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## Examining the Sensory Profiles of At-Risk Youth Participating in a Pre-employment Program

### Abstract

The purpose of this study is to use Dunn's model of sensory processing to investigate the sensory profiles of youth participating in a community-based occupational therapy pre-employment program. The youth participants had been involved in the juvenile justice system and were placed on probation. The study analyzed data from the Adolescent/Adult Sensory Profile (AASP) questionnaires (Brown & Dunn, 2002) completed by 79 youth participants. Analysis of the participants' scores on the AASP showed statistically significant differences from the norm in two quadrants; the delinquent youth scored lower in Sensation Seeking and higher in Sensation Avoiding. The delinquent youth participants demonstrated a high prevalence of atypical sensory processing patterns. Implications for further investigation and practice are discussed.

### Keywords

sensory processing, at-risk youth, productive occupation

### Cover Page Footnote

The authors would like to acknowledge the OTTP's occupational therapists' dedication to their clients, and their continuous effort to pursue evidence-based best practices to support their youth clients.

### Credentials Display

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Interventions that target juvenile offenders represent a wide range of programs. These programs include: Judicial placements, which include detention, supervised intervention or probation, and unsupervised intervention, such as community service participation (Gatti, Tremblay, & Vitaro, 2009); medical treatments to address mental and behavioral disorders (Wills, 2011); drug treatment programs to address substance addiction and abuse (Henggeler, McCart, Cunningham, & Chapman, 2012); development of self-management skills, such as coping and anger management skills (Rohde, Jorgensen, Seeley, & Mace, 2004); and diversion programs, such as family and community integration, to prevent recidivism (Burraston, Cherrington, & Bahr, 2012). The primary focus of these intervention programs is to address identified risk factors contributing to the juvenile offenders' delinquency (Dixon, Howie, & Starling, 2005; Fazel, Doll, & Langstrom, 2008; D. Martin, Martin, Dell, Davis, & Guerrieri, 2008). Studies identify a high incidence of psychopathology as one of the various risk factors among juvenile offenders, and many youth are at risk for major depression and posttraumatic stress disorder (Dixon et al., 2005; Fazel et al., 2008; D. Martin et al., 2008). Other common risk factors associated with juvenile delinquency include youth's use of illegal substances, experiences of abuse, anti-social peer group affiliation, lack of positive peer and parental supports, low bonding to school, academic failure, low socio-economic status, and a poor living environment (Chew, Osseck, Raygor, Eldridge-Houser, & Cox, 2010; Chung, Mulvey, & Steinberg, 2011; Green, Gesten, Greenwald, & Salcedo, 2008; Nagin & Tremblay, 2001; Nederlof, Van der Ham, Dingemans, & Oei, 2010). Moreover, exposure among youth to multiple risk factors results in a higher incidence of delinquent behaviors and arrests (Green et al., 2008).

Occupational therapy practitioners have a long history of providing interventions to adolescents who are involved in the juvenile justice system (Piper & Le Grow, 1956; Faigel, 1975; C. V. Martin & Rash, 1978; Hardison & Llorens, 1988; DeForest, Watts, & Madigan, 1991; Farnworth, 2000; Gourley, 2000). Youth have received occupational therapy services across various contexts, including within an incarcerated setting and in the community when on probation. Occupational therapy has also been provided to juveniles in psychiatric hospitals as an alternative for incarceration (C. V. Martin & Rash, 1978). The existing literature reflects a broad range of occupational therapy theoretical perspectives. Earlier studies exemplify the rehabilitation frame of reference by emphasizing the need for occupational therapists to support youths' participation in a tutoring program in preparation for community re-entry to a school setting (Piper & Le Grow, 1956). Farnworth (2000) employed an occupational science perspective by qualitatively studying the time use and leisure occupations of young offenders in order to inform occupational therapy practice aimed at developing health-promoting leisure occupations for this population. DeForest et al. (1991) designed a study based on the Model of Human Occupation and suggested that making positive changes in delinquent youths' performance subsystem through a craft activity may positively influence the volitional subsystem. However, there is a paucity of recent literature documenting occupational therapy interventions targeting the juvenile offender population.

The Occupational Therapy Training Program (OTTP), a community-based program in San Francisco, CA, serves the juvenile offender population. In cooperation with the San Francisco Department of Children, Youth, and Their Families (DCYF), the occupational therapists (OTRs) of the OTTP provided pre-employment services to juvenile offenders who were on probation through the New Direction Employment Program (NDEP). The NDEP was a

delinquency deterrent program targeting youth who were involved in the juvenile justice system due to minor offenses such as excessive school truancy, fights, graffiti, petty theft, and joy-riding (taking their parents' car without permission). Based on information provided by the referral sources, the majority of participants in the NDEP were experiencing their first involvement with the juvenile justice system. Some youth had been detained for a day or two at the juvenile detention center, but the court placed most of them on probation following their arrests. The NDEP's scope of services included the OTRs administering pre-vocational assessments and providing vocational preparation training to groups of 4-6 youth participants. Each program session was held at the Juvenile Justice Center (JJC) for two hours a day, four days a week, for three weeks. At the conclusion of the program, each youth presented his/her personal portfolio (a summary of what the youth had learned through the NDEP interventions) to an audience, which included other youth participants and family members, probation officers, and the OTRs. The DCYF received a comprehensive written report about the youth in order to match the youth's identified skills and interests to employment opportunities. The DCYF then placed the youth in paid positions such as youth counselor, office clerk, and maintenance assistant.

Studies show that productive occupations such as paid employment are a useful means to deter at-risk youth from involvement in delinquent activities (Heinrich & Holzer, 2011; Geest, Bijleveld, & Blokland, 2011). Occupational therapists support the use of employment as a meaningful occupation that develops youth's self-identity and promotes their self-worth (Iannelli & Wilding, 2007). However, studies have identified risks associated with youth employment. Specifically, employment has been associated with an increased incidence of delinquent activities such as violence, substance abuse, and robbery when youth engage in paid employment for monetary incentives only without proper supervision, opportunities to acquire skills, and/or

personal meaningfulness (Apel, Bushway, Paternoster, Brame, & Sweeten, 2008). Therefore, youth deemed capable of successfully meeting vocational expectations need careful guidance and support to assure that the employment opportunities selected are meaningful and to provide the right level of challenge (Heinrich & Holzer, 2011; Iannelli & Wilding, 2007).

The OTTP practitioners considered the various characteristics and risk factors in their implementation of the NDEP program. Besides the aforementioned documented risk factors and characteristics, the OTRs also considered the youth participants' sensory processing preference as a potential element that might affect the youth participants' success in the employment program.

### **Sensory Processing and Delinquent Youth**

One of the most frequently used and researched approaches within occupational therapy is the sensory processing frame of reference (Schaaf & Davies, 2010). Ayres (1979) suggested that, "many juvenile delinquents were children with sensory integrative disorders that interfered with their success in school" (p. 58). However, there is a dearth of studies applying the sensory frame of reference to youth who are in the juvenile justice system. The only study in the occupational therapy literature, conducted by Fanchiang, Snyder, Zobel-Lachusua, Loeffler, & Thompson (1990), found that the delinquent-prone adolescents scored poorly in some aspects of the Sensory Integration and Praxis Tests (SIPT) in comparison to non-delinquent-prone adolescents. Fanchiang's study posed major limitations, though, as the SIPT, the primary outcome measure for this study, was not developed and normed for the adolescent population. In addition, the study did not consider the subjects' behavioral responses to sensations or individual sensory processing preferences.

A few studies from the behavioral sciences literature have suggested that adult and juvenile offenders exhibit an increased tendency for “sensation seeking” behaviors compared to people from the general population as measured by the Sensation Seeking Scale (SSS) (Herrero & Colom, 2008; Wilson & Daly, 2006). The SSS, a standardized personality scale developed by Zuckerman, Kolin, Price, and Zoob (1964), defined “sensation seeking” as the preference “for varied, novel, complex, and intense experiences and sensations, as well as by the disposition to engage in physical, social, legal, and financial risks only for the sake of the experience” (Herrero & Colom, 2008, p. 199). Herrero and Colom (2008) found that in comparison to the general population, adult criminal offenders scored higher significantly on the SSS, indicating an increased tendency to seek thrills, adventures, and new experiences; they were more disinhibited and susceptible to boredom. Wilson and Daly (2006) also found that a group of juvenile delinquents scored higher in SSS than a control group of high school students. However, the conceptualization of “sensation seeking” in the current literature may not fully capture the complexity of sensory processing or consider a broad continuum of individual behavioral responses to sensations as described by Dunn’s model of sensory processing (Dunn, 1997).

### **Dunn’s Model of Sensory Processing**

Building on Ayres’s theory, Dunn’s model (1997) incorporates concepts from neuroscience and behavioral science to elucidate how sensory processing abilities impact people’s daily lives. Dunn proposed that sensory processing patterns are expressed by the intersection of neurological thresholds, which could be high or low, and behavioral self-regulation strategies, which could be passive or active. Dunn identified four sensory processing patterns: 1) Low Registration: “Individuals tend to miss or take longer to respond to stimuli” (Brown & Dunn, 2002, p. 35); 2) Sensation Seeking: Individuals seek high intensity

environments and experiences; 3) Sensory Sensitivity: Individuals respond readily to stimuli and may experience distractibility or discomfort with intense stimuli; 4) Sensation Avoiding: Individuals are overwhelmed or bothered by stimuli that others would not find noxious. Dunn initially developed her theory to address the pediatric population but it has evolved to include applications to adolescents and adults. The Adolescent/Adult Sensory Profile (AASP), a norm-referenced standardized questionnaire, was developed (Brown & Dunn, 2002; Brown, Tollefson, Dunn, Cromwell, & Filion, 2001) and has been used to investigate the sensory processing of various adult populations (Engel-Yeger & Dunn, 2011; Jerome & Liss, 2005).

### **Purpose**

The purpose of this study is to use Dunn's model and the AASP to examine the sensory profiles of youth who participated in the NDEP program. Better understanding of the sensory profiles of juvenile offenders may be beneficial for developing and implementing best practices pertaining to intervention programs that serve this population.

### **Methods**

This exploratory pilot study retrospectively analyzed data from the AASP (Brown & Dunn, 2002) completed by clients of the OTTP's NDEP program. The Institutional Review Board of Samuel Merritt University approved this study.

### **Participants**

The participants in this study comprised a convenience sample of the OTTP adolescent clients who participated in the OTTP's NDEP program and completed an AASP between February 2009 and June 2010. Specific information regarding the delinquency and medical diagnoses of individual clients was not made available to the OTTP from the referral authority. Among the 79 participants who completed the AASP, 26 were female and 53 were male. The



participants' ages ranged from 14 to 17 years old with a mean age of 15.51. Ethnically, 37 participants were identified as African American, 24 as Hispanic, 12 as Asian, 3 as Arab, and 2 as Caucasian.

### **Measure**

The AASP (Brown & Dunn, 2002) is a 60 item self-administered survey that contains statements of an individual's response to various stimuli. The statements are categorized by different sensory systems such as "Auditory Processing" or "Touch Processing." For each statement, respondents select a frequency rating ranging from "Almost Never" to "Almost Always." The responses are scored according to four quadrants (Low Registration, Sensation Seeking, Sensory Sensitivity, and Sensation Avoiding). For each quadrant, normative cut scores determine a classification: 1) Much Less Than Most People, 2) Less Than Most People, 3) Similar to Most People, 4) More Than Most People, or 5) Much More Than Most People. For example, a classification of "Much More Than Most People" in Low Registration indicates that the respondent may have lower registration than most people or an atypical sensory profile. The AASP's classifications in and of themselves are *not* meant to "indicate at which point a particular pattern becomes problematic" (Brown & Dunn, 2002, p. 31). Rather, if an individual's scores fall out of the "Similar to Most People" range *and* the individual is experiencing challenges with participation in daily life activities, then the respondent's sensory processing pattern may be an occupational performance barrier. The utility of the AASP for assessing a broad range of clinical populations has been established (Johnson-Ecker & Parham, 2000). The reliability and validity of the AASP have been well-supported (Brown et al., 2001; Brown & Dunn, 2002; Chung, 2006).

## **Procedure**

Participants in the NDEP completed the AASP as part of a comprehensive battery of assessments. Participants completed the AASP in small group settings during routine occupational therapy sessions at the JJC in San Francisco. The OTRs provided the youth participants with instruction for completing the AASP in accordance with the “Specific Administrative Procedures” stated in the AASP User’s Manual (Brown & Dunn, 2002, p. 23). The researchers of this study were not present for the data collection. The OTRs scored each completed AASP. The statistical software SPSS was used for data analysis.

## **Research Questions and Data Analysis**

The research questions guiding this exploratory study were:

1. What is the classification distribution of the participants in each quadrant of the AASP?
2. Are the sensory processing patterns of the participants different from the AASP’s normative population?

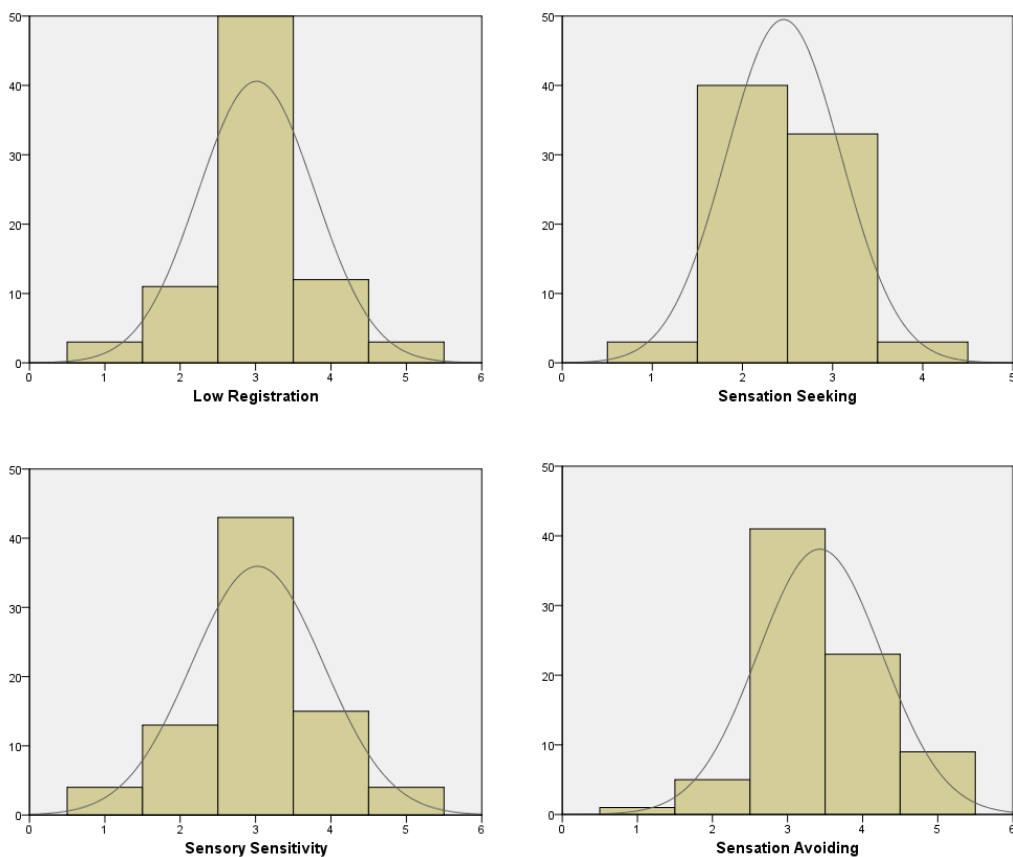
The AASP data were analyzed for: 1) frequency distribution of the five classifications in each quadrant, and 2) one-sample t-test comparing the mean quadrant raw scores of the participants to the AASP normative sample.

## **Results**

### **Classifications in the four quadrants**

Among the 79 participants who completed an AASP, 71, or 90%, scored outside of “similar to most people” (at least 1 standard deviation [SD] above or below the normative mean) in at least one quadrant, and 13, or 16.5%, scored 2 SD above or below the normative mean in at least one quadrant. Table 1 describes the classification distributions of the participants in the four quadrants, which is depicted by Figure 1. In Figure 1, the x-axis represents the five

classifications of the AASP: 1 = much less than most people (2 SD below the mean); 2 = less than most people (1 SD below the mean); 3 = similar to most people (mean); 4 = more than most people (1 SD above the mean); 5 = much more than most people (2 SD above the mean). The y-axis depicts the frequency count of the classifications. The classification of 3, similar to most people, has the highest frequency count in three quadrants: Low registration, sensory sensitivity and sensation avoiding. The classification of 2, less than most people, has the highest frequency count in the quadrant of sensation seeking.



*Figure 1.* Frequency distribution of the participants' classifications in the four quadrants. N = 79. Note: 1 = much less than most people; 2 = less than most people; 3 = similar to most people; 4 = more than most people; 5 = much more than most people.

Table 1

*Frequency Distribution of the Participants' Classifications in the Four Quadrants*

	Low Registration Count/%	Sensation Seeking Count/%	Sensory Sensitivity Count/%	Sensation Avoiding Count/%
1. much less than most people	3/3.8%	3/3.8%	4/5.1%	1/1.3%
2. less than most people	11/13.9%	40/50.6%	13/16.5%	5/6.3%
3. similar to most people	50/63.3%	33/41.8%	43/54.4%	41/51.9%
4. more than most people	12/15.2%	3/3.8%	15/19%	23/29.1%
5. much more than most people	3/3.8%	0/0%	4/5.1%	9/11.4%

*Note.*  $N = 79$ .

**Comparison of combined means to the norm**

Table 2 displays the participants' aggregated average AASP raw scores in comparison to the normative sample. There were statistically significant differences between the two groups: The delinquent youth's combined average scores were lower in Sensation Seeking and higher in Sensation Avoiding. Fourteen (18%) participants' scores were both lower than the norm in Sensation Seeking and higher than the norm in Sensation Avoiding.

Table 2

*Comparison of the Mean Raw Scores of the Participants (N = 79) Versus the AASP Normative Sample (N = 193)*

	Normative Sample M(SD)	OTTP Participants M(SD)	Mean Diff.	t.	Sig. 2 tails	Comparison to the Norm
Low Registration	33.57(7.66)	34.43(9.75)	0.860	0.785	.435	Above
Sensation Seeking	49.42(8.98)	41.24(7.931)	-8.179	-9.167	.000	Below*
Sensory Sensitivity	33.98(7.39)	34.25(8.896)	0.273	0.273	.786	Above
Sensation Avoiding	33.02(7.06)	38.01(7.642)	4.993	5.807	.000	Above*

*Note.* OTTP = Occupational Therapy Training Program.

\*  $p < 0.000$

### Discussion

Results from this study provide a baseline for further examination of the sensory processing trends among youth in the juvenile justice system. Ninety percent of the participants had scores in at least one quadrant that were more than one standard deviation from the mean normative score, which may suggest an atypical sensory processing profile from the normal population. In three quadrants (Low Registration, Sensory Sensitivity, and Sensation Avoiding), the most common classification of the participants was “similar to most people.” However, in the Sensation Seeking quadrant, more than half of the participants scored lower than the norm. There were also statistically significant differences between the scores of the participants and the

AASP's normative sample; the participants' scores were significantly lower than the norm in Sensation Seeking and higher than the norm in Sensation Avoiding.

The participants who scored below the norm in Sensation Seeking may experience less enjoyment from environmental stimuli and are unlikely to pursue sensory stimuli (Brown & Dunn, 2002). The high number of participants who had a low score in Sensation Seeking was particularly surprising. Previous studies had found delinquent youth to have the personality trait of higher sensory seeking tendencies and had suggested that the youths' need to seek sensory stimulations may have led them to delinquent behaviors (Herrero & Colom, 2008; Wilson & Davis, 2006). Dunn (2001), however, suggests that sensation seeking is prevalent in most people, whose curiosity and interest in the environment lead to exploration, learning, and enjoyment. Thus, individuals who score low in Sensation Seeking may lack exploration of or engagement with the sensory environment, in turn hindering their participation in daily activities (Brown & Dunn, 2002). Low sensation seeking behavior may also lead to less social bonding, fewer healthy outlets such as team sports, and less pleasure derived from daily activities, which could result in poor enrichment opportunities (McCarter, 2010). Delinquent youth have been found to have fewer community involvements and a lack of positive peer and parental support (Chew, et al., 2010). The lack of interests of these youth participants in exploring and finding pleasure in their environment warrants further investigation.

The significant number of participants who scored high in sensation avoiding may tend to have a low neurological threshold and high sensitivity in detecting sensory stimuli (Brown & Dunn, 2002; Dunn, 1997; Engel-Yeger & Dunn, 2011). These delinquent youths may be experiencing a mismatch between their sensory processing abilities, the demands of their daily life, and the behavioral norms of society. Sensation Avoiding is a strong predictor of state and

trait anxiety (Engel-Yeger & Dunn, 2011): therefore, individuals with a low neurological threshold may have a higher anxiety level and be less able to modulate their sympathetic fight or flight response when stimuli in their environments become too intense and inevitable (Schaaf, et al., 2010). Furthermore, the youth who had the combination of high sensation avoiding and low sensation seeking profiles may be less likely to seek sensory stimuli and more likely to avoid stimuli (Brown & Dunn, 2002). These youth may be particularly at-risk for social isolation and hyperreactivity to unwanted stimuli resulting in delinquent behaviors (Hsieh, von Eye, & Maier, 2010).

### **Limitations of the study**

The sample size of this study was relatively small, and the participants were a convenience sample from a single program in one geographic area. Thus, sampling limitations preclude generalization of the findings to broader contexts. There are also significant differences between the demographic status of the participants in this study (96% ethnic minority) and the normative population for the AASP. Of the 193 adolescents in the AASP's normative sample, 92% were Caucasian and most were living in the mid-western region of the United States. The normative sample may not be representative of the race, ethnicity, and geographic locations of the research participants.

### **Implications for Practice**

Low scores in sensation seeking and high scores in sensation avoidance may explain many at-risk youth's tendency for delinquent behaviors as a result of a lack of opportunities, a fear of exploring healthful environments, and undesirable behavioral responses to sensory environments that are too-stimulating for the youth (Brown & Dunn, 2002). Therefore, if the intention is to deter delinquent behaviors by engaging these youth in paid employment, it may be

helpful to carefully examine the youth's sensory profiles in order to match the youth with work environments and job activities that are compatible with their sensory processing preferences. For example, if a youth is known to have less tolerance to noise and visual chaos, a Boys and Girls Club may not be conducive to this youth's success, but perhaps a data entry position at a confined cubicle may promote a higher likelihood of successful vocational participation.

Employment may be a healthful occupation that provides this group of at-risk youth an opportunity for new experiences that are usually limited in their lives (Chew et al., 2010). Having knowledge of the youth's sensory processing preferences, the OTRs and the youth may identify more effective employment placements that are a compatible sensory match for the youth. In addition, the OTRs can assist the youth in developing skills to cope with and/or modify environments that may be uncomfortable to the youth.

There is a growing body of research in studying the therapeutic value of sensory processing awareness to successful engagement in meaningful occupations (Brown & Dunn, 2010; Hochhauser & Engel-Yeger, 2010). While most studies focus on children with disabilities, the merits of applying sensory processing knowledge to interventions that target at-risk youth warrant further investigations.



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