

A conceptual framework for understanding characteristics of self-awareness associated with autism spectrum disorder

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Introduction

Self-awareness has been investigated both theoretically and empirically by a wide range of disciplines (1-3). This has included the exploration of self-awareness among specific clinical groups, such as patients with right-hemisphere stroke, frontal lobe damage, schizophrenia, and autism. Still, a comprehensive model of self-awareness is lacking (3), and even the functional importance of self-awareness has not yet been established (4). The lack of a comprehensive model of self-awareness limits the current understanding of variations in and deficits of self-awareness.

Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized by difficulties with social communication and interaction as well as by repetitive patterns of behavior, interest, or activity, including differences in sensory responses (5). Specific characteristics of self-awareness are not specified in the current diagnostic criteria. However, the term *autism*—which was first coined in relation to schizophrenia—comes from the Greek *autos* meaning “self”; Asperger’s (6) and Kanner’s (7) early and defining descriptions suggest variations in awareness of the self among their original cases (8). Subsequent clinical descriptions, autobiographies, and other types of contributions by individuals on the spectrum, as well as parent reports, indicate that there seem to be very relevant differences possibly related to self-awareness that can often be linked to some of the everyday difficulties associated with ASD. In line with the notion of a spectrum of disorder is the fact that the indicated differences appear very heterogeneous with regard to their expression and how people on the spectrum experience them. Differences in self-awareness may,

for example, encompass the following: the sense that you do not know what you do not know and therefore have difficulty judging when it would be relevant to get more information; difficulty distinguishing between your own or others’ preferences and moods when you are together with them; perceiving your own actions (e.g., not being able to get out of the door in time for school, self-destructive actions) as “freestanding” actions without any link to antecedents, current situation, others’ reactions, or your own thoughts or feelings.

Addressing the concept of self-awareness and its potential differences among individuals with ASD should not be perceived as a devaluation of or a challenge to the validity of either the self-awareness or the selfhood of persons with ASD. Self-awareness and the experience of self are unique and valid for all persons. However, for each individual, the concept of the self and self-awareness may be more or less efficient for helping individuals to navigate in the world in a way that supports his or her everyday needs, helps him or her to reach goals, and meets his or her personal values. Insight into the characteristics and mechanisms of self-awareness may help people of all degrees of ability to calibrate this fine instrument and thereby improve their ability to navigate and manage the challenges of life.

The aim of this short paper is to sketch a conceptual framework for describing self-awareness to begin to integrate the accumulating knowledge about characteristics of and variations in self-awareness related to ASD. The formulation of a conceptual framework is important as a future common ground for the design and interpretation of new studies, theoretical discussions, and clinical work. It is especially important that the framework

encompass the wide individual variation in self-awareness that may characterize ASD due to the heterogeneity of the condition. The framework presented consists of different putative levels and dimensions of self-awareness that are identified in selected theoretical contributions. It aims to span not just the “what” of self-awareness but also the more procedural and functional aspects of “how” and “when.”

Levels of self-awareness: a general review

Most theories tend to distinguish among different levels of self-awareness. On the basis of a review of nine different theories of self-awareness, Morin (9) has suggested four levels that can work as reference points for different theoretical conceptions and that may help researchers to compare, contrast, and integrate these theories: 1) unconsciousness; 2) consciousness; 3) self-awareness; and 4) meta-self-awareness. At the unconscious level, the organism is unresponsive to both the self and the environment. At the level of consciousness, the organism focuses attention on the environment and on processing stimuli. At this level, a basic sense of self is involved, but mainly as a primitive experience of one’s body in relation to the environment, with the sense of self being implicit and diffuse. At the level of self-awareness, the organism focuses attention on the self and on certain aspects of the self more directly. At the level of meta-self-awareness, an awareness of the self as being aware of either the environment or the self is added. Two dimensions are seen as underlying the graded distinctions between the levels: the perception of self in time and the complexity of the information being accessed and processed (9). At the lower levels, the information processed is of a more sensory and perceptual nature; this information is primarily situated in the immediate present. At the higher levels, the information processed is more conceptual and complex; this information is linked to the present as well as to the past and the future, thereby enabling the individual to plan, act, and monitor his or her actions on the basis of both previous experiences and future goals.

Levels of self-awareness: a specific review for individuals with autism spectrum disorder

The question of self-awareness among individuals with ASD has been addressed theoretically by different authors, some from within the autism research community (10-14) and others from a more philosophical standpoint (15-17).

Hobson (10) argues that self-awareness is dependent on the individual being a self. With inspiration from Buber’s theoretical work (18), Hobson specifies two modes of being a self and therefore of self-awareness. In the first mode, which

Hobson calls *self-awareness*, the self is distinct from non-self (I-It). This is an impersonal distinction between the organism and all other things. In the second mode, *reflective self-awareness*, the self is distinct from other selves (I-Thou). This is a personal distinction that allows for an outside perspective on one’s own attitudes. The awareness of the self as distinct from the non-self is seen as a prerequisite for reflective self-awareness. The distinction between the modes is gradual, and reflective self-awareness itself includes a continuum that is based on an increasingly complex conceptualization of the self. Hobson argues that awareness of the self as distinct from the non-self is typically unaffected in individuals with ASD, whereas the distinction of the self from other selves may not be conceptually differentiated enough to support reflective self-awareness in these individuals. With the distinction of the self from other selves and the notion of reflective self-awareness as a continuum based on the increasing complex conceptualization of the self, this seems potentially to map onto both Morin’s description of self-awareness and meta-self-awareness, with the differences in ASD linked to these levels.

Powell and Jordan (11) have suggested that individuals with ASD are characterized by deficits in personal episodic memory. They describe deficits of both encoding and recall that arise from problems with the development of an “experiencing self” responsible for coding events as something experienced by and thus belonging to the self. Deficits in this encoding would lead to deficits in personal episodic memory, with the person being able to recall personal facts and knowledge but “unable to remember themselves as performing actions, participating in events or possessing knowledge and strategies” (11: p. 361). The experiencing self is also seen as allowing the individual to search his or her memory independently of specific situational cues, with the recall of episodic memory otherwise being dependent on situational cues (11). Powell and Jordan see this independence of situational cues as essential for problem solving that involves reflection on personal experiences, strategies, and knowledge. In relation to Morin’s levels, remembering personal facts and knowledge seems to relate to the level of consciousness and self-awareness, whereas remembering the self as acting and participating and as processing knowledge and strategies seem to relate to the level of meta-self-awareness, both due to the representational complexity of the self and to the implied perception of the self across time. Powell and Jordan’s reflections are primarily focused on the flexible use of personal information in time, but the dimension of conceptual abstraction is also relevant to the

descriptions of experiences being encoded as personal and this conceptualization as being essential for later recall.

Frith and Happé (12) build on the cognitive account that persons with ASD may have impaired “theory of mind” (ToM), which refers to the ability to represent the mental states of the self and others. Frith and Happé focus on introspection and suggest that a mind without introspective awareness would consist only of first-order representations, which would primarily be descriptions of objects and events on a concrete descriptive and perceptual level. What may be different in individuals with ASD would be a meta-representational level, where the first-order representation is re-represented, thereby differentiating the propositional attitude (e.g., desire, belief, pretense), the content (i.e., believing “X”), and the source status (i.e., who holds the belief: the self or the other). Potential problems that follow from a lack of or differences at the level of meta-representations may include the difficulties to distinguish between one’s own and others’ opinions or trouble understanding why you act as you do. More recently, Happé (19) has expanded and further defined some of the potential downstream developmental effects of problems with “reading [one’s] own mind.” Happé also highlights how some of these developmental effects may also be beneficial, such as the personal perspective being less conforming and less restricted by assumed knowledge (19). The differences in self-awareness among individuals with ASD are understood primarily as differences at the meta-representational level of processing, which are also responsible for problems representing other people’s thoughts or ToM. In relation to Morin’s levels (9), the differences among individuals with ASD as proposed by Frith and Happé seem to fall mainly at the level of meta-self-awareness.

Raffman (15), who is coming from a philosophical perspective, suggests different ways of conceptualizing deficits of self-awareness and highlighting the different levels of awareness introduced in Frith & Happé’s argument (12). Raffman views self-knowledge as a cognitive achievement, whereas self-awareness is viewed in two different senses: a “thin” sense of self-awareness and a “strong” sense of self-awareness. The thin sense of self-awareness involves the direction of attention and is non-conceptual; it is viewed as direct, immediate, and non-inferential. The strong sense of self-awareness is characterized as introspection and self-knowledge. Self-awareness in the thin sense is the source of introspection and self-knowledge and as such the foundation of self-awareness in the stronger sense (15). Self-awareness in the strong sense involves a conceptual judgement, in ToM

terms, of the thin sense of self-awareness; this conceptual judgement is involved in both the conceiving and reporting of this knowledge. In relation to ASD, Raffman argues that difficulties with self-awareness could be understood more as difficulties with representing and reporting mental states in ToM terms rather than as a lack of awareness of these states as such. Raffman goes on to add the possibility that some of the differences in self-awareness in individuals with ASD could be related to potential differences in the self-ascription of mental states based on differences in perceptual processing.

Raffman suggests that differences in self-awareness among individuals with ASD is a question of the character of the mental state one is having rather than a question of having or not having mental states as such (15). Raffman adds to the discussion of the relationships between the levels and makes explicit how more basic deficits or differences can affect the higher levels of processing. Thus, deficits or differences in self-awareness—although they may be seen at a higher level of awareness processing—may be explained by processing difficulties at more basic levels (e.g., perception), because these are the source of self-awareness and so influence all levels. In relation to Morin’s levels (9), the strong sense of self-awareness is seen as indicative of meta-self-awareness, whereas the thin sense of self-awareness is related to both the level of consciousness and the level of self-awareness. Raffman’s suggestions with regard to self-awareness among individuals with ASD place a potential difference at the levels of meta-self-awareness and consciousness, with potential differences here influencing the higher levels of processing (15).

McGeer (16) argues that self-awareness is the direction of attention during an experience of the world. In self-reports, it is these experiences of the world that are being reported directly. In contrast with the levels suggested by Frith and Happé (12), McGeer (16) argues to collapse the distinction between an experience and the awareness of that experience. When you are aware of “X,” it is not the experience of something that you are aware of; rather, you are simply experiencing “X,” and during this experience you are aware of “X” itself. In this sense, McGeer also seems to challenge the notion that a concept or representation of the self is necessary for this type of self-awareness. However, McGeer does recognize a cognitive awareness as a sophistication of this basic self-awareness, which includes the understanding that the actuality of world may differ from one’s subjective experience. In relation to Morin’s levels (9), cognitive self-awareness is clearly related to the level of meta-self-awareness. The level of direct self-awareness during

the experience seems related to both consciousness and self-awareness, and it seems in many ways to be closely related to Raffman’s thin sense of self (15). The connection to ASD is less explicit. In line with Raffman’s second suggestion, McGeer suggests that differences in sensory perception may influence the developmental process of higher-order social cognitive abilities, thereby resulting in social cognitive difficulties, which is one of the defining characteristics of ASD.

Williams (14) addresses aspects of self-awareness in his review of studies examining the “theory of own mind.” Williams concludes that, although an awareness of one’s own mind—the psychological self, is dependent on metarepresentations, this level of representation is not so necessary for reflexive awareness of the physical self. Further, differences in self-awareness that have been described for persons with ASD seem to be primarily evident in relation to tasks and aspects related to awareness of the psychological self. With this in mind, Williams (14) argues for the relevance of distinguishing between the physical and psychological domains of the self in the understanding of self-awareness. Recent studies of interoception (perceiving the internal state of

one’s body) have indicated that persons with ASD may be characterised by atypical interoception (20), which challenges the idea of intact awareness of the physical domain of the self in these persons. However, Shah and colleagues (21) investigated the relevance of comorbid alexithymia and found that “Alexithymia, not autism, is associated with impaired interoception” (19: p. 215).

The distinction between the physical and psychological domains of the self as suggested by Williams is not explicitly represented in Morin’s levels of awareness (9), and whether it makes sense to consider the level of meta-self-awareness in relation to the domain of the physical self is not quite clear. In Table 1, this distinction has been merged with Morin’s levels of awareness, and the presented theories of deficits or variations in self-awareness among individuals with ASD have been mapped onto the model. With the distinction between the physical and psychological domains of the self, it becomes clear that the differences suggested by the other authors are also primarily related to the domain of the psychological self.

TABLE 1. Suggested differences in self-awareness for persons with autism spectrum disorder mapped onto levels of self-awareness and domains of the self

Level and definition (Morin, 2006)	Physical self	Psychological self
4. Meta-self-awareness Being aware that one is self-aware		Specific difficulties related to awareness of the psychological self (W)
3. Self-awareness Focusing attention on the self; processing self-information		<ul style="list-style-type: none"> • Difficulties with meta-representing (FH) • Difficulties with conceptualizing or reporting in mentalizing terms (R) • Problems with the conceptual differentiation of the self from other-selves (H) • Experiences not encoded as personal (PJ)
2. Consciousness Focusing attention on the environment; processing external stimuli	<ul style="list-style-type: none"> • Differences in perceptual processing leading to different mental states affecting later levels of awareness (R) • Differences in sensory processing (M) 	
1. Unconsciousness Being unresponsive to the self and the environment		

↑
Conceptual complexity

FH, Frith and Happé (12); H, Hobson (10); M, McGeer (16); PJ, Powell and Jordan (11); R, Raffman (15); W, Williams (14).

Dimensions of self-awareness

As mentioned previously, Morin’s levels are defined by the perception of the self in time and the complexity of the information being accessed and

processed. Morin further identifies and promotes the variables of frequency, amount, and accuracy of self-awareness as relevant for understanding an individual’s level of self-awareness. The term *frequency*

of self-awareness refers to the engagement of the individual in either situational or dispositional self-observations; the *amount of self-awareness* refers to the quantity of self-information and seems to relate to both the type and extent of self-knowledge; and the *accuracy of self-awareness* refers to the quality of the information, such as the degree of consistency of the information as compared with the actual situation, with patients with brain injuries and psychiatric disorders such as schizophrenia providing case examples of inaccurate self-awareness. These variables can all be seen as more procedural and functional aspects of self-awareness, and, as such, they seem to be essential to describe the potential quality, efficiency, and usability of self-awareness in neurotypical individuals and individuals with ASD. However, these concepts are only briefly introduced in Morin's review, and they are not directly addressed in the work summarized previously regarding self-awareness among individuals with ASD. This procedural aspect of self-awareness is also evident in the theoretical distinction made by Crosson and colleagues (22) and summarized by Prigatano (3) in his summary of 20 years' work on understanding disturbances of self-awareness. The distinction that is made is that different deficits are related to one of the following: 1) an intellectual awareness (i.e., knowing that you have a problem); 2) emergent awareness (i.e., knowing that you have a problem when it occurs); or 3) anticipatory awareness (i.e., knowing in advance that you have a problem that will affect future behavior or functioning). This distinction highlights the idea that, when it comes to understanding self-awareness, it is not just a question of having self-awareness; when and how the individual comes to understand this self-awareness and how it is applied must also be considered.

Being self-aware is not always necessary and may sometimes be a hindrance to effective functioning, especially if the individual is not able to flexibly regulate his or her self-awareness. I would suggest that it is necessary to consider an additional dimension that addresses the attunement between the organism and the context. Here, the idea of *attunement* means the extent to which self-awareness is relevant to making the most of, on one hand, the prerequisites and objectives of the organism and, on the other, the prerequisites, requirements, and demands inherent in the context. The dimension of attunement is in many ways influenced by the variables of frequency, amount, and accuracy suggested by Morin (9), but it can also be seen as dependent on the relevance, timing, and potential self-directed control of both the activation of the different levels of self-awareness and the translation of this information into relevant action. Relevance is implicit in this understanding of attunement; it refers

to the pertinence of the content of self-awareness relative to the organism and the context. For example, in a classroom, certain actions are required by the persons participating. In this context, awareness of the self in relation to these requirements is more relevant than other aspects of the self. Likewise, if one of the children in the classroom is easily distracted by noise, then that child's awareness of his or her current level of concentration, task behavior, reactions to the level of noise, knowledge of previous reactions, the outcome of these reactions, and special arrangements with the teacher (e.g., being allowed to put on earmuffs) are more important for him or her to be aware of at that moment as compared with other aspects of self.

In addition, what is relevant may change quickly if elements of the context or the individual's motive changes. Sometimes self-awareness of certain self-information may hinder efficient behavior, such as becoming aware of a trembling voice when commencing an academic presentation or ruminating on past actions while trying to go to sleep. Similarly, a lack of self-awareness may be equally disruptive, such as not registering or differentiating the bodily signals of stress and anxiousness until actually experiencing a "meltdown." Timing reflects that the awareness of the same bodily signals at any other time, while still potentially relevant, may not be as helpful as being aware of them in a specific situation in which it is still possible to influence the situation and one's own reaction to the situation. Relevance is often highly interrelated with timing. The term *self-regulation* refers to the ability of an individual to identify moments in which it is relevant to activate or deactivate certain aspects of self-awareness and to actually regulate his or her self-awareness accordingly; this is a procedural aspect that is closely related to the level of meta-self-awareness. In this sense, a high degree of attunement is an essential foundation for efficient problem solving. Attunement may be seen as a relevant dimension at all four levels, and a balance among the different levels may in itself be relevant for more optimal attunement. This will ensure that the information that is processed, represented, and reflected on is linked to the past and the current situation as well as to an anticipated future context.

Conclusion and perspective

To sum up, the framework suggested for understanding and discussing variations and differences in self-awareness in individuals with ASD revolves around four levels of self-awareness across varying domains of the self. In various theoretical positions related to self-awareness among individuals with ASD, differences in self-awareness have been suggested at all levels (except the level of

unconsciousness); however, these differences may relate primarily to the psychological domain of the self. The levels are differentiated on the basis of the degree of conceptual complexity and the perception of the self in time and are, as such, closely related to the content of awareness. More procedural and functional aspects of self-awareness are highlighted with the concept of *attunement*. Attunement as presented here refers to variables of frequency, amount, accuracy, timing, relevance, and self-directed control; all of these aspects are relevant for understanding the how and when of self-awareness in the interaction between the organism and the context. The presented framework is not seen as a final model of self-awareness for individuals with ASD; it of course requires further research and elaboration. However, this framework may be a helpful stepping-stone along the path. The intention is that the conceptual framework presented in this commentary may help to direct future research and to organize relevant findings and discussions in the continued investigation of self-awareness among individuals with ASD. This framework may also help to organize empirical evidence from studies that investigate concepts such as executive functioning, mentalizing, autobiographical memory, self-regulation, and metacognition; although these concepts may not directly address the concept of self-awareness, together they may all add to the understanding of self-awareness in individuals with ASD. From a clinical perspective, understanding the variations of self-awareness could help with the identification and modification of interventions to support the development of self-awareness or compensatory strategies. It may also help us to understand the mechanisms of change and the challenges associated with ASD interventions, thereby helping us increase the effectiveness of clinical practice.

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Conflicts of Interest

The author declares no conflict of interest.

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