J Autism Dev Disord (2012) 42:697–706
DOI 10.1007/s10803-011-1296-8

ORIGINAL PAPER

Asperger Through the Looking Glass: An Exploratory Study of Self-Understanding in People with Asperger's Syndrome

Paul Jackson · Paul Skirrow · Dougal Julian Hare

Published online: 7 June 2011

Abstract Hobson (Autism and the development of mind. Lawrence Erlbaum, Hove, UK 1993) has proposed that the cognitive and linguistic disabilities that characterise autism result from abnormalities in inter-subjective engagement during infancy, which in turn results in impaired reflective self-awareness. The aim of the present study was to test Hobson's hypothesis by examining self-understanding in Asperger's syndrome (AS) using Damon and Hart's (Self-understanding in childhood and adolescence. Cambridge University Press, Cambridge, 1988) model of self-concept. Ten participants with Asperger's syndrome were compared with ten non AS controls using the Self-understanding Interview (Damon and Hart in Self-understanding in Childhood and Adolescence. Cambridge University Press, Cambridge, 1988). The study found that the Asperger's group demonstrated impairment in the "self-as-object" and "self-as-subject" domains of the Self-understanding Interview, which supported Hobson's concept of an impaired capacity for self-awareness and self-reflection in people with ASD. The results are discussed with reference to previous research regarding the development of self-understanding in people with ASD.

Keywords Asperger's syndrome · Self-concept · Development · Self-awareness

A version of this paper was presented at the 34th Annual Conference of the British Association for Behavioural and Cognitive Psychotherapy in 2006 at the University of Warwick, UK.

P. Jackson · P. Skirrow
Merseycare NHS Trust, Liverpool, UK

D. J. Hare (✉)
School of Psychological Sciences, University of Manchester, Zochonis Building, Brunswick St., Manchester M13 9LP, UK
e-mail: dougal.hare@manchester.ac.uk

Introduction

The 'self' is a fluid concept, overlapping and integrated with consciousness, memory and self-awareness. From a social-cognitive perspective as derived from the formulations of Cooley (1902) and Mead (1934), how we come to see ourselves is partially a reflection of how others see us, hence the idea of the 'looking glass self". Thus, the self can be conceptualised as the fundamental organiser of a person's social world, providing the conceptual means for distinguishing oneself from others and for establishing a unique personal identity (James 1892/1961; Damon and Hart 1988). As measuring 'the self' directly would be difficult, if not impossible, on philosophical grounds, emphasis has been placed on exploring what William James termed the *experiential* domains of the self, namely 'self-understanding', or the objective and subjective cognitions people hold about themselves.

To this end, James (1892/1961) divided the self into two main components, the *self-as-object* ("me") and the *self-as-subject* ("I"). The "me" constitutes "the sum total of all a person can call his" [sic] and incorporates the qualities that objectively define the self, including (1) material characteristics (physical features, body and possessions), (2) social characteristics (relationships, roles and personality) and (3) "spiritual" characteristics (consciousness, thoughts and psychological mechanisms) that identify the self as a unique configuration of attributes and qualities. James proposed that individuals organise the "me" into a hierarchical structure, assigning worth to each material, social or spiritual constituent.

The "I" incorporates the experiential features of the self and is essentially subjective, involving (a) "*Agency*" (awareness of self- agency over life events), (b) "*Distinctness*" (awareness of uniqueness of life experiences),

(c) "*Continuity*" (awareness of personal continuity) and (d) "*Reflection*" (awareness of one's own awareness). James integrates both the "I" and the "Me" into a single psychological construct of the self-as-subject. The "I" represents the aspect of self that initiates, organises and interprets experience in a subjective manner, which is crucial for the development of personal identity (Damon and Hart 1988).

Mead (1934), building on Cooley's (1902) notion of the "looking glass self", proposed that by reflecting on the "me", people implicitly assume the perspective of other people in a social group, thereby situating the "I" within a social context along with the objective self. If there were only a "me" component of self, behaviour would become automatic and completely consistent with social expectations; "the fact that no person's behaviour is absolutely robotic is a reflection of the activity of the 'I' (Damon and Hart 1988, pp. 131). Therefore, Mead proposed that the "I" is a person's freely chosen response to any given situation and that such indeterminacy of action gives rise to the experience of choice or freedom.

James' theory of self-concept, although comprehensive, does not incorporate a developmental component and Damon and Hart (1988) have subsequently developed the Jamesian conceptualisation of self-concept to produce a stage developmental model of self-understanding (Table 1), that maps the development of four components of "me" (*physical, active, social* and *psychological*) and three subjective "I" processes (*continuity, distinctness* and *agency*) from infancy to late adolescence, the process of 'reflection' being regarded as too inaccessible and thus omitted from the model.

Although change occurs over time, at all ages there is some understanding of the physical, active, social and psychological selves. Knowledge of each domain changes with development and preferences towards each domain change over time, but not to the extent that one domain disappears or turns into another. The developmental progression common to each "me" constituent signifies a conceptual reorganisation, as opposed to a preferential shift (Damon and Hart 1988) (Table 1). There may be age-related trends towards construing the self in social or psychological terms as people get older, but such a shift does not consist of developmental reorganisation in which one mode of self-understanding transforms into another.

The impaired social cognitive skills characteristic of autistic spectrum disorders (ASD) (Bowler 2007) would imply that the development of self in ASD would likewise be impaired. This is an important question, given the relationship of a sense of self to mentalisation and autobiographical memory abilities and to the development of quasi-delusional beliefs in ASD (Abell and Hare 2005). Hobson (1993) has proposed that a priori dysfunction in the capacity for inter-subjective engagement in children with ASD results in impaired understanding of minds, both own and others, leading to impaired mentalisation, autobiographical memory and executive functioning. There has been limited research into self-concept in ASD, for example Capps et al. (1995) finding that children with ASD perceived themselves to be less competent than their non-autistic peers in social, physical, but not cognitive, domains. Research into personal pronoun usage (Lee et al. 1994) and imitation (Meltzoff and Gopnik 1993) suggests a basic deficit in ASD in developing social representations of self and other via representational processes that work on patterns of self-other similarity. Hobson and Lee (1998) used Damon and Hart's (1988) Self-understanding Interview to investigate abnormalities in self-understanding, having predicted that the social and psychological aspects of self-concept would be relatively impoverished in children with ASD, which was supported by their findings. Whilst there were no ASD-specific differences in the "I" aspects of agency, continuity and distinctness, fewer children with ASD made reference to the future that conveyed an understanding of self-continuity. They concluded that the group similarities were of more note than the group differences in the self-as-subject descriptions.

The present study examined 'self-understanding' through a controlled study of verbally articulated concepts and opinions expressed by individuals with Asperger's syndrome. The current study aimed to investigate the following hypotheses:

1. People with AS will have a relatively under-developed self-concept as indicated by fewer self-as-object self-statements overall compared to a neurotypical [non-AS] (NT) comparison group.
2. People with AS will be less likely to understand themselves in a social way, indicated by fewer social self-statements than the NT comparison group.
3. People with AS will demonstrate relatively poorer self-understanding, indicated by fewer references to systematic beliefs and life plans in the Self-understanding Interview than the NT comparison group.
4. People with AS will have a relatively under-developed subjective sense of self/"I" as indicated by making fewer self-as-subject references than the NT comparison group.

Method

Ethical approval for the study was obtained from appropriate university and NHS ethics committees. Inclusion criteria for participants in the AS group were a verifiable diagnosis of AS on DSM-IIIR criteria received from a

Table 1 Development of self-as-subject/"I" & self-as-object/"me" (Damon and Hart 1988)

Developmental level	Early childhood	Middle and late childhood	Early adolescents—interpersonal	Late adolescents
Organising principle	Categorical identifications	Comparative assessments	Implications	Systematic beliefs and plans
Physical self	Bodily properties, descriptions or material possessions	Capability related physical attributes	Physical attributes that influence social appeal and social interactions	Physical attributes reflecting volitional choices or personal and moral standards
Active self	Typical behaviour	Abilities relative to others, self or normative standards	Active attributes that influence social appeal and social interactions	Active attributes that reflect choices, personal or moral standards
Social self	Fact of membership in particular social relations and groups	Abilities and acts considered in light of the reaction of others	Social-personality characteristics	Moral or personal choices concerning social relations or social characteristics
Psychological self	Momentary moods, feelings, preferences and aversions	Knowledge, cognitive abilities or ability related emotions	Social sensitivity, communicative competence and other psychologically related social skills	Belief systems, personal philosophy, self's own thought processes
"Agency"	External, uncontrollable factors determine self	Efforts, wishes and talents influence self	Communication and reciprocal interaction influence self	Personal and moral evaluations influence self
"Continuity"	Categorical identifications	Permanent cognitive and active capabilities and immutable self characteristics	Ongoing recognition of self by others	Relations between past, present and future selves
"Distinctness"	Categorical identifications	Comparisons between self and other along isolated dimensions	Unique combination of psychological and physical attributes	Unique subjective experience and interpretations of events

medical practitioner or psychologist on the basis of appropriate multi-disciplinary assessment and formal diagnostic tools and being over 16 years old. A total of 10 participants with a diagnosis of AS were recruited via a specialist service for people with AS at which one of the researchers (PS) worked or following participation in previous research conducted by two of the researchers (PS and DJH), with a further ten potential participants either declining to participate or being excluded for pragmatic reasons. All of the diagnoses of AS were verified by two of the researchers (PS and DJH) on the basis of their extensive experience of clinical and research work with this population.

Ten participants were included in the comparison group, being a convenience sample recruited from advertisement or personal contact. Inclusion criteria for participants in the comparison group were being 'neurotypical' [i.e. having no developmental disorder] and being aged over 16 years. All participants completed the Self-understanding Interview (Damon and Hart 1988), comprising seven principal questions to be presented in a fixed order, unless a change was required to maintain the flow of the interview ("Appendix") and the Wechsler Abbreviated Scale of Intelligence [WASI]. All interviews were audio-taped and then transcribed verbatim.

The Self-understanding Interviews were scored on the basis of 'chunks' of data, identified when a participant mentioned a self-characteristic (e.g. "I am tall".), which subsequently 'probed' to elucidate the understanding of that characteristic (e.g. "What does being tall mean to you") and any statements that explicated the reasoning or importance of that characteristic were included as part of that "chunk". For inter-rater reliability purposes, transcribed chunks were edited to remove identifying information and "chunks" from the AS and NT groups were randomly mixed. Damon and Hart's (1988) scoring procedure was followed, with each "chunk" being placed in one of seven categories of self-concept (four *self-as-object* ("me") and three *self-as-subject* ("I")) according to the quality of the self-characteristic (e.g. "I am tall" = *physical* self-statement). Responses to all questions posed could be scored in any of the four *self-as-object* categories, with *self-as-subject* chunks being scored specifically for the questions in the self-understanding interview pertaining to 'continuity', 'agency' and 'distinctness'. The number of *self-as-subject* references was also calculated, based on

whether reference was made to 'continuity', 'distinctness' or 'agency'. Thus, any given chunk could contain number of *self-as-subject* references. References at all levels were scored and recorded.

Self-as-object chunks comprised self-characteristics in the following categories:

- *Physical*—this includes an individual's body and material possessions.
- *Active*—this includes an individual's activities and abilities.
- *Social*—this includes attributions and scheme relating to social interactions and social relationships.
- *Psychological*—this includes the individual's emotions, thoughts, preferences or other cognitive processes.

Self-as-subject chunks encompassed the following categories:

- *Agency*—this includes self-statements concerned with the formation, existence or control of the self.
- *Continuity*—this includes reflections of awareness of self-continuity over time.
- *Distinctness*—this includes reflections on differences and contrast with others.

Within each of the above categories, self-statements were rated according to one of Damon and Hart's four 'levels:

- 'Level 1'—self being understood in terms of simple categorical identifications.
- 'Level 2'—comparative assessment between the self and others or normative standards.
- 'Level 3'—understanding focuses on the characteristics of self that determines the nature of one's interactions with others.
- 'Level 4'—understanding organises self-characteristics in terms of systematic beliefs and life plans.

Therefore, even when considering aspects of the 'physical' and 'active' self, 'Level 3' 'physical' or 'active' self-statements could reference attributes "that influence social appeal and social interactions", while 'Level 4' could reference attributes that reflect "choices, personal or moral standards" (Damon and Hart 1988). In line with Damon and Hart (1988), a chunk was only scored at the highest applicable level, unless it could be scored in two or more categories at the same level, in which case all applicable scores were given. Thirty randomly chosen *self-as-object* and thirty *self-as-subject* chunks were rated by another researcher blind to the study. Inter-rater reliability was assessed using the kappa statistic and was found to be high with substantial agreement for both *self-as-object* ($\kappa = .770$) and self-*as-subject* chunks ($\kappa = .727$). As the Self-understanding interview had not been used previously in research with an adult population, a small pilot study was completed with three subjects in each group, which indicated both its appropriateness and feasibility.

Results

The two groups were broadly comparable (Table 2). There was no association between gender and any of the measures used in this study, suggesting that the small gender difference between the two groups was not significant. Both groups were entirely white-British, which is of importance given cultural differences in self-understanding (Damon and Hart 1988).

A major between- group difference was current employment status, with 60% of the AS group being unemployed, compared with only 10% of the NT group. Students made up 30% of both groups. There was a difference was found between the two groups in terms of estimated full-scale IQ scores, with the NT group scoring higher than the AS group ($U = 20.0$; $p = .023$). However, post-hoc correlational analyses indicated that there no significant correlations between estimated full-scale IQ score and any other variables and therefore the between group discrepancy in estimated full-scale IQ score would appear to be negligible.

Self-as-Object/"Me"

The *self-as-subject*/"me" data were examined to see whether there was a between-group difference in (1) total number of self-as-object 'chunks' [indicative of general self-understanding], (2) number of self-as-object 'chunks'

Table 2 Composition of AS and NT groups

	Asperger's syndrome group	Neurotypical group
Group size (*n*)	10	10
Age	Mean: 35.0	Mean: 33.8
	SD: 12.6	SD: 13.7
	Range: 19–63 yrs	Range: 20–53 yrs
Gender	Male: 5	Male: 6
	Female: 5	Female: 4
Marital status	Single: 9	Single: 7
	Separated: 1	Married: 2
		With partner: 1
Employment status	Employed: 1	Employed: 6
	Student: 3	Student: 3
	Unemployment: 6	Unemployment: 1
Ethnicity	White: 10	White: 10
WASI score	103.0 (92–111.75)	119.9 (113.25–126.6)

in appertaining to the physical, active, social and psychological domains and (3) level of understanding implicit in the 'chunks' that they described (Table 3).

A Kolmogorov–Smirnov test indicated that the data for 'total number of chunks', number of 'social' chunks and number of 'psychological' chunks were non-parametric and Mann–Whitney-*U* tests were used for all between-group comparisons. There was a median of 20 *self-as-object* statements in the AS group compared with 28.5 statements in the NT group ($U = 9.00$; $p = .002$), indicating a significant between-group difference and that the NT group were more productive. Similarly, there was a significant difference in the median number of 'social' (AS = 8/NT = 14.5; $U = 9.5$, $p = .002$) and 'psychological' (AS = 9.5/NT = 21; $U = 3.0$, $p < .001$) self-statements, but none with regard to 'physical' or 'active' self-statements. To check that these findings were not artifactual, given that the NT group produced more self-statements, the *proportion* of statements scored in each of the four domains was examined (i.e. for each individual—domain score/total number of chunks identified × 100) and significant between-group differences were again found for 'social' (AS-43.75%/NT-52.6%;$U = 17.5$, $p = .014$), 'psychological' (AS-47.7%/NT-73.5%; $U = 7.0$, $p = .001$) and 'active' (AS-40.6%/NT-22.4%; $U = 23.5$, $p = .045$) domains.

Level of Self-Characteristic

Self-characteristics understood at level 4 (i.e. self-characteristics involving systematic beliefs, personal philosophy and life plans) differed significantly between the groups,

Table 3 Self-as-object: distribution of coded chunks

	Category																Total Chunks[a]
	Physical				Active				Social				Psychological				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
AS group																	
ASD1	0	0	0	0	0	1	1	3	1	0	2	2	1	2	1	5	17
ASD2	0	1	0	1	0	0	0	5	1	1	3	2	0	0	2	4	16
ASD3	0	0	0	0	0	1	0	2	0	0	1	8	1	0	1	14	23
ASD4	0	0	0	0	0	2	0	3	0	0	5	6	1	0	3	6	22
ASD5	0	0	0	0	2	2	1	1	1	2	8	0	2	0	7	0	18
ASD6	0	0	1	1	0	1	0	7	1	0	2	12	0	0	1	13	25
ASD7	0	0	0	0	2	1	1	11	0	0	3	4	0	2	2	13	26
ASD8	0	0	0	1	0	2	1	5	0	0	2	5	0	2	1	3	16
ASD9	0	1	0	1	0	2	1	10	0	0	0	11	0	1	0	10	25
ASD10	0	0	0	0	0	0	0	5	1	0	0	4	0	0	0	4	10
Totals	0	2	1	4	4	12	5	52	5	3	26	54	5	7	18	72	198
Sum	7				73				88				102				
NT group																	
NT1	0	0	1	1	0	0	0	2	0	1	1	12	0	0	2	17	26
NT2	0	0	0	1	0	1	0	3	1	0	6	7	2	0	6	6	21
NT3	0	0	0	0	0	1	0	3	0	0	3	10	0	3	3	14	27
NT4	0	0	0	2	0	1	1	4	0	0	1	14	0	1	2	16	29
NT5	0	0	0	0	0	3	1	6	0	1	1	7	0	2	2	13	23
NT6	0	0	1	0	0	1	0	6	1	0	1	20	0	0	1	22	34
NT7	1	0	0	0	1	0	0	8	0	0	1	14	0	0	1	23	28
NT8	0	0	0	1	0	1	0	5	0	0	2	12	0	0	2	22	29
NT9	0	0	0	2	0	0	0	9	0	0	2	14	0	0	2	26	32
NT10	0	0	0	1	0	1	0	9	0	0	1	19	0	1	0	21	32
Totals	1	0[b]	2	8	1	9	2	55	2	2	19	129	2	7	21	180	281
Sum	11				67				152				210				

[a] Some chunks are coded in more than one domain, therefore total number of chunks exceeds sum of all the columns

[b] All chunks were scored at the highest possible level and consequently there is hidden data in these scores, especially in the lower level self-understanding domains (Damon and Hart 1988)

with a median of 25 in the NT group compared with a median of 12.5 in the AS ($U = 11.5$; $p = .004$). In terms of the *self-as-object*/"me" domains in which these differences were evident, the NT group had a median of 13 in the 'social' domain, thus describing significantly more social characteristics that reflected personal or moral choices and beliefs than the AS group with a median of 4.5. ($U = 9.0$; $p = .002$). A similar difference was found for the 'psychological' domain, with a median of 19 in the NT group describing more psychological aspects of themselves that reflected personal philosophy, belief systems and their own thought processes, compared with the AS group median of 5.5 ($U = 9.0$; $p = .001$). No differences were found for the 'physical' or 'active' domains.

Some of the self-understanding chunks could be potentially scored at more than one level within a single category, but to be consistent with Damon and Hart's (1988) method, a chunk was only scored at the highest applicable level. However, if the chunk could be scored in two or more categories at the same level, the chunk was given *all* applicable scores. Consistent with their developmental model, Damon & Hart stress that, for each chunk, the scorer has to assume that a higher level score in one category incorporates the lower level elements within that category as well as the lower levels within the other categories, unless the lower level scores have been explored independently and are found to definitely have a separate meaning. As a result, there is therefore so-called 'hidden' data in the level of self-characteristic scores. Therefore, whilst comparison of level 1, 2 and 3 responses was inappropriate because of this 'hidden' data, the distribution of responses over the four levels was of interest and the *proportion* of the total number of characteristics that were understood at the four levels was analysed. A statistically significant difference was observed for level 1 understanding, with the AS group having a higher proportion, 5.40% median, of level 1 understanding of their self characteristics compared with the NT group's 0% median ($U = 18$, $p = .011$). Although there were no other significant differences between the groups for levels 2–4, the inter-quartile ranges for all levels of response were much larger in the AS group, suggesting a much wider distribution of level of understanding than in the NT group.

Self-as-Subject/I

Individual responses to the three specific *self-as-subject*/"I" questions were scored and rated as level 1–4, depending on the highest level of understanding achieved.

Item 5 Continuity: Do you change at all from year to year? If you do change from year-to-year how do you know it is always still you?

There was a significant between group difference relating to overall self-continuity (AS = 2.5/NT = 4.0; $U = 20$, $p = .012$), which indicated that the AS group had a less sophisticated sense of continuity. In the AS group, 50% achieved level 2 (NT = 0%), indicative of understanding self-continuity with reference to permanent psychological, active or self-characteristics. The scores for level 3, understanding self-continuity through the ongoing recognition of the self by others, were comparable across the two groups at 20%, whereas only 30% of the AS group showed level 4, understanding of the relationship between past, present and future self-characteristics and the development of themselves over time, as compared to 80% of the NT group.

Item 6 Agency: How did you get to be the way you are?

Unlike Item 5, the median scores of the two groups did not appear to differ with regard to understanding of agency (AS = 3.5/NT = 4.0; $U = 34$, $p =$ n.s.). In the AS group, 10% achieved level 2 understanding of agency (NT = 0%), which demonstrated an understanding that personal talents abilities, wishes, motivation and efforts influenced the formation of self. In comparison, 40% of the AS group (NT = 20%) demonstrated level 3 understanding of agency, indicating that they appreciated that reciprocal communication and interactions with others influenced the formation of the self and 50% (NT = 80%) showed level 4 understanding of self-agency, indicating comprehension of moral and personal evaluations of life's possibilities as influencing the self. Therefore, it was evident that the profile across the levels of agency was different in the AS group compared to the NT group.

Item 7 Distinctness: Do you think there is anyone who is exactly like you? What makes you different from anyone you know?

Again there was a significant difference between the groups with regards to distinctness (AS = 2.5/NT = 4.0; $U = 15$, $p = .004$). 50% of the AS group (NT = 0) achieved level 2 understanding, understanding self-distinctness by comparing the self and other along isolated personality, behavioural or cognitive dimensions, 30% (NT = 20%) level 3, understanding that self-distinctness derives from a unique combination of psychological and physical characteristics and 20% (NT = 80%) level 4, making reference to their unique subjective experience and interpretation of the world.

Previous research (Damon and Hart 1988; Hobson and Lee 1998) found very few self-as-subject references, but in the present study it was apparent that participants with AS made reference to continuity, agency and distinctness throughout the interview. Therefore, as well as scoring

items 5–7 as above, all spontaneous references to agency, continuity and distinctness were also scored (Table 4).

The NT group made significantly more self-as-subject references, reflecting more spontaneous references to self-agency and self-distinctness. Within each domain, the number of references at each level was analysed. With regards to self-agency, the AS group made significantly fewer level references that reflected levels 2 to 4 when compared to the NT group. However, when the level of description was examined for self-continuity and self-distinctiveness, the groups were comparable for the numbers of level 1–3 references but differed in that the AS group made fewer level 4 references in both cases. In the case of self-continuity, this indicated that the AS group made fewer references to past, present and current selves and the relationships between them and to the self being having evolving, interacting and changing characteristics. Regarding self-distinctiveness, the AS group made fewer references to the uniqueness of their own subjective experience than the NT group.

Discussion

The study found significant differences in self-understanding in people with AS compared with a matched NT sample, which supported the first hypothesis. In terms of the *self-as-object*/"me", the AS group generated fewer self-characteristics than the NT group, and showed a clear pattern of reporting significantly fewer social and psychological descriptions of themselves, supporting the second hypothesis. Similarly, it was found that the AS group generated significantly fewer 'level 4' statements, namely those that placed the person in a broader social and chronological context, in 'social' and 'psychological' domains that were scored at level 4, which supported the third hypothesis This does not necessarily imply that participants with AS could not understand and organise their self-characteristics at this level, but rather that they tended to focus more on the immediate here and now and less on the broader context of their lives and actions. It was also apparent that AS participants described a much wider *range* of understanding than the NT group, e.g. demonstrating significantly more 'level 1' understanding, i.e. identifying themselves in terms of simple physical and psychological descriptors, than the NT group, who showed a general tendency to describe their self-characteristics at the 'level 4' broad social and chronological context.. This suggests a between-group difference, but the sample size was too small in the present study to show a statistically significant effect.

The fourth hypothesis proposed that the AS group would have a relatively under-developed subjective sense-of-self/"I", manifesting fewer self-as-subject references in terms of *agency*, *continuity* and *distinctiveness*. As per the findings of Lee and Hobson (1998), there were no significant between-group differences in *agency*, but unlike the earlier study, differences were seen for *continuity* and *distinctness*. Significantly more people in the NT group achieved a 'level 4' understanding of self-continuity, i.e. not seeing the self as permanent and unchangeable but as having a number of evolving, interacting and changing characteristics, than in the AS group. Although there was some 'level 4' understanding of self-continuity in the latter group, the majority indicated a 'level 2' understanding, i.e. seeing self-continuity in terms of permanent cognitive capabilities and unchanging self-characteristics. A similar pattern was found for self-distinctness. The findings from the present study appear to be relatively robust and Lee & Hobson (*op.cit.*) raised the possibility that the lack of between group differences in their study might be an artefact given the relatively small number of statements produced by both groups.

Between-group differences were noted in spontaneous *self-as-subject* references and a similar pattern was found, with NT participants making more references to the self-as-subject, specifically relating to personal agency and self-distinctness. The nature of the *self-as-subject* references followed the same pattern, with the AS group showing a greater range of levels but skewed towards levels 2 and 3 in

Table 4 Descriptive statistics comparing the number of self-as-subject references made by each group

	Group	*N*	Median	IQR	Mann–Whitney *U*	*p* value
Total number of "I" references	Asperger	10	25.5	20–32.75	16.5	.011*
	Neurotypical	10	39.5	31.25–48.25		
'Agency' references	Asperger	10	7.0	5.0–12.0	9.5	.002*
	Neurotypical	10	15.5	12.5–21.25		
'Continuity' references	Asperger	10	13.0	8.0–14.75	38.5	.379
	Neurotypical	10	14.0	10.0–17.0		
'Distinctness' references	Asperger	10	5.5	4.0–8.5	23.5	.043*
	Neurotypical	10	9.5	5.75–11.5		

the case of self-agency and self-continuity. Therefore, the fourth hypothesis was supported. Interestingly, most AS participants made reference to all three *self-as-subject*/"I" domains at "level 4", i.e. referred to systematic beliefs and plans at some point during the interview, but when directly asked, this understanding was not evident, possibly demonstrating impaired reflective self-awareness (Hobson (1993).

However, whilst but most of the AS group demonstrated a relative lack of self-understanding some participants with AS demonstrating 'normal' self-understanding. One possible explanation is that reflective self-awareness is manifest in people with AS, but requires deliberate effort and has to be 'hacked out' (cf. Happé 1995). Interestingly, those participants with AS whose scores in the *self-as-object* domain were equivalent to the NT group spoke explicitly about their efforts to make sense of themselves and the world through deliberate self-reflection, self-evaluation and education. Such self-knowledge appears to involve developing an objective, logical and semantic understanding of the "me", lacking the subjective qualities that seemed to come relatively easily to the NT group. This fits with the impairments shown in the AS group in the "I" domain and could also account for the greater range of responses across the four levels of self-understanding demonstrated by the AS group, as those who did not deliberately reflect upon themselves would describe far fewer *self-as-object* characteristics.

The current study permits an analysis of the *self-as-subject* and it is possible to consider agency apart from continuity and distinctness, which form the basis of personal identity (Damon and Hart 1988). Hobson proposes that people with AS would still demonstrate a "core" self (Stern 1985), based on continuity and agency In terms of 'distinctness', the intersubjective awareness that develops as a result of awareness of the contrast between personal subjective awareness and the subjective awareness of the people around them should, via the development of the inter-subjective self (Stern 1985), lead to 'level 4—distinctness'. The current data indicated impaired development of the intersubjective self in the people with AS, with only 20% demonstrating the requisite 'level 4' distinctness. To achieve 'level 4—continuity', a symbolic representation of the self over time is necessary and this 'level 4' understanding was achieved by only 30% of the AS group. Such impairments in personal identity have implications for both autobiographical memory (Bowler et al. 2000) and the ability to plan ahead and take responsibility for one's actions (Parfit 1971), as sense of continuity into the future is essential for making life plans and forestalling immediate gratification.

Mead (1934) proposed that if there were only a "me" and no "I", behaviour would become automatic and completely consistent with social expectations, "…the fact that no person's behaviour is absolutely robotic is a reflection of the activity of the "I"" (Damon and Hart 1988, pp. 131). On this basis, the reliance on routines by people with AS may be a behavioural reflection of the inactivity of the "I", specifically the agency component, as although the AS group demonstrated a 'normal' understanding of self-agency, there were significantly fewer *spontaneous* references to it.

Whilst some of the AS group readily demonstrated an internalised conception of themselves over time, with an awareness of the relationship between their past, future and present selves rooted in autobiographical memories and judgments and moral choices made on the basis of those experiences, others did not. One participant in the AS group when asked "If you change from year-to-year how do you know you are still you?" stated that his routines performed that function and related feeling very anxious and confused if his routines were disrupted, thus presenting the possibility that the routines and repetitive behaviour in people with AS might be a behavioural manifestation of a lack of *internal* self-continuity impacting on self-concept. The collecting behaviour of another participant in the AS group similarly seemed to be linked to self-continuity. In this instance, she was able to talk about herself in terms of past and current characteristics, while simultaneously describing how she didn't really know who she was. Again, this could be construed as an externalised, behavioural manifestation of a lack of internal self-continuity. In the case of other participants in the AS group, their inability to "understand a general frame of reference…to reason in concepts, categories, principles [and] to evolve common denominators" (Scheerer et al. 1945) provided further evidence of an impaired 'abstract attitude'. Such narratives tended to involve the recognition of themselves through others and their repetitive nature appeared to sub-serve the provision of a sense of self-continuity and hence maintain self-identity. The foregoing reference to an impaired "abstract attitude" leads to consideration of the possible influence of the neuropsychological dysfunctions typically observed in people with AS, for example specific elements of executive functioning (e.g. Russell's (1996) proposal that autism is essentially the result of impaired agency) and 'theory of mind' functioning. These relationships remain to be investigated but other research (e.g. Hobson and Meyer 2005) strongly suggests that deficits in the development of the self in children with autism may be primary to such neuropsychological processes.

The present study has a number of limitations that necessarily restrict the conclusions that can be drawn from it and the generalisability of these findings. The size of the AS sample is small and possibly rather unrepresentative of the overall population of people with AS given the 1:1

male to female ratio rather than the more usual ratio of between 4:1 and 10:1 and the suggestion that there may be a differential expression of AS in females compared to males. In addition, the use of additional further screening and assessment measures to measure AQ and verbal ability would have strengthened the present study and it is strongly recommended that these be incorporated in any replication or development of this work.

In addition, the impact on a person's sense of self of growing up and living with AS must also be considered and this becomes more pertinent given the emphasis on self-other comparison in social interactionist accounts of self-development. Other research, (Abell and Hare 2005) has indentified the insidious effect of everyday misunderstanding, stress and isolation on the emotional and psychological well-being of people with AS, often resulting in paranoid and grandiose quasi-delusional beliefs. The relationship of such negative experiences and dysfunctional beliefs on the development of a sense of self has yet to be investigated.

Conclusions

The current study, with the above caveats, found evidence to support the four hypotheses under investigation. Thus, the current findings lend support to the notion that self-understanding is both quantitatively and qualitatively different in people with Asperger's syndrome compared to the neurotypical majority. In particular, there appears to both a wider range of spontaneous self-description with less self-description at the psychological and social level and also a reduced sense or awareness of self-continuity and self-distinctiveness associated with Asperger's syndrome. Whilst this is of interest from a theoretical perspective and requires both the replication and extension of the present study, there also implications with regard to the practical support of people with Asperger's syndrome. As well as indicating a possible explanation for some of the potentially dysfunctional behaviours engaged in by some people with Asperger's syndrome, such as being extremely bound by routine and hoarding, the relative under-development of continuity and distinctness may in itself be clinically important.

James (1892) posited that any disturbance of continuity and distinctness have grave consequences for personal identity. Marcia (1980) found that "identity failure" in young adults resulted in a lack of serious thoughtful commitment to occupations, ideologies and social relationships, whilst problems in developing an effective sense of self in adolescence and young adulthood have been linked with serious mental health problems (Harrop and Trower 2003). Therefore, an apparently underdeveloped personal identity in some people with AS may be a contributory factor to the relatively poor social adjustment seen in this population (Szatmari et al. 1989). Such a process may be amenable to facilitation and this might well be the primary role of psychological therapies for people with Asperger syndrome.

Acknowledgments The authors wish to acknowledge the support of the Liverpool Asperger Service in carrying out this study, which formed part of the first author's doctoral thesis.

Appendix: Self-Understanding Interview (Damon and Hart 1988)

Item 1: Self-definition: What are you like? What kind of person are you? What are you not like? How would you describe yourself?

> Probes: What does that say about you? Why is that important? What difference does that (characteristic) make? What would be different if you were/were not like that?

Item 2: Self-evaluation: What are you especially proud of about yourself? What do you like most about yourself? What are you not proud of? What do you like least about self?

> Probes: What does that say about you? Why is that important?

Item 3: Self in the past and future: Do you think you'll be the same or different 5 years from now? How about when you're an adult? How about 5 years ago? How about during your childhood?

> Probes: What will be the same? What will be different? Why is that important?

Item 4: Self-interest: What do you want to be like? What kind of person do you want to be? What do you hope for in life? If you could have three wishes, what would they be? What do you think is good for you?

> Probes: Why do you want to… be that way?…wish for that?…believe that is good for you? What else do you…hope for?…wish for?…believe is good for you? Why is that good for you?

Item 5: Continuity: Do you change at all from year to year? How (how not)? If you do change from year to year, how do you know it's still always you?

> Probes: In what ways do you stay the same? Is that an important thing to say about you? Why?

Item 6: Agency: How did you get to be the way you are? How did that make you the kind of person you are? How could you become different?

Probes: What difference did that make? Is that the only reason you turned out like you did? What else could make you different? How would that work?

Item 7: Distinctness: Do you think there is anyone who is exactly like you? What makes you different from anyone you know?

Probes: Why is that important? What difference does that make? In what other ways are you different? Are you completely different or just partly different? How do you know? Are you different from everybody or just from some people? How can you be sure you're different from everybody else when there are many people in world you do not know?

References

Abell, F., & Hare, D. J. (2005). An experimental investigation of the phenomenology of delusional beliefs in people with Asperger syndrome. *Autism, 9*, 515–531.

Bowler, D. M. (2007). *Autism spectrum disorders: Psychological theory and research*. Chichester: Wiley.

Bowler, D. M., Gardiner, J. M., & Grice, S. (2000). Episodic memory and remembering in adults with Asperger's syndrome. *Journal of Autism and Developmental Disorders, 30*, 305–316.

Capps, L., Sigman, M., & Yirmiya, N. (1995). Self-competence and emotional understanding in high-functioning children with autism. *Development and Psychopathology, 7*, 137–149.

Cooley, C. H. (1902). *Human nature and the social order*. Charles Scribner's Sons: New York.

Damon, W., & Hart, D. (1988). *Self-understanding in childhood and adolescence*. Cambridge: Cambridge University Press.

Happé, F. (1995). The role of age and verbal ability in the theory of mind task performance of subjects with autism. *Child Development, 66*(3), 843–855.

Harrop, C., & Trower, P. (2003). *Why does schizophrenia develop at late adolescence? A cognitive-developmental approach to psychosis*. Chichester: Wiley.

Hobson, R. P. (1993). *Autism and the development of mind*. Hove: Lawrence Erlbaum.

Hobson, R. P., & Lee, A. (1998). On developing self-concepts: A controlled study of children and adolescents with autism. *Journal of Child Psychology and Psychiatry, 39*(8), 1131–1144.

Hobson, R. P., & Meyer, J. A. (2005). Foundations of self and other: A study in autism. *Developmental Science, 8*, 481–491.

James, W. (1961). *Psychology: The briefer course*. New York: Harper & Row. (Originally published 1892).

Lee, A., & Hobson, P. (1998). On developing self-concepts: A controlled study of children and adolescents with autism. *Journal of Child Psychology and Psychiatry, 39*(8), 1131–1144.

Lee, A., Hobson, R. P., & Chiat, S. (1994). I, you, me and autism: An experimental study. *Journal of Autism and Developmental Disorders, 24*, 155–176.

Marcia, J. (1980). Identity in adolescence. In J. Adelson (Ed.), *Handbook of adolescent psychology*. New York: Wiley.

Mead, G. H. (1934). *Mind, self and society: From the standpoint of a social behaviourist*. Chicago: University of Chicago Press.

Meltzoff, A. N., & Gopnik, A. (1993). The role of imitation in understanding persons and developing a theory of mind. In S. Baron-Cohen, T. Tager-Flusberg, & D. J. Cohen (Eds.), *Understanding other minds: Perspectives from autism*. Oxford: Oxford University Press.

Parfit, D. (1971). Personal identity. *Philosophical review, 80*, 3–27.

Russell, J. (1996). *Agency: Its role in mental development*. Hove: Taylor & Francis.

Scheerer, M., Rothmann, E., & Goldstein, K. (1945). A case of "idiot savant": An experimental study of personality organisation. *Psychological Monographs, 58*, 1–63.

Stern, D. N. (1985). *The interpersonal world of the infant*. New York: Basic Books.

Szatmari, P., Bartolucci, G., Bremner, R., Bond, S., & Rich, S. (1989). Follow-up study of high-functioning autistic children. *Journal of Autism and Developmental Disorders, 19*(2), 213–225.