The female phenotype of autism spectrum disorder: The 'camouflage' hypothesis

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It is being increasingly recognised that females with autism spectrum disorder (ASD) may exhibit superficial social skills which may help them to mask or hide their ASD symptomology. This ability can subsequently impact on the identification of the disorder. This ability to exhibit superficial social skills in order to mask ASD impairments is what is referred to as the 'camouflage' hypothesis. It is worth highlighting here that the capacity to 'camouflage' social impairments in social situations is increasingly recognised as being one of the key features of the female phenotype of ASD. This paper will explore some of the studies which have investigating camouflaging behaviours in females with ASD. The studies identified in the systematic review by Allely (2019) highlighted that there exists relatively little empirical research exploring this main feature of the female phenotype of ASD.

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Before discussing the female phenotype of autism spectrum disorder (ASD) a brief description of ASD is necessary. ASD is a neurodevelopmental condition which is characterised by social communication and social interaction difficulties in addition to restricted, repetitive behaviours or interests (RBRIs). In the most recent edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) the subtypes of ASD have been removed (such as autistic disorder and Asperger disorder) and instead replaced with a single category of ASD (Maenner et al., 2014). There are numerous studies which have shown that, compared to females, ASD is identified in males at a much higher frequency (Brugha et al., 2011). Specifically, about four males are given a diagnosis of ASD for every female (Fombonne, 2009; Loomes, Hull, & Mandy, 2017).

What is the 'camouflage' hypothesis?

Researchers have found that females with ASD may exhibit superficial social skills which may help them to mask or hide their ASD symptomatology. This ability can subsequently impact on the identification of the disorder. This ability to exhibit superficial social skills in order to mask ASD impairments is what is referred to as the 'camouflage' hypothesis. There is increasing recognition that females with ASD have a much greater ability to imitate behaviour which is considered socially acceptable. In females with ASD this ability is even more marked in those who have higher cognitive abilities, such as intelligence levels which are within the normal range (see Ehlers & Gillberg, 1993).

Attwood (2006, p. 4) has also found that girls can be relatively effective at displaying a 'superficial social competence'. They do so by imitating and modelling highly socially skilled individuals. They will observe these socially skilled individuals in order to imitate their mannerisms, voice and personality. The females who engage in this behaviour are excellent at identifying the most socially skilled and popular people at, for instance, a party. After observation they will imitate the mannerisms (among other things) of this person. This can often have a number of negative consequences for while the female with ASD will appear to be socially skilled, they can quickly find themselves in situations where they can be completely ill-equipped to manage due to the social impairments that they are so keen to camouflage – such as being the target of sexual interests.

It is worth highlighting here that the capacity to 'camouflage' social impairment in social situations is increasingly recognised as being one of the key features of the female phenotype of ASD.

A recent systematic review (Allely, 2019) explored the literature on camouflaging or masking behaviour in females with ASD. The review identified a total of eight articles. Four of the studies identified in the review comprised of semi-structured interviews with girls and women with ASD (Bargiela, Steward, & Mandy, 2016; Cook, Ogden, & Winston, 2018; Hull et al., 2017; Hull, Mandy, & Petrides, 2017; Tierney, Burns, & Kilbey, 2016). Two of the eight studies were quantitative, using standardised measures and assessments (Parish-Morris et al., 2017; Rynkiewicz et al., 2016). One study used behavioural and cognitive measures in addition to neuroimaging (Lai et al., 2017). Lastly, one study (Dean, Harwood, & Kasari, 2017) utilised concurrent mixed methods (quantitative and qualitative).

Crucially, all four of the qualitative studies identified in the review (which consisted of semi-structured interviews) found evidence to support the presence of camouflaging and/or masking behaviour in their samples (see Bargiela et al., 2016; Cook et al., 2018; Hull, Mandy, & Petrides, 2017; Tierney et al., 2016). In the study which was carried out by Hull, Mandy and Petrides (2017) and Hull, Petrides, Allison, Smith, Baron-Cohen, Lai and Mandy (2017), respondents reported that they would engage in camouflaging in order to try and 'blend in with the normal' or appear to be 'normal enough' in social situations. Participants in the study developed explicit strategies in order to address their social and communication impairments which were related to their diagnosis of ASD. Participants described that another key motivation for engaging in camouflaging behaviour was to improve their connections and

relationships with others. Participants reported that engaging in camouflaging behaviour enabled them to overcome the initial difficulties to connection (e.g., meeting people for the first time) and also enabled the development of relationships. Hull and colleagues referred to these explicit strategies to camouflage ASD impairments as compensation. Some of these explicit compensatory strategies included things like: forcing and maintaining appropriate eye contact or looking as close as they possibly can to another person's eyes. It is also interesting to highlight here that the participants in the study by Hull and colleagues reported having to monitor intensively the way that they acted (e.g., their tone of voice, body posture, etc.) when they were engaging in these compensatory strategies. This intense self-monitoring was in order to try and ensure themselves that they were performing as close as possible to what they believed was normal. Some of the participants reported that they would make a conscious effort to adopt facial expressions of emotion or interest which they considered to be normal even if these facial expressions of emotion or interest did not match their inner feelings.

A number of participants in the study carried out by Bargiela and colleagues (2016) also reported engaging in camouflaging. Participants described that they would deliberately make an effort to learn and employ 'neurotypical' social skills which was a behaviour they sometimes called 'putting on a mask'. The finding from this study by Bargiela and colleagues would suggest that the development of such neurotypical personas may depend on a number of factors such as the close observation of peers, trial and error social learning, reading novels and psychology books or textbooks, and imitating fictional characters in television shows or in films.

Additionally, in the study by Tierney and colleagues (2016), interviews were conducted with 10 teenage girls with ASD on the social challenges they experience associated with adolescence. Findings from the study revealed that the teenage girls with ASD described developing explicit sophisticated strategies to help them manage social relationships and appear socially competent so that the core areas of impairment in ASD were not identified by others. The activities of imitation and acting were the most commonly reported strategies. Specifically, six participants attended drama classes and said that these classes had a beneficial impact on their levels of confidence and also their skills in social situations. Participants also reported that they would engage in sophisticated levels of peer-imitation. For instance, pretending to be engaged with an activity, such as reading a book, when what they were actually doing was observing others who were around them in order to imitate their behaviours, mannerisms, facial expressions, topics of conversation, postures, tone of voice, among other features. Tierney and colleagues (2016) found that participants were motivated to do this in order to try and blend in with others in social situations. The study also showed that participants had a fear of being 'caught out' and, as a result of this fear, they would go to significant lengths in order to hide the fact that they were engaging in imitative behaviours. All the participants in the study by Tierney and colleagues reported feelings of unhappiness and anxiety when in social situations and that they would mask these negative feelings in most social situations by putting on a facial expression which was excessively happy or a very blank facial expression. Participants reported that they would frequently maintain their masks even when they had developed and maintained friendships due to their fear of losing the friendship should their inner feelings be revealed.

The negative consequences of engaging in camouflaging behaviours

The four qualitative studies (which used semi-structured interviews) identified in the review by Allely (2019) all identified negative consequences which arose due to camouflaging. In the study by Hull, Mandy and Petrides (2017) and Hull, Petrides, Allison, Smith, Baron-Cohen, Lai and Mandy (2017) it was revealed that exhaustion was the most consistently reported adverse consequence of engaging in camouflaging behaviours. Moreover, in addition to exhaustion, some of the participants also reported that they experienced severe levels of anxiety and stress after having engaged in camouflaging. Therefore, this review highlights that the relatively small number of studies which have been conducted

to date all indicate that under the surface of the effective camouflaging in social situations, females may experience significant levels of subjective stress, anxiety and exhaustion. There is typically a great need to recharge or recuperate by withdrawing from social interactions. In order to achieve this, a female with ASD may lie down in a darkened room to recuperate from the day at work and camouflaging or having engaged in a camouflaging session (e.g., a party, conference, etc.). This recuperation period can be anything from an hour to several hours.

Appropriate diagnosis and support

Some may argue that a diagnosis and relevant support is not really necessary in cases where the individual is engaging in camouflaging behaviours so effectively that they are not identified and diagnosed. Many would naturally agree with this argument. However, Hull, Mandy and Petrides (2017) and Hull, Petrides, Allison, Smith, Baron-Cohen, Lai and Mandy (2017) have argued that although it would seem perfectly reasonable to hold the belief that camouflaging is an effective strategy which is relatively low-impact, the significant difficulties, such as exhaustion, which are reported by the participants in a number of the studies identified in the review by Allely (2019) strongly argue that individuals who are effective in engaging in camouflaging behaviours still require access to relevant support and services (e.g., Hull, Mandy, & Petrides, 2017; Hull, Petrides, Allison, Smith, Baron-Cohen, Lai, & Mandy, 2017).

Measure for camouflaging behaviour

There is a need for further research to 'operationalise the construct of camouflaging'. Given the covert nature of camouflaging, self-report needs to be used when developing this measure of camouflaging (Bargiela et al., 2016). This self-report research would help inform the development of camouflaging behaviour measures or assessments. The development of such a measure would enable the standardisation as well as the comparison of experiences of camouflaging between individuals with and without ASD.

Recently Hull and colleagues (2018) developed The Camouflaging Autistic Traits Questionnaire (CAT-Q). A significant strength of this questionnaire is that it was developed based on autistic adults' experiences of camouflaging. The CAT-Q was administered online to 354 autistic and 478 non-autistic adults. Participants were asked to respond to each of the 48 statements using a seven-point Likert scale which ranged from 'strongly disagree' to 'strongly agree'. Analysis of the responses revealed three key factors comprising a total of 25 items. The three factors included: (1) compensation (which are strategies employed to compensate for impairments in the social and communication domain); (2) masking (strategies which are used in order to present a non-autistic or less autistic persona to others); and, (3) assimilation (strategies used to fit in to social situations which are uncomfortable). Hull and colleagues showed that the CAT-Q had robust psychometric support and is appropriate for use in both clinical and non-clinical populations, even if ASD diagnostic criteria changes in the future. As a result, the CAT-Q does not need a formal diagnosis of an ASD to enable the assessment of camouflaging behaviours. Another useful feature of this questionnaire is that the scores can be compared between males and females.

In their study, Hull and colleagues (2018) found the CAT-Q to have acceptable to good internal consistency and reliability (at least over a three-month duration). The types of questions in the CAT-Q include: 'I learn how people use their bodies and faces to interact by watching television or films, or by reading fictions'; 'In my own social interactions, I use behaviours that I have learned from watching other people interacting'; 'I have researched the rules of social interactions (e.g., by studying psychology or reading books on human behaviour) to improve my own social skills'; 'I monitor my body language or facial expressions so that I appear interested by the person I am interacting with'; 'I am always aware of

the impression I make on other people'; and, 'In social situations, I feel like I'm "performing" rather than being myself'. However, Hull and colleagues have recommended that additional research is still required in order to replicate these analyses using samples of autistic and non-autistic individuals which are more diverse given that the test-retest reliability analyses that they conducted were only carried out in the older autistic sample.

Hull and colleagues also recommend that the CAT-Q 'can be used in combination with observed behavioural and cognitive measures of camouflaging to assess all aspects of this complex phenomenon' (Hull et al., 2018). Moreover, they argue that the CAT-Q may have 'clinical implications to identify levels of camouflaging along with other clinical information, including those derived from current autism diagnostic measures, to enhance the sensitivity and specificity of clinical diagnosis, formulation, and support planning' (Hull et al., 2018). However, as highlighted by Hull and colleagues, there is an urgent need for research to further investigate the clinical utility of this new questionnaire.

CONCLUSION

As highlighted by the studies identified in the review by Allely (2019), there is a very real need for much more research in this field in order to increase our understanding and knowledge of the female phenotype of ASD. This lack of understanding and knowledge has a detrimental impact on the ability to identify females with ASD. The capacity to 'camouflage' social impairments in social situations is increasingly being considered to be one of the key features of the female phenotype of ASD.

The studies identified in the systematic review by Allely (2019) highlight that there exists relatively little empirical research exploring this main feature of the female phenotype of ASD. The review discussed the relatively little research that has been conducted in this area and the studies indicate that social imitation or camouflaging behaviour enables some degree of success and coping in social situations. Such success may result in many females never being identified and receiving a diagnosis as a result of the lack of any observable functional impairments. However, it is imperative that not only are these camouflaging behaviours recognised but that the negative consequences of such behaviours are also understood. For instance, a number of the studies identified in the review by Allely (2019) highlight that females with ASD who engage in camouflaging can experience high levels of stress, anxiety and exhaustion.

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