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Humor as character strength and its relation to life satisfaction and happiness in Autism Spectrum Disorders

Abstract: The goal of this study was to examine the importance of humor as character strength in individuals with Asperger's syndrome/High Functioning Autism (AS/HFA) and how it relates to life satisfaction and orientation to happiness. Thirty-three individuals with AS/HFA and 33 gender-, age- and education-matched typically developing (TD) participants filled out scales assessing character strengths (VIA-IS), life satisfaction (SWLS) and orientation to happiness (OTH). Profile analyses of the character strengths and character strengths factors revealed significant differences between the two groups. Humor was found to be the 8th highest out of 24 character strengths in TD, but was only at the 16th position in individuals with AS/HFA when the strengths are rank-ordered. In TD participants, humor is related to life of pleasure, life of engagement, life of meaning and life satisfaction. In individuals with AS/HFA, humor is only related to life of pleasure. This shows that 1) individuals with AS/HFA seem not to consider humor as one of their important strengths, which is in line with humor difficulties reported earlier and 2) humor does not seem to contribute to life satisfaction to the same degree as in TD controls.

Keywords: humor, character strength, Positive Psychology, Autism Spectrum Disorder, Asperger's syndrome

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1 Introduction

Humor is more than often ascribed to many positive characteristics and consequences such as being adaptive or healthy, fostering relationship intimacy, and contributing essentially to life satisfaction (Martin 2007; Ruch 2008). However, not everybody seems to have the same sense of humor, and certain individuals are even characterized by a lack of a sense of humor. Hans Asperger (1944)

specifically described individuals with Asperger's syndrome as humorless – unable to understand jokes, be cheerful in a relaxed way, or experience "genuine" humor. Subsequent studies have not only confirmed these difficulties in humor comprehension (Baron-Cohen 1997; Ozonoff and Miller 1996, Emerich et al. 2003), particularly related to social cognition deficits, but have also identified a reality and detail oriented processing style and higher seriousness (Samson and Hegenloh 2010; Samson et al. this issue) that affect humor processing. Nevertheless, certain types of humorous stimuli such as slapstick or visual and verbal puns seem to be enjoyed as much as by typically developing (TD) participants (Samson and Hegenloh 2010; Weiss et al. this issue). Since humor can be understood also as character strength which contributes to positive functioning, the present paper aims to focus on the significance of humor as character strength in individuals with Asperger's syndrome and High Functioning Autism (AS/HFA) and its relation to life satisfaction and orientation to happiness.

1.1 Humor as a character strength

Individuals on the autism spectrum are most frequently characterized by their weaknesses in domains such as social communication, cognitive flexibility, or repetitive behaviors (e.g., Baron-Cohen et al. 2001; Frith and Frith 2003). On the other hand, research within the discipline of Positive Psychology has developed a tradition of describing the strengths of individuals, rather than their weaknesses by focusing on positive emotions and their mechanisms.

In this approach, humor was described as one of 24 character strengths that are understood as resources and whose processes or mechanisms lead to virtues. These virtues include wisdom and knowledge, courage, humanity, justice, temperance, and transcendence (Peterson and Seligman 2004). Different facets of humor appear to be related to all virtues, but humor seems to be most strongly related to humanity and wisdom (Beermann and Ruch 2009; Müller and Ruch 2011). Several approaches attempted to ascribe the character strengths to the different virtues. One way of categorizing character strengths is via statistical methods to examine which of the character strengths are more related to each other. Five factors have been most recently described by Ruch et al. (2010b), similar to the findings by Peterson and Seligman (2004): emotional strengths, interpersonal strengths, intellectual strengths, strengths of restraint, and theological strengths.

Humor embraces several distinguished facets related to sense of humor, temperament and humor styles (Ruch 2008), and includes more benevolent (positive, socially warm) but also malevolent (negative, aggressive or hostile humor)

components. In the tradition of Positive Psychology, humor is understood as to be thoroughly positive by aiming at enhancing positive mood and building social bonds (Peterson and Seligman 2004). Müller and Ruch (2011) empirically confirmed that humor assessed as a character strength with the Values in Action Inventory of Strengths (VIA-IS, Peterson et al. 2005a) was most strongly correlated to positive components of humor, such as socially warm and competent humor, and also playfulness (i.e., a playful attitude to deal with situations or to life in general).

1.2 Humor, life satisfaction and orientation to happiness

Earlier studies revealed humor as one of the highest endorsed strengths and that humor is also highly associated with subjective well-being and life satisfaction (Park et al. 2004; Peterson et al. 2007; Ruch et al. 2010b). Happiness, another important concept in Positive Psychology, can be achieved via different ways. According to Peterson et al. (2005b), a good life is constituted by three orientations to happiness: (i) the life of pleasure – hedonism, (ii) the life of meaning – eudaimonia, and (iii) the life of engagement, which is related to experiences of flow. Pleasure, meaning or engagement represent three ways in which one can reach happiness and all of them are related to life satisfaction. Humor as a character strength is most strongly related to life of pleasure, but also to a lesser degree to life of engagement and life of meaning (e.g., Peterson et al. 2007). Fundamental questions that emerge when thinking about humor as character strength in Autism Spectrum Disorders are whether humor is important for life satisfaction and how humor is related to orientations to happiness.

1.3 The present study

Since humor contributes substantially to mental health and positive functioning, the main goals of present paper are to focus on (1) the significance of humor as character strength in individuals with Asperger's syndrome and High Functioning Autism (AS/HFA) and (2) how humor relates to life satisfaction and orientation to happiness in individuals with AS/HFA. We expected that individuals with AS/HFA do not consider humor as one of their main strengths and that humor does not strongly contribute to life satisfaction in this group.

We first aimed to compare individuals with AS/HFA with TD individuals on all the 24 character strengths assessed with the VIA-IS, which will allow us to characterize the strengths' profiles in individuals with AS/HFA in comparison to

the TD group with a special focus on humor as character strength. In addition, and as secondary aims, the two groups will be compared on five strength factors: (1) emotional strengths, (2) interpersonal strengths, (3) intellectual strengths, (4) strengths of restraint, and (5) theological strengths (Ruch et al. 2010b). We expected that individuals with AS/HFA to have lower scores on interpersonal and emotional strengths, as individuals with AS/HFA are known to have difficulties with social communication and identifying and regulating their own emotions (e.g., Frith and Frith 2003; Laurent and Rubin 2004; Samson et al. 2012). Furthermore, we compared individuals with AS/HFA with TD individuals on life satisfaction and orientation to happiness. To the best of our knowledge, no study exists on AS/HFA that focused on life satisfaction and orientation to happiness thus far. However, on the basis of studies that showed higher negative affect in individuals with AS/HFA (e.g., Capps et al. 1993; Kasari and Sigman 1997), we expected individuals with AS/HFA to score lower on life satisfaction. No hypotheses were formulated about orientations to happiness.

2 Method

2.1 Participants

Thirty-three individuals who have been diagnosed with Asperger's Syndrome or High Functioning Autism (AS/HFA) and 33 gender-, age-, and education-matched typically developing (TD) participants filled out all questionnaires completely. Each group consisted of 14 male and 19 female participants and had a mean age of 33.49 years (SD = 10.49, range: 18–58). In each group, 3% had 9 years of education, 27.3% had 10 to 12 years, 33.3% had 12–13 years and 36.4% had more than 13 years. The two groups were almost matched regarding their nationality: 87.9% of the AS/HFA and 90.9% of the TD participants were from Germany, 6.1% of the AS/HFA and 3% of the TD participants were from Austria, and 6.1% of both groups were from Switzerland.

2.2 Measures

The *Values in Action Inventory of Strengths* (VIA-IS, Peterson et al. 2005a; German version: Ruch et al. 2010b) is a self-report questionnaire that assesses 24 character strengths (see Figure 1) by using a 5-point Likert-style items (from 1 = "very

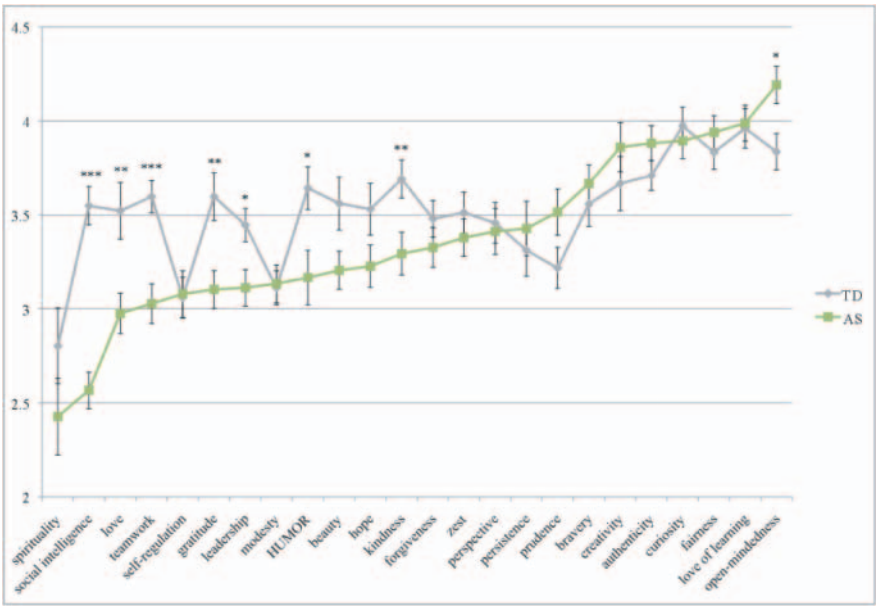

Fig. 1: Character strengths profiles of individuals with Asperger's syndrome and High Functioning Autism (AS/HFA) and of matched typically developing (TD) individuals (*N* in each group = 33), rank ordered according to the average scores of the AS/HFA group. *Note. Beauty = Appreciation of beauty and excellence.*

much unlike me" to 5 = "very much like me"). Each of the character strengths is covered with 10 items (240 items in total). A sample item for the subscale on humor is "Whenever my friends are in a gloomy mood I try to tease them out of it". Responses were averaged across the respective items to provide scores for each of the 24 character strengths. The internal consistencies were satisfactory in the present sample (Cronbach's α = .70–.95).

On the basis of the extensive study by Ruch et al. (2010b), we computed five factors of strengths (similarly to Peterson and Seligman 2004). The factor of *emotional strengths* included strengths such as zest, hope, bravery, humor, and love. The factor of *interpersonal strengths* (e.g., leadership, teamwork, kindness, forgiveness, fairness) combined all strengths related to justice and some of temperance and humanity. The factor of *strengths of restraint* included prudence, persistence, self-regulation, and honesty, etc. Factors representing *intellectual strengths* (e.g., love of learning, creativity, curiosity, open-mindedness) and *theological strengths* (religiousness, gratitude, and appreciation of beauty) included only strengths from one virtue domain.

The *Orientations to Happiness Scale* (OTH, Petersen et al. 2005b; German version: Ruch et al. 2010a) is an 18-item measure that consists of three scales reflecting the endorsement of engagement, pleasure, and meaning as routes to happiness: *engagement* (e.g., "I am always very absorbed in what I do"); *pleasure* (e.g., "Life is too short to postpone the pleasures it can provide"); and *meaning* (e.g., "I have a responsibility to make the world a better place"). Each item required the respondent to answer on a 5-point scale the degree to which the item applies ("1 = very much unlike me" through "5 = very much like me"). Scores were averaged for each subscale (Cronbach's α = .79 for life of pleasure, .82 for life of meaning, but only .52 for life of engagement, which is, however, comparable to Ruch et al. 2010a).

The *Satisfaction with Life Scale* (SWLS; Diener et al. 1985; the German version was used in previous studies, such as Peterson et al. 2007) consists of five items that measure the individual's evaluation of satisfaction with his or her life in general (e.g., "I am satisfied with my life," and "If I could live my life over, I would change almost nothing"). The answer format ranges from 1 = "strongly disagree" to 7 = "strongly agree". Responses were summed to provide a total life satisfaction score. The SWLS is one of the standard instruments for the subjective assessment of subjective well-being (see Pavot and Diener 1993). SWLS scores are typically skewed toward the right, meaning that most respondents are relatively happy, but in most samples there is nonetheless some variability in life satisfaction (Cronbach's α = .84).

The short German version (AQ-k: Freitag et al. 2007) of the *Autism-Spectrum Quotient* (AQ, original long version by Baron-Cohen et al. 2001) was used to check the clinical status of the individuals with AS/HFA. It assesses domains connected with the autism spectrum such as difficulties in social cognition and imagination. It consists of 33 items to be answered on a 4-point scale to express agreement. A score of 17 is seen as the cut-off for a diagnosis with autism (Cronbach's α = .74 for the AS/HFA group).

2.3 Procedure

An invitation email with a link to the online survey was sent to approximately 40 individuals on the autism spectrum. Several of the individuals had participated in previous studies (e.g., Samson and Hegenloh 2010). All of them were on the autism spectrum with either a diagnosis for AS (ICD-10: F84.5) or HFA. After the participants agreed to participate in the online survey, they were provided with a code that they were asked to enter at the beginning of the survey. This enabled matching with the obtained data. After filling out the questionnaires, the partici-

pants received immediate feedback about their strengths, life satisfaction and orientation to happiness. In total, 37 participants with AS/HFA filled out the questionnaires completely. Since four individuals with AS/HFA had an AQ-k score below 17, which is defined as the threshold for an autism diagnosis (Freitag et al. 2007), they were excluded from further analysis. The 33 individuals with AS/HFA (one participant had a HFA diagnosis) had an AQ-k of $M = 25.85$, $SD = 4.26$ (range = 17–31). From the robust data pool available at the University of Zurich (on $N = 13850$ data were available for the VIA-IS, OTH and SWLS), a control group was selected that was matched on gender, age, and education. Local ethical standards were fulfilled.

2.4 Statistical analysis

First, the character strength profiles were compared between the groups of AS/HFA and TD with a multivariate approach to repeated measures analysis of variances (ANOVA). Then, a posteriori tests were used to determine on which of the character strengths the two groups differed significantly. The same was done for the five factors of character strength (emotional, interpersonal, restraint, intellectual and theological). Life satisfaction and the subscales of orientation to happiness were compared by means of independent t-tests. Next, Pearson correlations were used to identify whether humor is related to the five factors, life satisfaction and orientation to happiness within the AS/HFA and TD group. One-tailed correlations were computed as the correlations were expected to be positive. The correlations were Fisher's z transformed to compare whether they were significantly different in the two groups.

3 Results

The averaged character strengths for each group were computed and rank ordered according to the strengths in the AS/HFA group to create character strength profiles (see Figure 1). Humor was amongst the 10 most prominent strengths in TD, in line with the studies by, for example, Peterson et al. (2007). However, in individuals with AS/HFA, humor was only in 18th position if the character strengths are rank-ordered. The five highest strengths in individuals with AS/HFA were open-mindedness, love of learning, fairness, curiosity, and authenticity. The lowest five were spirituality, social intelligence, love, teamwork, and self-regulation. In the TD group, the five most pronounced strengths were curiosity, love of learning,

open-mindedness, fairness, and authenticity. The TD group scored lowest on spirituality, self-regulation, modesty, prudence and persistence.

The multivariate approach to repeated measures ANOVA showed that the two groups had different character strengths profiles ($F[23,42] = 5.73$, $p < .001$). Analysis of differences on the 24 character strengths between the two groups revealed that individuals with AS/HFA score higher on *open-mindedness* ($t[64] = 2.57$, $p < .05$), and lower on *love* ($t[64] = -2.96$, $p < .01$), *kindness* ($t[64] = -2.61$, $p < .01$), *social intelligence* ($t[64] = -6.95$, $p < .001$), *teamwork* ($t[64] = -4.18$, $p < .001$), *leadership* ($t[64] = -2.54$, $p < .05$), *appreciation of beauty* ($t[64] = -2.04$, $p < .05$), *gratitude* ($t[64] = -3.04$, $p < .01$), and *humor* ($t[64] = -2.57$, $p < .05$). The two groups did not differ on the other character strengths.

The two groups had also different profiles on the five factors, as shown by the multivariate approach to repeated measures ANOVA ($F[4, 61] = 6.37$, $p < .001$). The analysis of the five factors revealed that AS/HFA scored lower on *emotional strengths* (e.g., zest, hope, bravery, humor, and love), *interpersonal strengths* (e.g., leadership, teamwork, kindness, forgiveness, fairness) and *theological strength* (see Table 1). Factors representing *intellectual strengths* (e.g., love of learning, creativity, curiosity, open-mindedness) and *strengths of restraint* (e.g., prudence,

Table 1: Means and standard deviations of humor as a character strength, orientation to happiness and life satisfaction in individuals with Asperger's syndrome and High Functioning Autism (AS/HFA) and of matched typically developing (TD) individuals (N in each group = 33)

	TD M (SD)	AS/HFA M (SD)	Statistics t
Humor (VIA-IS)	3.64 (.65)	3.16 (.83)	−2.57*
Orientation to happiness (OTH)			
Life of pleasure	3.46 (.77)	2.92 (.76)	−2.86**
Life of engagement	3.01 (.68)	3.16 (.47)	1.01
Life of meaning	3.01 (.96)	2.71 (.99)	−1.28
Satisfaction with life (SWLS)	4.16 (1.44)	4.22 (1.31)	.18
Factors: Character Strengths			
Emotion	3.55 (.58)	3.16 (.43)	−3.06**
Interpersonal	3.53 (.42)	3.31 (.40)	−2.20**
Restraint	3.35 (.50)	3.46 (.56)	.85
Intellectual	3.86 (.51)	3.98 (.45)	1.05
Theological	3.32 (.81)	2.91 (.63)	−2.28*

*Notes. VIA-IS = Values in Action Inventory of Character Strengths, OTH = Orientation to Happiness Scale, SWLS = Satisfaction with Life Scale, AS/HFA = Asperger's syndrome/High Functioning Autism, N = 33, TD = Typically developing individuals, N = 33; df = 64. *p < .05, **p < .01, ***p < .001.*

persistence, self-regulation, and honesty) showed no differences on individuals with AS/HFA and TD individuals.

Individuals with AS/HFA did not differ from TD individuals on life satisfaction (see Table 1). Regarding the orientation to happiness, individuals with AS/HFA scored significantly lower on life of pleasure, but there was no difference on life of meaning and life of engagement.

Finally, inter-correlations of humor with life satisfaction, orientation to happiness and the five strength factors were computed for each group (see Table 2). In both groups, humor correlated with life of pleasure, but humor correlated only in the TD group with life of engagement and life of meaning – which was significantly different to the AS/HFA group. Humor correlated also with life satisfaction in the TD group, which is in line with previous studies (Park et al. 2004; Peterson et al. 2007; Ruch et al. 2010a). Although humor did not correlate with life satisfaction in the AS/HFA group, this difference between the correlations of the two groups was not significant. In both groups, humor was also correlated with the emotional (even if humor was not taken into account for computing the emotional factor: $r = .72$, $p < .001$ for the TD group; $r = .32$, $p < .05$ for the AS/HFA group) and interpersonal factor. Only in the TD group, humor correlated with the intellectual strengths, theological strengths and strengths of restraint, but not in the AS/HFA group.

4 Discussion

This is the first study that focused explicitly on humor as character strength, and its relation to life satisfaction and orientation to happiness in individuals with AS/HFA. The aim was to examine the relationship between these concepts by using well-established measures developed within Positive Psychology.

In relation to our main research question, individuals with AS/HFA did not report humor as one of their important character strengths. This seems to be in contrast to recent studies that found either no differences or only marginal differences in joke and cartoon processing (e.g., Weiss et al. this issue). However, humor seems to be more than simple cartoon and joke appreciation: Humor assessed as character strength has a strong social component, is adaptive in nature, can be understood as world view and is strongly related to playfulness (Müller and Ruch 2011). These are the components that were described by Hans Asperger (1944) as "genuine" humor and that individuals with autism are less able to engage in or experience it. The present findings are also in line with a recent study that showed individuals with AS/HFA to score significantly lower on components

Table 2: Humor in relation to life satisfaction and orientation to happiness: Pearson correlations within individuals with AS/HFA and within TD individuals

		1	2	3	4	5	6	7	8	9	10
1	Humor (VIA-IS)	4	.50***	−.25	−.07	−.09	.59***	.39**	−.15	.04	.18
2	life of pleasure (OTH)	.44**	1	.00	−.07	.18	.11	.00	−.47**	−.17	−.12
3	life of engagement (OTH)	.42**	.71***	1	.37*	.14	.13	.09	.21	.43**	.28
4	life of meaning (OTH)	.44**	.42**	.44**	1	.11	.44**	.16	.11	.58***	.71***
5	life satisfaction (SWLS)	.33*	.41**	.47**	.53***	1	.12	−.11	.07	−.11	.07
6	Emotion factor (VIA-IS)	.80***	.44**	.64***	.56***	.57***	1	.55***	.41**	.51***	.64***
7	Interpersonal factor (VIA-IS)	.60***	.08	.14	.46**	.16	.58***	1	.21	.20	.42**
8	Restraint factor (VIA-IS)	.43**	.36*	.65***	.40*	.37*	.68***	.28	1	.43**	.21
9	Intellectual factor (VIA-IS)	.77***	.47**	.56***	.68***	.31*	.81***	.61***	.64**	1	.50***
10	Theological factor (VIA-IS)	.62***	.13	.31	.70***	.35*	.75***	.65***	.45**	.73***	1

*Notes. Correlations for the Asperger's syndrome/High Functioning Autism (AS/HFA) group (N=33) above the diagonal; correlations for the Typically developing (TD) group below the diagonal (N=33). 6–10 are the 5 factors of character strengths. VIA-IS = Values in Action Inventory of Character Strengths, OTH = Orientation to Happiness Scale, SWLS = Satisfaction with Life Scale, *p < .05, **p < .01, ***p < .001* (within-group). *Significant differences between the groups are indicated in colors: green p < .05, blue p < .01, red p < .001.*

of humor related to social communication and playfulness (i.e., individuals with AS scored very high on seriousness: see Samson et al., this issue).

While humor as a character strength was related to all five strength factors in TD individuals, it was only associated with emotional and interpersonal strengths in individuals with AS/HFA. This shows that humor is related to emotional and interpersonal strengths, but that the role of humor is more restricted in individuals with AS/HFA. Moreover, humor is associated with life of pleasure as one of the orientations to happiness in individuals with AS/HFA, but not to life of engagement and life of meaning. Furthermore, the two groups did not differ on life of engagement and life of meaning, but individuals with AS/HFA scored lower on life of pleasure. Contrary to our hypotheses, individuals with AS/HFA and TD individuals did not differ on satisfaction with life. Finally and importantly, humor correlated with life satisfaction in the TD group, but not in the AS/HFA group. This suggests that humor as character strength does not seem to play a major role in individuals with AS/HFA. Humor is related to pleasure as orientation to happiness in AS/HFA, but does not seem to contribute to life satisfaction.

4.1 Limitations

Despite the above-mentioned intriguing and promising results, the study suffers from certain limitations. First of all, it would be desirable to replicate the results with a bigger sample that is better characterized to correlate character strengths with symptom severity in the different domains of the autism spectrum (social communication deficits, sensory deficits or repetitive behavior). Furthermore, one could criticize that individuals with AS/HFA have difficulties in adequately reporting information about themselves, especially in the domain of emotional states (see Hill et al. 2004, Szatmari et al. 2008; Tani et al. 2004). However, Berthoz and Hill (2005) demonstrated that individuals with AS/HFA are able to respond to self-report questionnaires adequately. In addition, the present sample was high-functioning, which is associated with less difficulties in reporting about own mental and emotional states.

4.2 Future directions

As previously mentioned, other studies were able to show that other components of humor seem not to be affected in AS/HFA: individuals with AS/HFA or ASD do not differ in their enjoyment of slapstick or cartoon humor (e.g., Weiss et al., this issue) as long as the stimuli do not include social cognitive aspects such as false

beliefs (Theory of Mind humor: e.g., Samson and Hegenloh 2010). Joke and cartoon appreciation are also components of humor, but not assessed with the VIA-IS. One question that emerges here is whether humor understood as appreciation of verbal and visual puns and slapstick humor might be related to life satisfaction in individuals with AS/HFA, but not necessarily in TD individuals. This should be clarified in future studies.

Surprisingly, the two groups did not differ in life satisfaction, but in the associations between life satisfaction and other constructs: life satisfaction is significantly correlated to the emotional factor (which includes humor) in TD participants, but there is no correlation in the AS/HFA group (these correlations were significantly different, see Table 2). One question that becomes apparent from this study, is, what strengths actually lead to life satisfaction in individuals with AS/HFA. Further correlational analyses of our data showed that only *hope* correlated with life satisfaction in individuals with AS/HFA ($r = .38$, $p < .05$), whereas in TD individuals life satisfaction was positively correlated with *curiosity* ($r = .52$, $p < .01$), *perspective* ($r = .40$, $p < .05$), *bravery* ($r = .45$, $p < .01$), *persistence* ($r = .47$, $p < .01$), *authenticity* ($r = .37$, $p < .05$), *zest* ($r = .58$, $p < .001$), *love* ($r = .58$, $p < .001$), *kindness* ($r = .37$, $p < .05$), *gratitude* ($r = .47$, $p < .01$) and *hope* ($r = .60$, $p < .001$). This is in line with results from previous studies, for example, Peterson et al. (2007), who found the following character strengths to be associated with life satisfaction: zest, love, hope, gratitude, curiosity, and perseverance. Another important question that emerges from this study is what contributes in general to life satisfaction in individuals with AS/HFA. Knowledge about what activities, strengths, characteristics or abilities lead to life satisfaction would have important implications on trainings and treatments for individuals with AS/HFA. Further studies are necessary that take into account other measures (e.g., qualitative interviews) to understand in more detail what contributes to satisfaction with life in individuals with AS/HFA.

4.3 Conclusion

The present paper broadens the knowledge about humor in individuals with AS/HFA. While previous studies reported difficulties in humor appreciation (e.g., Baron-Cohen 1997; Emerich et al. 2003), several recent studies provided evidence that individuals on the autism spectrum are able to enjoy jokes and cartoons to a comparable extent than TD individuals, especially if they are based rather on slapstick humor and not on social cognition (e.g., Weiss et al. this issue). Nonetheless, humor extends beyond simply understanding and appreciating written jokes and drawn or animated cartoons: individuals with AS/HFA appear not to

use humor frequently understood as a positive and playful attitude towards life and as world view (e.g., to take life not too seriously), or as emotion regulation mechanism. The present study underscores the importance of distinguishing between different facets of humor and to define humor not only as the ability to process jokes and cartoons in order to understand humor and its role in individuals in the autism spectrum.

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Bionotes

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