



**COMPARATIVE INVESTIGATION ON LEVEL OF SENSATION SEEKING
AMONG TRAINABLE RETARDED CHILDREN WITH DOWN SYNDROME,
AUTISM AND NORMAL INTELLIGENCE CHILDREN**

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Abstract

Research on personality characteristics of individuals with Low Intelligence (LI) is quite few and controversial. This study investigates behaviors and reactions of children with Down Syndrome (DS) or Autism Disorder (AD) based on Zuckerman's Sensation Seeking (SS) Theory, because these two groups show the same patterns reported by high sensation seekers and low sensation seekers. This study is conducted on 9 to 12 years old boys including 37 boys with DS, 16 boys with AD, and 50 boys with normal intelligence (NI) to investigate their SS levels by Sensation Seeking Scale for Children (SSSC). MANOVA results indicated that groups' interaction was significant, and the mean differences in total SS for DS and NI children, and also AD and NI children, were significant; however, the mean difference between total SS scores for children with DS and children with AD was not significant. Also the mean difference between LI and NI children was significant. In conclusion, LI children's SS levels are lower than NI children. The total SS in children with DS and children with AD are lower than NI children but the total SS scores in children with DS and AD are almost the same.

Key Words: Mental Retardation; Down Syndrome; Autism Disorder; Sensation Seeking.

INTRODUCTION

Sensation Seeking (SS) is "a trait defined by the seeking of varied, novel, complex and intense sensations and experiences, and the willingness to take physical, social, legal and financial risks for the sake of such experiences" (Zuckerman, 1994, P.27). Like the other personality traits, individuals differ largely on SS. Research shows that SS needs heritage and biological readiness (Zuckerman, 1979), although some researchers emphasize on its cognitive and learning aspects (Moffitt et.al, 2006). In professional groups like sport teams or artists, SS may be emerge in assertive or risky behavior forms (Franques et.al, 2003; Rawlings, 2003; Zuckerman, 2007), however, these risky behaviors may set the stage for development of delinquency as well (Curcio et.al, 2013). In delinquent groups, SS may show up in some other forms of behaviors such as drug abuse (Stephenson & Palmgreen, 2001; Stephenson et.al, 2002; Yanovitzky, 2005), drinking problem (Ramadan & McMurrin, 2005; Yanovitzky, 2006), and antisocial behaviors (Romero et.al, 2001).

If any group member is a mental retarded, especially suffering Down Syndrome (DS) with characteristics like obeying (Sadock & Sadock, 2007), she/he may be abused easily by other members. In contrast, individuals with Autism Disorder (AD) usually avoid social communications (Sadock et.al, 2008), and as a result may be neglected and ignored. Therefore, these children show characteristics that perhaps make them prone to be considered as sensation seekers when they are not; and non sensation seekers when they are.

Interestingly SS in terms of behaviors and emotions seem to be complicated in mentally retarded children, for instance, while behavioral problems, delinquency, social problems, and isolation are frequently seen in children with DS (Susan Shur-Fen et.al, 2008); others recognize them as mostly calm, obeying, and passive with high avoidance from danger (Sadock & Sadock, 2007). Children with autism avoid social relationships and new situations (American Psychiatric Association (APA), 2000) and on the other hand sometimes act impulsive (Matson et.al, 2012; Matson & Dempsey, 2009).

Furthermore, some researchers believe that SS is positively correlated with intelligence quotient (Ripa et.al, 2001; Zuckerman, 1994), speed rate of information processing (Ball & Zuckerman, 1992), and creativity (de Vries et.al, 2009). According to these findings, it can be concluded that SS is expected to be high in intelligent people, and low in people with lower intelligence; however, Russo et.al (1991) did not find significant differences in intelligence level of 176 boys with a range of diagnoses including conduct disorder, attention deficit/hyperactivity disorder, and childhood anxiety disorder for scores on the Sensation Seeking Scale for Children (SSSC).

Moreover, on the biological side, researchers have found high levels of dopamine in AD people (Previc, 2007; Nakasato et.al, 2008). Interestingly high sensation seekers also have higher dopamine comparing low sensation seekers (Zuckerman, 2007). In addition, research indicates that the low blood serotonin level is a clinical symptom for DS diagnosis (Groner et.al, 1994), and serotonergic system in their frontal cortex shows dysfunctions (Gulesserian et.al, 2000); in contrast, high sensation seekers show lower serotonergic reactivity (Zuckerman, 2007). However, it needs to be mentioned that biochemistry of SS is much more complicated to be concluded simplistic. Dunn's Theory of Sensory Processing argues that sensation seeking quadrant is a combination of high threshold and active responding to environmental stimuli (Dunn, 2001). On the other hand, similar characteristics such as having high tolerance for severe environmental stimuli (Zuckerman, 2007) and tendency for receiving various sensory stimuli from environment (Arnett, 1991) are observed in high sensation seekers based on Zuckerman's SS theory (Roberti, 2004).

Putting these two theories together, it can be argued that there might be a relation between them conceptually. Investigations have been mostly focused on sensation seeking quadrant of Dunn's Theory of Sensory Processing; for example, Kern et.al (2007) in a study based on Theory of Sensory Processing on 103 AD subjects between 3 to 43 years old found that autistic individuals show lower sensation seeking in comparison to control group matched on age and gender. These findings are compatible with the de la Marche and colleagues' findings (2012) who reported that juveniles with AD have lower sensory sensation seeking than their normal sibling who themselves have lower sensory sensation seeking than the normal control group. Therefore, it seems that behaviors of DS and AD persons are not compatible with the recognized patterns of Zuckerman's SS theory, and demands further research when is getting applied to DS and AD individuals. As far as authors are aware there is not any investigation on this personality trait in DS and AD. The current study is going to conduct a research addressing SS trait based on Zuckerman's SS theory in two groups of children with DS and AD, comparison to normal intelligence (NI) children.

METHOD

Participants

This study is conducted on mentally retarded 9 to 12 years old boys with DS or AD and a group of NI boys. The DS group subjects (n=37) were collected from children at three "training and educating center for retarded children", and the DA group subjects (n=16) were collected from children at three "educating and rehabilitating center for autistic children" in Tehran, Iran. All diagnoses made base on Diagnostic and Statistical Manual of

Mental Disorders (DSM-IV-TR) (APA, 2000) by a clinical psychologist based on the mean score of three intelligence measures including Wechsler's Intelligence Scale for Children, Raven's Intelligence Scale for Children, and Goodenough Draw a Person Test. Intelligence levels of both groups were in the boundary of trainable to borderline, as retrieved from their educational files. Moreover, AD subjects were included if able to speak. The LI group (n=53) included DS and AD children. Children in NI group (n=50) were selected through a multi stage cluster sampling method. At first stage, 4 districts of Tehran city (3, 6, 15, and 22); then one primary school from each; and in third stage, two classes from each school were randomly selected. Finally, there were 12 to 15 volunteers from each class and their IQ levels were retrieved from the educational files, which were medium or higher. All three groups were matched on age and gender. The protocol of this study has received the approval of the Research Ethics Committee at Islamic Azad University, and after receiving, participants' parents' official consent, they completed sensation Seeking Scale for Children (SSSC). To make sure that participants understood all items, the items were read to them individually by researcher.

Measure

Sensation Seeking Scale for Children (SSSC) which is designed and standardized by Russo and colleagues in 1991 was applied to measure sensation seeking. The modified scale (1993) contains 26 A/B dichotomy items, and three subscales of Thrill and Adventure Seeking (TAS), Drug and Alcohol Attitude (DAA), and Social Disinhibition (SD). Russo et.al (1993) reported internal reliability of 0.83 for whole scale, 0.81 for TAS subscale, 0.72 for DAA subscale, and 0.67 for SD subscale. The SSSC is standardized on an Iranian sample (Shabani, 2011), which contains 20 items. Due to cultural and religious considerations, after scale designer's (Russo) permission and advice, the DAA subscale was omitted. The internal reliability of the Persian version is 0.70 based on Cronbach's alpha, and 0.87 for Kuder-Richardson method. The alpha coefficient for the subscales' reliability of TAS and SD are respectively 0.70 and 0.54. The alpha coefficient of whole scale was .70 for boys and .71 for girls. In current study the alpha coefficient for total SS, TAS and SD subscales were respectively 0.73, 0.68, and 0.56.

RESULTS

Statistical analyses were performed using Statistical Package for the Social Sciences (SPSS, version 17). Mean and (standard deviation) for all groups of DS, AD, LI, and NI are respectively 7.8 (3.56), 7.2 (1.63), 7.6 (3.1), and 9.8 (4.2).

Independent *t* test was conducted to compare LI children and NI children on SS while Levene's test for equality of variances was assumed. As it can be seen in table 1, the total scores of SS in LI subjects were significantly ($p < 0.01$) lower than that of NI subjects. The mean difference of SD subscale for LI and NI participants was statistically significant ($p < 0.0001$); however, there was no significant difference between these two groups for TAS subscale scores.

Table 1: Equality of Means in LI and NI children

	Sig. (2-tailed)	Mean Difference
Total SS	.002**	2.255
SD	.000**	1.128
TAS	.062	1.071

Significant at the 0.01 level

The significant group differences were tested by Multiple Analysis of Variances (MANOVA) test. The value of Wilks' lambda in groups' interactions was .19 which is significant [$F=2.9$, $df(2,100)$, $p < 0.0001$]. In order to determine the meaningfulness of each pair of groups, Scheffe post hoc was examined. These results are reported in table 2.

Table 2- Comparison for group mean differences between DS, AD, and NI groups

Dependant Variables	Groups		Mean Difference	Sig. Level
Total SS	NI	DS	2.06*	0.041
		AD	2.71*	0.041
	DS	AD	0.66	0.837
SD	NI	DS	0.92*	0.021
		AD	1.61**	0.001
	DS	AD	0.69	0.311
TAS	NI	DS	1.06	0.249
		AD	1.11	0.415
	DS	AD	0.05	0.998

Significant at the 0.05 level

Significant at the 0.01 level

Post hoc results revealed significant differences for total SS scores in NI and DS children, and also NI and autistic children ($p < 0.05$). The total SS mean difference for DS and AD groups was not significant.

As shown on table 2, a significant difference found for SD subscale scores between NI and DS groups ($p < 0.05$), and for NI and AD groups ($p < 0.01$). Mean difference of SD subscale scores of two DS and AD groups was not significant. The mean differences for TAS subscale scores of all three groups were not significant.

DISCUSSION

The current study was aimed to investigate SS in DS, AD, and LI children, and compare them to SS in NI children. The results indicated that SS in DS, AD, and LI children is lower than NI children. Lower SS level in LI children is compatible with the results of Ripa et.al, (2001) who found a positive association between SS and intelligence quotient. Also, Ball & Zuckerman (1992) found a mild positive association between intelligence and SS that supports our findings. In contrast, current results are not in agreement with Russo et.al (1991) that found no significant difference between conduct disorder, attention deficit/ hyperactivity disorder, and childhood anxiety disorder, or with control group on SS scores. Probably, this inconsistency may stems from the nature of the samples in different studies. Perhaps children with a variety of problems on DSM axis I are different with those who receive diagnosis on axis II.

It is suggested that the positive correlation between intelligence level and SS level in mentally retarded children is a better predictor than DS children's low-SS-behavior-pattern for SS; since, the cognitive skills such as creativity and high speed information processing which are seen in high sensation seekers (Ball & Zuckerman, 1992; de Vries et.al, 2002), are almost damaged in mentally retarded persons (Hallahan et.al, 2009). Given to the fact that there was no investigation on SS in DS children, observation of characteristics such as obeying and danger avoidance in low sensation seekers (Roberti, 2004), and DS children (APA, 2000; Sadock et.al, 2007), may help to shed light on the nature of low SS in DS children.

On the other hand, other findings (Kern et.al, 2006; de la Marche et.al, 2012) indicate that sensation seeking quadrant in autistic population is lower than that of NI population. The research on Zuckerman's theory of SS have shown that high SS is associated with tendency for receiving various sensory stimuli from the environment (Arnett, 1991), and showing high tolerance for severe environmental stimuli (Zuckerman, 2007). Thus, the mentioned results (Kern et.al, 2006; de la Marche et.al, 2012) which might be relatively near to those of present study are compatible. This finding also may suggest that autistic children, at least on some psychological features such as SS, are closer to mental retarded children than NI children in general; a suggestion that demands further research to tap it.

Two subscales of SS (SD and TAS) in both DS and AD children show lower levels of SS in these two groups in comparison with NI children. Since, children with DS are more calm and obeying (APA, 2000; Sadock & Sadock,



2007), then it is possible to be less assertive towards others and have lower SD than NI children. The low level of SD in autistic children is relatively understandable, because these children have limited social communication, and overall more susceptible to ignore their environment (Sadock et.al, 2008). Therefore, they may do not feel necessary to behave conventional or unconventional since are not expecting any social feedback. The findings of this study about TAS subscale do not show much difference between three groups. It seems that this subscale in DS, AD and LI individuals needs more considerations than the SD subscale.

The results of the present study are limited in terms of gender differences as sample includes only boys. Also, participants of the study were those children who had the minimum required capacity to be able to understand instructions and able to respond the items; this may impose further limitation to the external validity of the findings.

CONCLUSION

SS level is lower in LI children in comparison to NI children. The total SS and SD subscale in children with DS and children with AD are lower than that of NI children, but the total SS scores and SD subscale in children with DS and AD are almost the same. The levels of TAS subscale in all three groups do not show significant difference.

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Highlights

- ☒ Low intelligent children have lower SS than normal intelligent children
- ☒ Down syndrome children have lower SS than normal intelligent children
- ☒ Children with autistic disorder have lower SS than normal intelligent children
- ☒ Autistic and Down syndrome children comprise a similar group on SS