgency and BAS has been discussed in various sources (Rothbart & Bates, 1998; Rothbart, 2011) and demonstrated in multiple studies (Carver & White, 1994; Elliot & Thrash, 2002; Muris & Meesters, 2009; Quilty & Oakman, 2004). This in turn suggests that not only are the two strongly linked, but also that they can be perceived as different versions of the same construct. Therefore, it seems plausible that similar gender differences would be found on surgency and measures of BAS.

Heritability and Stability

Temperament is thought to be biological which suggests that it has a core that remains relatively stable. Behavioural genetics research has demonstrated the genetic roots of temperament, as well as showcasing the different roles of the environment. Twin studies have indicated that identical twins who share the same genes are more similar in various temperament dimensions than fraternal twins (Matheny & Brown Dolan, 1980; Saudino, 2005). Heritability of temperament appears evident from these findings. However, this field

of research has also demonstrated the significant contribution of the environment to variability in temperament. In particular, the nonshared environment is highlighted (Saudino, 2005). Nonshared environmental effects come from when genetically similar family members who live in the same environment are significantly different (Krueger & Johnson, 2008). This asserts that despite living in the same setting there are still factors that uniquely affect individuals and lead to differences. The aspects of the nonshared environment that can be influential include siblings receiving different treatment from parents or having different extracurricular activities (Krueger & Johnson, 2008). Therefore, despite having a genetic basis temperament is not resistant from environmental input as it can also be modified by external factors. This indicates that both biological dispositions as well as the environment have significant contributions to differences in temperament.

Temperament traits can vary in relation to their stability throughout development. According to Rothbart (2011), some traits are more stable from early on in life whereas others emerge as development progresses and as individuals get older. Moreover, Rothbart emphasized that even though there is a biological component to temperament this does not mean that these aspects do not evolve or develop as well. Similarly, Saudino (2005) expressed that the genetic aspect of temperament can actively evolve throughout development and as a result “be sources of change as well as continuity in behavioral development” (Plomin & Nesselroade, 1990, as cited in Saudino p.5). Together it implies that there is diversity in trait trajectory and they may be assessed differently depending on what point in development they are being examined. For example, longitudinal work (Rothbart, Derryberry & Hershey, 2000) has shown that in infancy between the ages of 6.5-13 months fear and distress are quite stable. On the other hand, effortful control does not emerge until later on in childhood also showing signs of stability around this time (Kochanska, Murray & Coy, 1997; Rothbart, 2011).

When looking at stability of aspects of surgency and approach characteristics some work indicates that these can be fairly stable. In infancy to early childhood Rothbart et al. (2000) determined that several early characteristics of positive disposition and approach were related to similar later outcomes, while early signs of fear related more to later inhibitory dispositions. This shows that approach qualities linked to surgency as well as inhibitory tendencies remain relatively stable between infancy and age 7; however, may change slightly in their manifestations. Further understanding of stability has also been demonstrated in a broader age span. Roberts and Delvecchio (2000) conducted a meta analysis and looked at rank order consistency of personality and temperament traits across the lifespan. In general,

they found that consistency of traits increased with age and had various peaks around preschool, in ones 20's and middle age with traits reaching stability after around age 50. Moreover, the lowest state of consistency was in infancy and early childhood. Temperament factors in particular were examined in samples mainly below age 12. These findings indicated that approach, negative emotionality, task persistence, and adaptability were alike in their moderate consistency trajectories whereas activity level had lower continuity. The instability of activity level in early life is also in line with other studies (Rothbart et al., 2000). Moreover, the temperament traits did not show the same strength in consistency as the adult personality traits given their findings that traits stabilize with age.

Overall, research that includes a comprehensive meta-analysis shows that stability and consistency of temperament varies with age and depends on the trait being assessed-with some traits being more stable than others. However, consistency of both temperament and personality traits increase gradually with age, which points to the significance of maturation influencing trait stability.

Temperament and Personality

Temperament and personality are two concepts that at times are used interchangeably. Despite there being overlaps and clear associations between the two, there is also a distinction. Temperament refers to the biological bases for individual differences that exist from early on in life. This creates the foundation upon which personality later develops from, as well as personality being the product of experience, environmental factors and self-concept (Buss, 1989; Rothbart, 1989; Shiner & Caspi, 2003). Therefore, temperament is the seed of adult personality making it an important component to study and understand.

The link between temperament and personality has been well studied. The factors of surgency and negative affectivity have been associated with adult personality factors of extraversion and neuroticism respectively (Derryberry et al., 2003; Pulkkinen, Kokko & Rantanen, 2012; Shiner & Caspi, 2003). In addition, links have been found between personality, positive/negative emotionality and BAS/BIS (Elliot & Thrash, 2002). These works that support the connections between temperament and personality strengthen the association that personality derives in part from early temperamental differences.

Regarding gender differences in personality similar findings have been demonstrated across many countries. Lynn and Martin (1997) examined gender differences in 37 countries and found that women were generally higher in neuroticism, while men were proportionately higher on extraversion and psychoticism. However, variability with

extraversion found that in five countries women were higher than men. Other studies have also shown women being rated higher on neuroticism and extraversion across many nations (Schmitt, Realo, Voracek & Allik, 2008). In line with the association between early temperament and personality, these results suggest that the gender differences in personality may be traced back to similar patterns in temperament. The consistency in gender differences in personality that is seen across cultures and countries indicates a biological root. If gender differences were only the product of socialization processes they would likely vary with countries, especially between countries that are on the higher and lower ends of promoting gender roles.

In sum, there are significant links between temperament factors and personality that is also highlighted through gender differences in both. This emphasizes that understanding temperament has significant contributions to other areas of research such as adult personality.

Temperament and Psychopathologies

Temperament has a close relationship with the development of later psychopathologies. (For review see Nigg, 2006). This can occur in a direct manner or more so where early temperament characteristics interact with experiences that in turn lead to problem behaviours (de Boo & Kolk, 2007; Lengua, Wolchik, Sandler & West, 2000; Rothbart, Ahadi & Hershey, 1994; Rothbart, 2011). In other words, pathologies can be traced to stemming from both biological dispositions and moderating factors in the environment. Pathologies can often be divided into two categories of externalizing and internalizing. Definitions by Keenan and Shaw (1997) have stated that externalizing problems are in the scope of attention, impulsivity and conduct issues, and internalizing problems are pathologies in the realm of depression and anxiety. The characteristics associated with surgency have been specifically linked to externalizing problems (Bohlin & Hagekull, 2009; Honomichl & Donnellan 2012; Oldehinkel, Hartman, De Winter, Veenstra & Ormel, 2004). Therefore, specific temperament factors may be more relevant for one type of pathologies than another and studying surgency can help to further understand externalizing problems.

The gender differences that exist in temperament are also associated with the development of later psychopathologies. There are different rates of pathologies for males and females as well as a difference in the types of pathologies that are likely to develop. In many cases boys make up a larger portion of those with externalizing problems, whereas girls are highly represented in internalizing disorders (Keenan & Shaw, 1997; Rothbart, 2011) and

many studies relate these differences to those in early temperament. Due to the link between surgency and externalizing problems, this suggests that boys having more externalizing issues may stem from boys also being higher on surgency. As a result, exploring gender differences in surgency will aid in understanding differences in the development of psychopathologies and assessing the risks that boys and girls face.

Gender Differences

Gender differences in temperament have been studied through the use of various measures and across age groups as early as infancy. The literature of previous studies in this area reveals several consistencies yet also distinct variations in results. The variation in gender differences across studies can be due to a number of reasons. Commonly, studies have different parameters that impact the interpretation of their results such as the measures used, the age group studied, and importantly differences in cultures/ environments where the study took place. These could be potential reasons why the pattern of temperament dimensions for boys and girls are at times inconsistent.

Gender differences in surgency have been explored in diverse settings and yielded multiple findings. Sparse research was recovered that specifically investigated gender differences in surgency in Sweden. However, gender differences on other forms of temperament in Sweden have been demonstrated and generally found small (Malveholm & Stapleton, 2012) or no significant gender differences (Hagekull & Bohlin, 2003).

Surgency

The factor of surgency includes the dimensions activity level, high-intensity pleasure, impulsivity, and shyness (reversed). Else-Quest, Hyde, Goldsmith and Van Hulle (2006) conducted a comprehensive meta analysis looking at gender differences in temperament for children between the ages of 3 months to 13 years. In terms of surgency boys were higher than girls overall. Moreover, within the dimensions of surgency significant results were obtained for activity level, characterized by motor activity, and for high-intensity pleasure where boys were higher on both. This meta-analysis is useful for compiling and comparing many studies that have investigated gender differences. The results provide strong support that boys are consistently higher on activity level and high intensity pleasure. A later single study has also yielded congruent findings. Olino, Durbin, Klein, Hayden and Dyson (2013) compared gender differences in temperament for children ages 3-7, but also compared three different measures (maternal reports, paternal reports and laboratory observation) since

caregiver reports tend to be the most widely used. The results showed that across all three measures boys were found to be higher on activity level than girls, which affirms the conclusions of Else-Quest et al. (2006). That boys are higher on activity level corresponds to other studies that have also determined this across different ages, including birth-12 months (Campbell & Eaton, 1999), from ages 5-6 years old (Gaias et al., 2012) and in 8-14 year olds (Muris & Meesters, 2009). The magnitude of gender differences in activity level may also vary with age. For example, sex differences appear to remain stable in the first year of life pointing to the strong biological nature of activity level (Campbell & Eaton, 1999). However, early findings have also established that as children develop into adolescence these gender differences tend to increase with age (Eaton & Enns, 1986). Together these studies point towards a general tendency for boys to be higher on activity level than girls, especially since this has been established in numerous studies.

Impulsivity refers to how quick response tendencies are (Simonds & Rothbart, 2004). Olino and colleagues (2013) also found gender differences for impulsivity where boys were rated higher on both the laboratory measure and on maternal reports, yet this was most highlighted in the laboratory assessment. This gender difference was thereby not detected in paternal reports indicating that one type of measure may be better suited when assessing impulsivity. At the same time when comparing a large volume of studies Else-Quest et al. (2006) found only a small, although significant, effect size for boys being higher on impulsivity. Therefore, there may be inconsistencies in the degree of gender differences in impulsivity especially when looking at single studies versus multiple and the parameters that each study has used. Impulsivity has also been examined in terms of its progression with age. Boys were rated as highly impulsive more so than girls, and continued to be higher even though the levels of impulsivity declined between kindergarten and grade six (Côté, Tremblay, Nagin, Zoccolillo & Vitaro, 2002). The decrease in impulsivity with age may perhaps be due to parallel emerging maturation (Côté et al., 2002). Studies demonstrate support for gender differences in the dimension of impulsivity where boys are favored. However, there may be less agreement between studies about the magnitude of the gender difference where larger studies suggest only a small difference.

The dimension of high-intensity pleasure also appears to have a distinct gender difference. This dimension refers to pleasure experienced by activities and stimuli that are highly intense (Else-Quest et al., 2006). Multiple studies have found similar outcomes. Putnam et al. (2006) found that caregivers rated females between 18-36 months as being lower on high-intensity pleasure. In addition, Gaias et al. (2012) reported that boys between

the ages of 5-6 in a sample of American and Finnish children were higher on high-intensity pleasure. Congruent results of boys being favored on high-intensity pleasure have been supported in other single studies (Muris & Meesters, 2009) and in larger meta analysis as well (Else-Quest et al., 2006). Taken together there is high agreement that boys are inclined to greater levels of high-intensity pleasure and more so that this gender difference can be found at various ages.

The final dimension of shyness is part of surgency but reversed. This means that the higher one is rated on shyness the lower one is on surgency. Shyness is a tendency towards inhibition in new or unfamiliar situations (Simonds & Rothbart, 2004). Muris and Meesters (2009) found that shyness was higher in girls between 8-14 years old. Whereas Ahadi et al. (1993) discovered no statistically significant gender difference in shyness in an American sample of 6-7 year olds. Other studies with various constructs of shyness have conveyed that shyness and inhibition had no significant gender differences (Rubin, Coplan & Bowker, 2009). This suggests that shyness is a dimension that has yielded both a distinct gender difference and no gender difference at all, meaning that shyness is equally dispersed between the genders. Considering that this gender difference is not as clear as some of the others in surgency and that mixed results could be due to differences in the construct of shyness signifies that further explanation is needed.

Because surgency relates to the biological system of reward sensitivity, corresponding gender differences have also been found on BAS. Generally, research has conveyed that boys are higher on measures of BAS. This includes males being higher on BAS traits of approach (Carey & McDevitt, 1978; Rothbart, 1989), being higher in risk taking (Boles, Roberts, Brown & Mayes, 2005; Cross, Copping & Campbell, 2011), and continuing to take risks when it is not a good idea (Byrnes, Miller & Schafer, 1999). Having a high BAS disposition is characterized by a sense of “go” and less ability to refrain from impulsive and approach behaviors. Different reasons exist to help explain why males tend to be higher on this. Macdonald (2008) discussed gender differences in effortful control as it relates to males being higher in approach, due to that effortful control is seen as a vital regulator of the approach system. The author referred to evolutionary theory that states that males are less parentally invested than females thereby leading to an inclination for riskier tendencies. As a result males have less ability to inhibit behaviours, which explains them being lower on effortful control than girls and moreover having higher dispositions of approach including “sensation seeking, impulsivity, reward seeking, [and] aggression” (p.1018). The fact that

similar gender differences are seen on several surgency dimensions and on BAS measures suggests a strong pattern for boys to be higher on these.

Cross Cultural Gender Differences in Surgency

The gender differences in surgency that have been discussed so far show a favoring of boys both overall and on many of the dimensions within the factor. Yet, some show a stronger gender difference than others. Despite the emergence of gender differences, research also shows that these patterns may not always remain consistent when elements of environment and culture are taken into account. For example, in several studies activity level and high intensity pleasure are higher in boys. However, a study by Ahadi et al. (1993) found contradictory evidence when comparing American and Chinese children. Their study showed that many of the gender differences in America were in fact opposite in the Chinese sample. While activity level favored boys in the American sample, the boys in the Chinese sample were rated lower than girls on surgency and its dimensions of activity level, high-intensity pleasure and impulsivity. Another cross-cultural study by Gaias et al. (2012) examined American and Finnish populations. When comparing 5-6 year old children between the cultures higher activity level was found in Americans over Finns, yet in general boys were higher in activity level over girls in both places. However, this gender difference did vary with age groups. These studies convey that differences in cultures and environments are important. Therefore, while some similar gender differences in surgency across cultures indicate a form of consistency, in other settings the gender differences are contrasting which instead proposes significant environmental contribution in altering gender differences.

The overall summary of gender differences in surgency suggests the following. Firstly, several dimensions show a favoring of boys however; gender differences are stronger on some dimensions over others. Secondly, variability in contextual factors such as culture and the external environment can impact gender differences as seen in cross-cultural research. Therefore, further clarification on gender differences on the multiple dimensions of surgency is needed, as well as highlighting how these manifests in diverse environments. This in turn will help in understanding how gender differences relate to biological differences, socialization processes and the environment.

The Relationship between Temperament and the Environment

Culture and society are two slightly distinct concepts. Society emphasizes relationships with others while culture encompasses concepts and information (Matsumoto &

Juang, 2007). However, both constructs have a significant impact where every culture and society has different aspects that will inevitably influence perceptions and behaviours. Even though general temperament constructs can be seen in various cultures the environment can shape the expressions of them. Research has demonstrated that aspects of temperament can vary between cultures, ethnicities and settings. Moreover, gender differences in temperament have also shown to vary as a function of the environment. On the one hand boys have been found as higher on several surgency dimensions and congruent findings have also been seen in some cross cultural studies (Gaias et al., 2012; Gartstein, Slobodskaya, Zylacz, Gosztyla & Nakagawa, 2010). On the other hand there is indication that diverse cultures can have variable gender differences (Ahadi et al., 1993; de Boo & Kolk, 2007; Zajenkowska & Zajenkowski, 2013). If the environment is important, what specific aspects are influential? Matsumoto and Juang (2007) discussed several factors that can affect cross-cultural temperament differences including genetic histories, the temperament considered most appropriate and strains in the environment including poverty. As indicated the environment is not one-dimensional, but rather multiple factors may be involved. Furthermore, the environment can exert its influence in various ways. One possibility is that over time impact from the environment may result in variability of the actual biological structure of temperament (Matsumoto & Juang, 2007).

The environment alone is likely not producing gender differences but rather may be working in conjunction with biology. Surgency dimensions such as activity level and high intensity pleasure could be considered “typical” boy behaviours, thereby questioning if these are the outcomes of socialization or biological dispositions. Campbell and Eaton (1999) have discussed these two major realms of explanations for early gender differences in activity level. The first is that the differences stem from socialization. This means that through norms, practices and encouragement in the environment boys and girls are socialized to differ in terms of their behaviours, which also affects perceptions and stereotypes of what behaviors are gender appropriate. Boys are both shaped and perceived as being more active than girls. The second is that the differences stem from innate and biological differences between the sexes. This view states that sex differences are already present at birth and continue to be highlighted throughout development. Despite finding results that suggested a strong biological root of sex differences in infant activity level, Campbell and Eaton did not believe this to be the only contributing factor. Early sex differences impact behaviours and experiences, which in turn continue to interact with aspects of socialization throughout development. This would also help explain why gender differences in activity level become more visible with age, suggesting that early biological differences become emphasized

through development and from the continued impact of socialization (Eaton & Enns, 1986; Kohnstamm, 1989). This same debate over biological and environmental contributors can extend beyond activity level to gender differences found in temperament in general. In turn this conveys the powerful relationship between nature and nurture.

The body of research that shows both similar and dissimilar gender differences produces a puzzling picture of what exact mechanisms are behind these. It appears that the dynamic between gender differences in temperament and culture is multifaceted. Temperament despite its biological basis is also shaped by external factors. Therefore, instead of strictly favoring biology or the environment it seems more plausible that the two are interacting in different ways and to varying degrees.

Conceptualizing Culture and Society

Several aspects in the environment exist that may moderate and influence gender differences. An instrumental component in the environment has to do with the cultures' views on gender roles and stereotypes. Gender roles manifest in cultures, where one culture may promote stereotypical roles and the division between males and females more strongly than others. These distinct gender norms can be reflected in numerous ways such as in the family, school settings and the media (Hofstede & Hofstede, 2005). Depending on the cultural views on gender, this in turn could lead to stronger or weaker gender differences. If the environment has a significant contribution to gender differences, it would be plausible to assume these would be pronounced in places where gender norms are more strongly enforced as opposed to places that nurture equality. Many sources state that gender roles and stereotypes are universal. However, there are variations in these stereotypes that are likely attributed to individual cultures (Best & Williams, 2001; Hofstede & Hofstede, 2005; Matusmoto & Juang, 2007). For example, in an early study by Intons-Peterson (1988) Swedish samples (ages 11-18) held more similar gender concepts for boys, girls, women and men, whereas the sample in the United States showed more divided and stereotypical gender concepts. This was thought to be in line with the overall climate of equality that Sweden promotes. Yet, at the same time when choosing likely and ideal future jobs the Swedish sample followed common stereotypes while the American males and females chose similar jobs. Recent studies indicate that even when a culture or society has more progressive views to promote gender equality such as Western and European countries, significant gender differences can still be found (Costa, Terracciano & McCrae, 2001; Gaias et al., 2012; Schmitt et al., 2008).

Other essential characteristics of a society have been brought up through the work of Hofstede. In the 1960's and 70's Hofstede (Hofstede & Hofstede, 2005) conducted a landmark study with IBM that shed light on organizations and cultures. Although this study focused on work values it also contributed to knowledge of cultures in a broader sense. From this study Hofstede was able to construct four dimensions – power distance, uncertainty avoidance, individualism/collectivism and masculinity/femininity- that countries were rated on. How each country was rated on these dimensions gave a general impression of their society. Hofstede also determined relationships between these dimensions, where wealthy countries tended to also be higher in individualistic orientation and places with higher power distance tended to be lower in individualistic ranking. By understanding societies in terms of these classifications it can provide insight to the mechanism of that environment and culture. This in turn leads to greater understanding of how gender differences can be formed differently in diverse contexts. How a society is conceptualized, including their views on gender equality may be an important feature of the larger environment that can affect gender differences in temperament.

Sweden: Culture and Gender Equality

Sweden as a society and culture can be regarded in various ways. In Hofstede's work (Hofstede & Hofstede 2005), Sweden was categorized as individualistic placing at number 13/14 out of 74 countries with lower numbers being the most individualistic. Individualistic societies tend to place the individuals best interest ahead of the collective group's interest. This can be seen in classrooms for example where collectivistic classrooms emphasize positive relations and refraining from disagreements that could jeopardize this, whereas in individualistic classrooms students see themselves as individuals and working through disagreements is often encouraged. In regards to the dimension of masculinity/femininity, Sweden was ranked as the most feminine out of all 74 countries. This suggests that Sweden is a society that fosters both sexes to have similar emotional characteristics, for example both should be caring. Moreover, there is less distinction between men and women in terms of work values (Matsumoto & Juang, 2007). The emerging picture is that Sweden is a more individualistic society with little differences placed between men and women in the context of work values. This also indicates that at the time of Hofstede's study Sweden had modern and gender equal views as compared to other societies.

In the formal context Sweden is a country with laws that promote gender equality. These include laws against discrimination based on sex among other factors (SFS

2008: 567) and equal rights laws for men and women in the labour market (SFS 1979:1118). However, despite these regulations in actuality and practice there are many ways in which gender inequality still remains. A report on equality in schools (SOU 2009:64) found that stereotypical gender norms were intact in many school settings where young girls tend to be quieter and well behaved while young boys are louder, outspoken and often the focus of the teachers' attention. Recent work provides conflicting information on this pattern, where some state that it has changed and others maintain that traditional roles still persist. Similar reports on equality have been conducted in older populations. According to official reports on equality in higher education (SOU 2011:1), gender inequalities were found to still exist such as unequal pay for women and men in teaching positions across various areas. Together these official reports suggest a disparity between official laws that enforce gender equality and actual practice where inequality remains.

Overall, Sweden can be viewed as on the higher end of being individualistic. In regards to gender differences and gender equality contrasting findings become apparent. While some work shows that Sweden has a smaller degree of gender differences as well as laws that promote gender equality, other recent reports find that in for example educational settings gender differences in various facets persist. Due to these mixed findings as well as the understanding that the interaction between gender differences across cultures can be diverse, Sweden provides an interesting environment to study gender differences in surgency.

Present Study

The literature shows a variety of results in terms of gender differences in temperament. It is important to stress that many studies have differed in their choices of measures including their choices of questionnaires, as well as the age group and context being studied. The review of literature indicates that similar gender differences on measures of surgency have been demonstrated across multiple studies that typically rate boys as higher on several of these. However, looking at cross-cultural studies from outside Sweden indicates that the external environment can significantly impact the pattern of gender differences. Taken together these studies show both consistent and inconsistent gender differences across settings. Therefore, even though surgency stems from biological dispositions the environment can also be fundamentally influential.

The purpose of the current study is to explore gender differences in the temperament factor of surgency in 9 year olds in Sweden. This selected age group is appropriate since by age 9 socialization has affected development. Therefore, this sample

allows for observing the effects of socialization in early childhood on gender differences in surgency. The gender differences will be examined on two measures, namely a caregiver questionnaire and a performance task. The hypothesis is open and explorative because of the variable results that have been found with the relationship between gender differences and cross-cultural settings and because little work has been conducted in Sweden that specifically examines this in surgency. The study is intended to help contribute to the understanding of gender differences in surgency and temperament in Sweden.

Method

Participants

This study included 62 third grade children (36 boys, 26 girls) at the age of 9 years old ($M= 9$ years, 5 months). The children were recruited through their respective elementary schools. Sixteen elementary schools were contacted in various communities in the area between Helsingborg and Lund in the southern part of Sweden. Schools and communities were limited to those with a high percentage of Swedish speaking members, since the questionnaire itself was in Swedish. The principals of the schools were initially contacted by letter and given information about the study and asked if they were interested in participating. This was followed up with phone calls and emails. It was stressed that participation was completely voluntary. For the present study, a total of three elementary schools participated that were from small to large communities. These three schools came from mainly middle class communities with high rates of Swedish speaking families. The response rates for the schools varied between 54.7%, 36.7% and 31.4% and schools also varied in the size of their grade three classes. All the children who participated in the study were assigned a code, thereby making their personal information anonymous and the collected questionnaires were kept in a locked filing cabinet at Lund University.

Measures

The current study used two types of measures to explore gender differences in surgency. The first was the Temperament in Middle Childhood Questionnaire (TMCQ) (Simonds & Rothbart, 2004). The second was a performance task named Assessment of Risk-taking Behaviour in Children (ARB-C) and was created by the head researchers of the project (Bengtsson & Nyström).

Choice of Method

The TMCQ is a questionnaire that asks caregivers to rate their children on a number of statements. Questionnaires in the form of caregiver reports have been widely popular as a means of assessing temperament in children. It is a tool that is relatively easy to distribute, thereby allowing access to many participants. It is an approach in temperament research that can include many dimensions for assessment and allows for analyses of how traits organize into larger domains (Rothbart, 2011). For these reasons questionnaires are an appropriate method for studying temperament. However, as with any method there are potential issues with the benefits. According to Rothbart and Goldsmith (1985), parents are the main observers of how a child typically behaves and will often have more personal knowledge of their child. At the same time potential problems include biases of their children shaped by their own attitudes and behaviours. Other plausible issues with questionnaires are cultural factors such as biases and constructs may have different values in diverse cultures (Ahadi et al., 1993). This can become problematic when questionnaires are used globally.

There are other approaches to studying temperament besides questionnaires, and each will hold their own advantages and disadvantages. Olino et al. (2013) compared three different methods for assessing gender differences in temperament and found that these changed across dimensions and with the type of measurement being used. For example, the dimension of fear was consistently higher for girls in all three types of measures, while the dimension of impulsivity had the strongest gender difference in the laboratory observations. This indicates that one approach may be more suitable in identifying gender differences on a dimension than another. Consequently, there is an advantage to using multiple approaches for assessing gender differences in children especially when results are at risk for variation. Therefore, if gender differences are found on more than one assessment it points to strong consistency. In line with this conclusion, the current study used both caregiver reports and a performance task as a way to investigate gender differences in surgency.

Temperament in Middle Childhood Questionnaire

The TMCQ is geared at studying temperament in children between the ages of 7-10 years old and was developed by Simonds and Rothbart (2004). Rothbart and colleagues have developed several questionnaires for different age groups that all measure a similar structure of temperament with broad factors of surgency, negative affectivity and effortful control. Moreover, multiple studies have validated the use of these questionnaires and this structure in a variety of settings (Ahadi et al., 1993; Gaias et al., 2012; Putnam et al., 2006; Rothbart et al., 2001). The TMCQ and its reliability was assessed by Simonds and Rothbart

(2004) who determined Cronbach alpha's between $\alpha = .63-.90$ for all of the scales. Moreover, for the specific scales included in the surgency factor Cronbach alphas ranged between $\alpha = .63-.79$, all of which indicated good internal consistency.

The TMCQ consisting of 157 items in the form of statements asked the caregivers to rate how well these corresponded to their child. The ratings were made on a 5 Point Likert scale where 1= Almost always untrue of your child, 2= Usually untrue of your child, 3= Sometimes true, sometimes untrue of your child 4= Usually true of your child and 5= Almost always true of your child. There was also an option to answer with "does not apply" (NA). The statements have the aim of assessing typical activity and behaviour of the child across a variety of situations. Together these 157 items measure 17 dimensions: 1) Activity level 2) Affiliation 3) Anger/Frustration 4) Assertiveness/Dominance 5) Attentional Focusing 6) Discomfort 7) Fantasy/ Openness 8) Fear 9) High intensity Pleasure 10) Impulsivity 11) Inhibitory Control 12) Low Intensity Pleasure 13) Perceptual sensitivity 14) Sadness 15) Shyness 16) Soothability/ Falling Reactivity 17) Activation Control. These dimensions in turn organize in to the 3 broad factors of temperament. In the present study, the factor of surgency was examined and analyzed with its dimensions of activity level, impulsivity, high-intensity pleasure and shyness (reversed). There were a total of 38 items that measured surgency with activity level having 9 items, high-intensity pleasure having 11 items, impulsivity having 13 items and shyness having 5 items. Table 1 provides descriptions of the dimensions as well as examples of statements used to assess them.

Table 1

Definitions and Examples of Surgency Dimensions

	Definition	Examples of statements: “My child...”
Activity Level	Level of gross motor activity including rate and extent of locomotion	Is always on the move Likes to be physically active
HI Pleasure	Amount of pleasure or enjoyment related to situations involving high stimulus intensity, rate, complexity, novelty, and incongruity	Likes rough and rowdy games Likes to go high and fast on the swings.
Impulsivity	Speed of response initiation	Can't help touching things without getting permission Says the first thing that comes to mind
Shyness (Reversed)	Slow or inhibited approach in situations involving novelty or uncertainty	Is shy with new people Acts insecure with others

Note. From TMCQ English version (Simonds & Rothbart, 2004)

In order to use the TMCQ the researchers first sought permission from the developers in the United States. Once this was granted the questionnaire was translated to Swedish by the head researchers. Afterwards, it was sent to a third party who translated the questionnaire back in to English and this version was compared with the original version. Upon comparison the necessary adjustments were made. In the final Swedish version the 4 specific scales for surgency that were used yielded Cronbach alphas between $\alpha = .69-.87$.

Assessment of Risk-taking Behaviour in Children (ARB-C)

The head researchers of the project created this performance task. The general concept of the task was to study children's choice behaviours in a resembling go/no go situation. The first part of the task consisted of a baseline test. This was conducted in order to determine the child's average reaction times without the presence of any losses or gains. The computer screen presented two squares in different sizes and the child was instructed to decide which of the two was larger, and to do so as quickly as they could. They indicated if the square on the left side or the right side of the screen was larger by pressing the respective buttons on the response box in front of them. There were a total of 20 trials.

The second part of the task was the ARB-C performance task and the goal was to win as many stars as possible over the series of trials. The computer screen displayed how many stars could be won or lost in each trial and these amounts varied across trials. The child's job was to decide whether they wanted to play in the given trial, yet it was up to chance to actually determine whether they would win or lose. Therefore, the only aspect the child could influence was their choice to take a chance to play or not. Based on the information provided in each trial, in the amount of stars that could be won versus lost, the children would decide to play or not play. After making a choice the next trial automatically followed. Their answers were made on a response box that had signs indicating a button for "yes" and a button for "no". First, 8 practice trials were conducted where the child could become familiar with the instructions and goal at hand. This was followed by the real trials, which were 64 trials in total and were presented in random order. At the end of the game the total number of stars won was displayed on the screen for the child to see. These were a predetermined random number of 20, 22, 25, 26, 28, 32, 40 or 41.

All trials varied in the amount of stars that could be won or lost. The structure of the test followed a symmetry where 16 combinations of wins versus losses were possible. These can be seen in Table 2.

Table 2

16 combinations of amount of stars to win versus lose

Type of trials	All-lose	All-win	Unequal	Conflict
	win-lose	win-lose	win-lose	win-lose
	0-1	1-0	1-2	0-0
	0-2	2-0	1-3	1-1
	0-3	3-0	2-1	2-2
			2-3	3-3
			3-1	
			3-2	

The first variable that was used to examine gender differences in surgency was reaction time to all-win conditions (RTall-win). These trials were characterized by blatant wins where a certain number of stars could be won and 0 could be lost. These trials varied between winning 1 star-losing 0; winning 2 stars – losing 0; and winning 3 stars – losing 0. The reaction times from these trials represented how impelled the child was by the rewards. There were a total of 12 trials with these all-win conditions. The second variable for assessment was the same reaction time to all-win conditions but corrected for baseline (RTall-win-B). Subtracting the baseline reaction times provided a more accurate distinction between reactions to rewards versus average reaction times under neutral conditions. The final variable that was examined was the total number of Go's across the 64 trials (TotalGO). At times the conditions of the trials were more obvious such as the child could win 0 and lose 3 stars, yet other trials produced a conflict such as equal numbers of stars could be won and lost. The total number of Go's overall represented how inclined the child was to play despite the conditions of wins and losses.

These three variables together encompassed characteristics of surgency. In general, faster reaction time in the all-win conditions and when these were corrected for baseline, as well as having a high number of Go's suggested a higher inclination of surgency.

Procedure

At each school the TMCQ and a consent form were handed out in envelopes to the children in grade three. Parents were asked to fill them out and return them either to their child's teacher or send them directly to Lund University. Upon the return of completed questionnaires, researcher went to each school and met with the children who had volunteered

to participate in order to conduct the performance task. The computer and necessary instruments were set up in a separate room. The rooms were quiet and private so that there would be little outside disturbance or distraction during testing. To also best enable this blinds were pulled down slightly and the child sat facing away from the doors. After brief conversation to make the child feel comfortable and address any general questions or concerns the testing began. The child sat in front of the computer and was given instructions, they were also instructed to try and only use their dominant hand when making their responses. First the baseline test was conducted. Upon its completion, new instructions for the ARB-C were given followed by proceeding with the task. For each trial the children were told to respond by pressing one of two buttons- yes and no- on a response box placed in front of them. After the completion of the task the children were given a certificate thanking them for their participation in the study. The total testing time was between 15-25 minutes.

Results

Independent sample t-tests were conducted to explore gender differences in surgency both on the questionnaire and the performance task. After initial preliminary analyses were carried out to assess the data, a total of five t-tests were performed on variables from the questionnaire and three t-tests were performed on the performance task data. In addition, a factor analysis was performed to ensure that the variables included in the surgency factor on the temperament questionnaire fit together.

Preliminary Analyses

Preliminary analyses were performed on all the independent and dependent variables in SPSS version 21. One participant had missing values on the three performance task variables, due to the computer equipment not working properly during testing. Therefore, the participant was excluded on the analyses where they had missing values.

Several outliers were detected in the descriptive analyses. One way to judge the strength of their impact is via comparison with the mean and the 5% trimmed mean for each variable (Pallant, 2010). If the variables with the outliers had similar means and 5% trimmed means, as well as the outliers having values that were relatively close to other cases they were kept in the data. Only the variable RTall-win fell outside of these parameters with three outliers. These outliers also had an extreme effect on normality. After closer examination these three outliers were subsequently removed from the data and treated as missing values. As a result, some analyses had slightly lower number of participants ($N=58$).

A perfectly normal distribution has skewness and kurtosis values of 0 (Tabachnick & Fidell, 2007). However, this is not a norm in the social sciences and deviations from normality are not a major concern for acceptable use of parametric techniques (Pallant, 2010). When normality criteria are not being met this can sometimes be due to problems with the construct being assessed more so than the measure itself (Pallant, 2010). For the current data the skewness and kurtosis values, the tests of normality and histograms were all evaluated for each variable. In some cases the tests of normality were not significant, however the other forms of evaluation were deemed acceptable with overall skewness values ranging from -.001 to 1.012 and kurtosis values ranging from -.814 to .592. Therefore, overall normality was judged to be satisfactory for the present data.

Factor Analysis

Factor analyses are sensitive to small sample sizes (Tabachnick & Fidell, 2007). Because of this and the discrepancy between the small sample size and the large number of dimensions on the questionnaire, only the variables included in the surgency factor were assessed to judge if they fit together. The data was deemed to be suitable for factor analyses in regards to inspecting its correlations, the Kaiser-Meyer-Olkin value and Bartlett's Test of Sphericity being significant. Although the KMO was slightly lower (.564) than the optimal value, the other forms of evaluation were acceptable for proceeding with the factor analysis.

Activity level, high-intensity pleasure, impulsivity and shyness were entered into a factor analysis to assess whether they were significantly related to each other to form a broader factor of surgency. The analyses demonstrated one component with an eigenvalue above 1 that also explained 46.574 % of the variance. This was also supported by visual inspection of the screeplot. All four variables loaded strongly on to the one component as seen in Table 3. The results indicate that the variables all load suitably onto one component, which in turn supports that they have similar underlying processes.

Table 3

Component Matrix from Factor Analysis

Component Matrix ^a	
	Component
	1
D10HighIntensityPleasureSU	.815
D2ActivitylevelSU	.721
D11ImpulsivitySU	.698
D16ShynessSU	-.439

Note. Extraction Method: Principal Component Analysis. a. 1 components extracted

T-tests for Surgency on Questionnaire

Five independent samples t-tests were performed to compare boys and girls ratings for activity level, high-intensity pleasure, impulsivity and shyness as well as for surgency overall, which was a combination of all its included dimensions and derived from the factor analysis. For a summary of values including group means and standard deviations see Table 4.

Table 4

Summary of Results from T-tests

	Males		Females		<i>t</i>	<i>p</i>	<i>d</i>
	(<i>N</i> =36)	M	SD	(<i>N</i> =26)			
Activity	3.80	.629	3.50	.606	1.871	.066	.48
Hpleasure	3.01	.490	2.94	.497	.556	.580	.14
Impulsivity	2.77	.515	2.65	.514	.884	.380	.23
Shyness	3.01	.666	3.31	.700	-1.694	.096	-.44
Surgency	.181	1.040	-.251	.902	1.705	.093	.44
RTall-win	1186.36	434.651	1308.57	332.866	-1.145	.257	-.31
RTall-win-B	548.91	396.198	529.39	235.669	.235	.815	.06
TotalGO	39.94	10.422	36.36	10.797	1.302	.198	.34

Note. With alpha level of $p < .05$, RTall-win and RTall-win-B analyses with $N=58$, TotalGO analysis with $N=61$

The means alone pointed to boys scoring slightly higher on these surgency variables, except on shyness where girls scored slightly higher. The t-tests yielded no significant gender differences for high-intensity pleasure $t(60) = .556, p = .580$ (two-tailed) and impulsivity $t(60) = .884, p = .380$ (two-tailed). Similarly, no significant gender differences were obtained for the remaining variables. However, these were closer to significance at an alpha level of $p < .05$, activity level $t(60) = 1.871, p = .066$ (two-tailed), shyness $t(60) = -1.694, p = .096$ (two-tailed) and surgency $t(60) = 1.705, p = .093$ (two-tailed).

Calculating effect sizes such as Cohen's d helps to understand the extent of differences in means between the groups, therefore this is also useful to examine in situations when no statistical significance has been found (Pallant, 2010; Tabachnick & Fidell, 2007). A small Cohen's d effect size is .20, a moderate effect size is .50 and a large effect size is .80 (Aron, Coups & Aron, 2010). High intensity pleasure and impulsivity yielded small effect sizes of $d = .14$ and $d = .23$ respectively. However, the three remaining variables that were also closer to significance had close to moderate effect sizes: Activity level $d = .48$, shyness $d = -.44$ and surgency $d = .44$. This suggests that there may be a degree of difference between boys and girls on these three variables, although this is not strong enough to be significant in this study. An important note has to do with the set alpha level of $p < .05$. This is a common standard however Stevens (2002) suggested that when sample sizes are smaller and under 100 this thereby also lowers the power of the test, subsequently it can be a good idea to have more flexible alpha levels for example at $p < .10$ or $p < .15$ to increase power. It is significant to point out that with less stringent alpha values of $p < .10$ the t-tests of activity level, shyness and surgency would be significant.

In summary, no significant results were obtained for any of the t-tests, indicating no gender differences on any of these variables. However, the effect sizes and the possibility of less stringent alpha values suggests that there may be a tendency for some difference between boys and girls on activity level, shyness and surgency yet the exactness of this is unknown and it is not supported through significance testing.

T-tests for Performance Task

Three independent sample t-tests were conducted to examine gender differences on the components from the performance task: RTall-win, RTall-win-B and TotalGO. For a

summary of values see Table 3. The means for RTall-win and TotalGO suggested that boys had more surgent responses. However, RTall-win-B indicated that girls had slightly faster reaction times. This may have represented a problem with the baseline test itself. It is not clear whether the baseline test was in fact neutral. Even though there were no rewards or losses present, children may still have wanted to answer quickly to show that they were good at the test or to gain the researchers' approval. This calls into question the data that the baseline test provided and whether it accurately tested reaction times under neutral conditions.

The t-tests were not significant for any gender differences on the performance task. RTall-win $t(56) = -1.145, p = .257$ (two-tailed) with an effect size of $d = -.31$, RTall-win-B $t(55.572) = .235, p = .815$ (two-tailed) with an effect size of $d = .06$, and TotalGO $t(59) = 1.302, p = .198$ (two-tailed) with an effect size of $d = .34$. The effect size for RTall-win-B suggests no difference between the groups. However, for RTall-win and TotalGO, effect sizes are slightly above small and thereby indicate that some difference between the means of boys and girls may exist yet these are not strong enough to be conclusive or significant in the present study.

Discussion

This study explored gender differences in surgency in 9-year-old children in Sweden. This was conducted with a caregiver questionnaire and a performance task. The factor analysis yielded a similar broad factor of surgency with its included dimensions fitting together well. This also supports that the factor of surgency can be determined in this particular cultural context.

The overall findings were that none of the surgency variables showed significant gender differences, thereby implying similarities between boys and girls on these aspects. However, three variables on the questionnaire yielded moderate effect sizes and were closer to significance. Further work is necessary in order to be able to draw more exact conclusions. The lack of gender differences that were found can provide insight into how the Swedish environment may be influencing temperament. Previous research in this field has found that gender differences are both consistent and inconsistent across settings and that the environment can have an important role. The lack of gender differences that were detected does not fit with the normative findings that boys tend to be higher on several surgency variables. Nor do they fit with other patterns seen in cross-cultural studies that show variations in this gender difference. Rather, they present a new pattern of gender differences that signifies the importance of considering features in Sweden. Therefore, explanations and interpretations of the study's outcome will be discussed.

Interpreting the Results: Effect Size and Power

No significant gender differences were determined on the surgency variables. However, it is also important to consider the effect sizes and power of the study when interpreting the results. The effect sizes for the majority of the variables were small or less than small. Yet, activity level, shyness and surgency on the questionnaire had close to moderate effect sizes. Activity level and surgency showed higher means for boys whereas shyness showed higher means for girls. This implies that a difference may exist between boys and girls scores on these three variables, yet statistical significance was not attained. At the same time, effect sizes are valuable and suggest that not only may there be a difference between the groups but they could perhaps become clearer if other adjustments were made. In order words, it is important to evaluate the parameters of the study in case these hindered finding stronger gender differences.

An important construct to consider when examining and evaluating the results is power. Powers is defined as the likelihood that a true effect will be detected and yield statistical significance (Tabachnick & Fidell, 2007). Moreover, the power of a test is influenced by sample size, effect size and set alpha level (Aron et al., 2010; Pallant, 2010). Thereby, having a small sample, small effect sizes and strict alpha levels leads to lower power (Aron et al., 2010). The current study fulfilled some of these criteria, which should be considered when interpreting the results. Lower power combined with non significant gender differences in the results suggests that the findings may be ambiguous. Aron et al. (2010) stated that when a test is non significant and has low power the results are inconclusive, and it leads to the chance that significant results could be found under circumstances of higher power. Not only does this indicate caution in drawing final conclusions from the present study, it also provides grounds for replicating the study with adjustments made to increase power such as having a larger sample size. In turn this would generate a better understanding of gender differences in surgency and whether the lack of them found in the current study was a true effect or the result of low power.

Two outcomes can be drawn from the present study. Firstly, no significant gender differences in surgency were obtained. This leads to considering factors that could be contributing to this outcome. Secondly, the three variables of activity level, shyness and surgency showed some subtle differences. When taking into account that less stringent alpha levels can help power, it is useful to note that these three variables would also be significant with more lenient alpha levels. Taken together this points to a discrete tendency for gender

difference to be present on these three variables, however further work is needed. Therefore, additional work including replications is necessary in order to further clarify the relation between gender and surgency.

Gender Differences in Sweden

It is difficult to compare the outcome of no major gender differences with previous studies, since sparse research has been found that specifically looks at gender differences in surgency in Sweden. However, looking at research on temperament and gender differences in general can be helpful. Malveholm and Stapelton (2012) conducted a study within the same project as the current study and explored gender differences in effortful control in Sweden. They determined differences on two out of six of their variables that favoured girls. Overall, their findings as compared to studies conducted abroad suggested smaller gender differences in effortful control in Sweden. Another Swedish study by Hagekull and Bohlin (2003) used the Colorado Childhood Temperament Inventory and assessed emotionality, activity and sociability in 20-month-old infants. Although this study was looking at links between temperament, attachment and later personality, they also found no significant sex differences on the temperament dimensions. These two studies together suggest that few gender differences have been found in other aspects of temperament.

The current study is not conclusive about the lack of gender differences and no attempts at generalization are made. However, despite potential issues with power and the need for further work, the results do appear to indicate that gender differences in surgency are reduced in this sample in Sweden. As compared to research conducted abroad the lack of gender differences in surgency in the present study show a different pattern. This thereby is also in line with the previously mentioned studies that suggested smaller gender differences in Sweden as well. It is possible that surgency as with other aspects of temperament are becoming more evenly dispersed across genders. This may not be completely unexpected since the particular environment in Sweden has characteristics that may minimize gender differences. There could be multiple important factors in the Swedish environment and certain aspects seem appropriate to examine, including the cultural tendencies towards individualism and gender equality.

The Role of the Environment in Sweden

Previous research has established the importance of the environment in regards to temperamental gender differences. This does not eliminate the fact that biological

differences may be causing the effect, but rather emphasizes the equal significance of diverse environments. What particular aspects of the environment are influential for gender differences? Ahadi and colleagues (1993) who found inconsistent cross cultural gender differences proposed possible contributing factors in the Chinese setting. These included goodness of fit between personality and culture where approach and surgent behaviours were not valued, that boys in particular could be exposed to more discipline, that the Chinese sample were mainly children without siblings and that the Chinese culture may have different standards for boys. These provide a good understanding of the multiple features in the external environment and culture that may have been influential.

It is not easy to view the lack of gender differences in the present study in terms of environmental factors, since more work would be needed to determine what these are. However, several possibilities can be considered. As previously mentioned Sweden is a country that aims for gender equality. Despite the fact that gender stereotypes and a gender divide are evident in places such as schools, there may still be an overarching presence of gender equality that is influential to various degrees. This climate in turn may lead to a decrease in gender differences within such domains as surgency. At the same time the association between gender equality in societies and gender differences is not entirely clear (Schmitt et al., 2008). Therefore, attitudes and practices of gender equality are important factors yet the full implications of these remain to be seen. Sweden has also been regarded as an individualistic country. Being identified as more of an individualistic versus collectivistic culture affects socialization processes that can relate to diverse gender differences in temperament. Although at times the associations are not always straightforward. Gartstein et al. (2010) studied four countries (Poland, USA, Russia and Japan) that varied on the individualistic/collectivistic continuum. The researchers hypothesized that a country's orientation could influence socialization factors and in turn contribute to early temperamental differences. Even though the research found cross-cultural differences, when it came to gender differences it was determined that high intensity pleasure and approach were higher for boys across all four countries. This finding suggests a degree of stability in gender differences in surgency despite variability in cultural orientation. In contrast, research has also demonstrated inconsistent gender differences in older samples on dimensions like activity level across individualistic and collectivistic countries (Zajenkowska & Zajenkowski, 2013). The cultural orientation of a country plays a significant role in development and can lead to various outcomes. The results from the current study suggest that gender differences in surgency may have a more complex relation to the individualistic climate of Sweden.

Therefore, there may not be clear-cut gender differences as a function of how individualistic or collectivistic a country is.

The findings of the present study highlight the complexity of understanding gender differences in temperament in terms of biology and the environment. Although the findings point to the influence that the environment in Sweden may have on gender differences in surgency, it is not a simple relationship. Thereby, it can not be concluded that the absence of significant gender differences implies that the environment is the only contributor- although it is regarded as very important. It is likely more complicated making it difficult to pinpoint the exact mechanisms from only one study. This study sheds light on gender differences in surgency in Sweden and provides a starting point for further work.

Methodological Discussion

Two important strengths of the study can be highlighted. First, little work has specifically looked at gender differences in surgency in Sweden as well as having used the TMCQ. The second is that two types of measures, namely a questionnaire and performance task, were used in the method. However, there are also limitations with the study that need to be addressed including methodological limitations.

The TMCQ has been shown to have good reliability and as a method holds several advantages. The factor analysis conducted on the questionnaire indicates the suitability of the surgency dimensions fitting together as a factor, which in turn supports the use of this measure. Using a caregiver questionnaire also entails potential issues including biases. A particular bias to be aware of is that gender stereotypes and norms may influence the caregivers who are rating a child's behaviour (Else-Quest et al., 2006; Olino et al., 2013). This makes it difficult to completely separate true ratings of temperament from social influences. Because of potential problems with biases when answering the questionnaires, it leads to discussing the validity of the TMCQ. No specific or extensive detail of this was found in the literature. To help support the validity of the TMCQ having additional raters, such as both parents would have been beneficial. This could have led to comparisons between raters. Not only would this have given more understanding on the child's surgency related behaviours, but also provided insight into the validity of the measure. Another aspect that would help in understanding the validity of the TMCQ is if the performance task gave identical results. This would then be an additional support for validity. These points also provide improvements that can be incorporated in future directions. Another possible issue to consider is that temperament research has a range of available questionnaires that are used

and these may all yield slightly different outcomes. Therefore, the lack of gender differences found through the use of the TMCQ may not necessarily be found on other questionnaires.

Both the questionnaire and performance task were together intended to help illustrate a coherent view of gender differences in surgency. Furthermore, having an objective performance task based solely on the child's behaviour could address some of the biases seen in caregiver reports. Both measures yielded the same lack of overall gender differences. Interestingly, however, the two measures produced varying effect sizes perhaps pointing to some disparity between them. For example, the measures may have been incompatible in capturing surgency overall. Or perhaps one measure better captured surgency than the other, for example the three components from the task may not have encompassed surgency as effectively as the questionnaire. As demonstrated by Olino et al. (2013) one type of assessment can be more sensitive to uncover gender differences in temperament than another.

The performance task has not been used numerous times, which could have led to some potential issues. Beyond having good face validity, it is necessary to further investigate the use of the performance task including examining its reliability, validity and the constructs that it aims to grasp since this has not yet been done. There were also some practical matters with the task that surfaced during testing with the children at their respective schools. At times the children did not easily understand the instructions. This could have led to playing the game without fully understanding how it worked. Another issue was the instructions for the children to use one hand during the performance task when answering on the response box. Although the children understood this some of them automatically resorted to using both hands. This occurred even after being reminded and may have resulted in some children responding faster than normal due to using both hands.

The study focused on environment and culture in a broader sense. Due to restrictions, the study did not address the specific cultures and subcultures in each child's environment. This is a weakness in the methodology and could certainly be improved. Because Sweden is diverse, different cultures within Sweden likely play an important role as well. It would have been useful to collect more in depth information about the children's unique environments and cultures that are an influential part of their daily lives.

The sample of participants was selective and limited. Firstly, they were all from the southern part of Sweden. Secondly, the three schools that ended up choosing to participate came from similar communities in terms of socioeconomic status and were composed of a high proportion of Swedish speaking families. This poses a problem for external validity in that this sample is not necessarily representative of Sweden on a larger scale. Therefore, the

outcome of the study would be difficult to generalize. Another issue with external validity is that the obtained findings only pertain to 9 year olds, which in turn also limits any generalizations to other age groups. There may be various patterns of gender differences in surgency that exist for other ages.

Future Directions

Although the present study provides a good starting point for exploring gender differences in surgency and contains good reasons for continuing with future work, it also has limitations. Therefore, future directions and replications are needed in order to attain additional clarification. First and foremost, larger sample sizes and other adjustments that help increase power would be beneficial. Many of the studies that have found gender differences in surgency have had large sample sizes or in the case of meta analyses have had a large range of included studies. The smaller sample size of the current study leads to some caution in drawing any final conclusions about the results.

The results pose interesting future directions for research. The sample of participants came from three communities that had several similarities. It would be interesting and beneficial to include more diverse communities and nationalities. This could either be to have a wider range of samples across all of Sweden such as between the north and south, or have a larger sample from the south of Sweden but have this include diverse communities with for example varying SES or ethnicities. If the environment is an important component gender differences may manifest differently in various communities. Another future direction is that if no gender differences in surgency exist it is important to investigate the exact underlying mechanism that led to this outcome. In other words, what are the specific factors in the Swedish environment that lead to these findings? Moreover, how does this relate to and interact with the biology of temperament? Finally, it has been demonstrated that gender differences in surgency relate to differences in personality and psychopathology. If there are no major gender differences in surgency in Sweden what does this entail for the other associated areas? Are there also fewer gender differences in personality traits in adults and in the development of psychopathologies? It would be interesting to investigate how the findings in surgency relate to other aspects of children's development.

Conclusion

This study found no significant gender differences in surgency in 9-year-old children in Sweden. Although some discrete tendencies for gender differences were seen

further work has to be conducted to clarify this. The lack of gender differences points to evaluating the role of the environment and its influence on temperament. At the same time the study's results do not conclude that the environment alone is responsible for the absence of gender differences; rather it is likely an intricate relationship between biology and the environment. Although no final conclusions are drawn, the present study contributes to understanding gender differences in surgency in Sweden and is a starting point for further work. Research in this area is beneficial in that it allows for understanding several aspects of children's development. Therefore, future directions can hopefully continue to investigate this topic and thereby provide more knowledge about temperament and gender differences in a cross-cultural context.

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APPENDIX A

Information letter to caregivers and consent form:

Till vårdnadshavare

Hej,

Under hösten startar ett forskningsprojekt vid Lunds Universitet som ska studera barns utveckling under de tidiga skolåren. Syftet är att studera hur barns medfödda temperament påverkar deras inlärning och problemlösning, till exempel hur de planerar och fattar beslut när de ställs inför ett problem. Barn har olika temperament – en del är livligare och har häftigare humör än andra barn. Barn har även olika inlärningsstilar. Några barn vill gärna glänsa och visa framfötterna medan andra barn är mer försiktiga och noga med att ingenting blir fel. Vi vill undersöka om barns temperament påverkar deras inlärningsstil. Detta kan vara bra att veta i undervisningssituationer.

Undersökningen ska omfatta cirka 200 barn och vi har vänt oss till skolor i närliggande kommuner för att rekrytera deltagare. Ert barns skola har ställt sig positiva till att vara med i undersökningen.

De barn som medverkar kommer att få delta i två datoriserade test på skolan, test som liknar vanliga dataspel. Testet studerar barnens strategier och svarssnabbhet. Det tar sammanlagt cirka 40 minuter att göra testen. För att få en bild av barnets temperament kommer vi att be barnens föräldrar om hjälp, genom att svara på frågor i två frågeformulär.

Undersökningen är granskad och godkänd av en etisk nämnd. Allt deltagande är helt frivilligt och anonymt. Medverkan i studien kan när som helst avbrytas utan att ange skäl. Vi skapar koder för samtliga elever. Koderna kommer att förvaras i ett kassaskåp på försöksledarens rum på Institutionen för psykologi, Lunds Universitet. Resultaten från studien redovisas bara gruppvis genom statistiska siffror. Vid avbrutet deltagande kommer redan insamlat material att förstöras och inte vidare användas i studien.

OM barnet ska delta i studien krävs samtycke från barnets vårdnadshavare. Bifogat detta brev finns en samtyckesblankett som vi ber er fylla i och skicka tillbaka till skolan med ert barn. Är ni två vårdnadshavare måste båda skriva på blanketten. Ni behöver bara skicka tillbaka blanketten om ni samtycker till att ert barn medverkar i undersökningen.

Om ni har frågor angående projektet och vill ha mer information är ni välkomna att ta kontakt med undertecknad via e-post eller telefon.

Bästa hälsningar,

Beatrice Nyström, *Doktorand i utvecklingspsykologi, Leg. Psykolog*
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Barnets namn:..... Kod.....

SAMTYCKESBLANKETT VÅRDNADSHAVARE

Ni har nu läst brevet med information om vårt projekt och har möjlighet att kontakta oss om det är något ni undrar över. Vi ber er här bekräfta att ni samtycker till att ert barn deltar i studien. Var vänlig och ringa in korrekt alternativ. Skulle ni vid ett senare tillfälle vilja dra er ur projektet kan ni göra det utan att ange något särskilt skäl.

Blanketten skickas med barnet tillbaka till skolan. Det finns inga krav på att blanketten ska skickas tillbaka om ni inte samtycker till att barnet deltar i undersökningen.

Vårtnadshavare 1

Jag har fått tillräcklig information om projektet.	Ja	Nej
Jag är medveten om att jag när som helst kan dra mig ur projektet.	Ja	Nej
Jag är villig att låta mitt barn delta i projektet.	Ja	Nej

Datum Underskrift vårdnadshavare 1

Vårdnadshavare 2

Jag har fått tillräcklig information om projektet. Ja Nej

Jag är medveten om att jag när som helst kan dra mig ur projektet. Ja Nej

Jag är villig att låta mitt barn delta i projektet. Ja Nej

Datum Underskrift vårdnadshavare 2

APPENDIX B

Information letter to children and consent form:

Brev till elever i årskurs 3

Hej!

Vi är forskare vid Lunds universitet som är intresserade av hur barn lär sig saker. Vi tycker det är viktigt att ta reda på det så att vuxna kan förstå barn bättre. Därför har vi startat en stor undersökning där vi ska träffa ungefär tvåhundra barn i tredje klass och låta dem få göra ett test, som väldigt mycket liknar ett dataspel.

Vi undrar om du vill vara med och göra testet. Vi kommer till skolan och man sitter där och gör testet vid en dator som vi tar med oss.

Du kan bara delta i undersökningen om du och dina föräldrar går med på det. Vill du vara med ska du skriva på den blankett som följer med detta brev. Ringa in Ja om du vill vara med och Nej om du inte vill vara med. Självklart kan du sluta delta i undersökningen när som helst och du behöver inte förklara varför.

Ingen annan kommer att få veta hur du svarar i testet än den som du träffar när du gör testet.

Om du har några frågor får du gärna ringa eller maila någon av oss.

Bästa hälsningar,

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Kod.....

SAMTYCKESBLANKETT BARN

Jag har fått tillräcklig information om undersökningen	Ja	Nej
Jag vet att jag när som helst kan dra mig ur om jag ångrar mig.	Ja	Nej
Jag vill vara med i undersökningen.	Ja	Nej

Datum

Ditt namn