



Published in final edited form as:

J Autism Dev Disord. 2013 May ; 43(5): 1098–1105. doi:10.1007/s10803-012-1652-3.

The Use of the Autism Diagnostic Interview-Revised with a Latino Population of Adolescents and Adults with Autism

Sandy Magaña and

Department of Disability and Human Development, University of Illinois at Chicago, 1640 Roosevelt Road, Chicago, IL 60608, USA

Leann E. Smith

Waisman Center, University of Wisconsin-Madison, Madison, WI, USA

Sandy Magaña: maganas@uic.edu

Abstract

Research shows that Latinos are less likely to be diagnosed with autism than their non-Latino counterparts. One factor that may contribute to these differences is that autism diagnostic instruments have not been adapted for the Latino population. The present study compared scores from the Autism Diagnostic Interview-Revised for two groups: 48 Latino adolescents and adults with autism and a matched sample of 96 non-Latino Whites. There were no significant differences between the two groups in total impairments in social reciprocity or communication. However, lower levels of restrictive-and-repetitive behaviors were found among Latino adolescents and adults with autism compared to Whites. Findings suggest that there may be cultural equivalency in some domains, but others may warrant further exploration.

Keywords

ADI-R; Culture; Latino; Adolescents and adults; Autism

Introduction

Recent research indicates that Latinos are less likely to be diagnosed with autism than their non-Latino counterparts (Mandell et al. 2009; Palmer et al. 2010). Analyzing CDC data collected in 14 states, Mandell et al. (2009) found that Latino children were less likely to have an autism spectrum disorder (ASD) diagnosis in their health records than non-Latino Whites out of all children who met surveillance criteria for having an ASD. They also found that children whose maternal education was below a high school level were less likely to have a diagnosis of autism in their health records. In a study by Palmer and colleagues, school administrative data were examined for children with autistic disorder (they excluded other ASDs). Findings indicated that for every 10 % increase of Latinos in a district there was an 11 % decrease in a diagnosis of autism; these relationships persisted even after controlling for community level socio-economic variables (Palmer et al. 2010). Although these studies may not estimate the actual *prevalence* of the disorder among Latinos (Mandell et al.), they do provide evidence of differences *in rates of diagnosis* of ASD between Latinos and other groups.

Multiple factors may contribute to the differential rates of ASD diagnosis between Latinos and other groups including a lack of information about developmental disabilities and autism in Latino communities (Mercadante et al. 2009) and financial barriers in accessing diagnostic services (e.g., no insurance or funds; Shattuck and Grosse 2007). Further, diagnostic clinics are often unable to serve children of Spanish speaking parents because they do not employ bilingual professionals and because diagnostic instruments have not been culturally adapted for the Latino population, raising questions regarding validity (Williams et al. 2009). The focus of the present study was on the latter issue. We argue that validity studies need to be conducted on diagnostic instruments for different populations as a way of determining cultural equivalence of the instruments. As a first step towards determining cultural equivalence of one of the primary diagnostic instruments for autism, we compared item and summary scores of the Autism Diagnostic Interview-Revised (ADI-R) between Latino adolescents and adults with ASD and non-Latino White adolescents and adults with an ASD diagnosis.

Latinos in the US

Latinos represent the largest and fastest growing ethnic minority group in the US (Fry 2008), making them an important group to include in autism research and services. Although the US Latino population is heterogeneous and can include people with origins from Mexico, Central America, the Caribbean, and South America, there are many similarities across Latino groups (e.g., history of immigration to the US, Spanish language). These commonalities among Latinos have the potential to impact the standard assessment process and subsequently may contribute to low rates of autism diagnosis. Latino immigrants often are poorer, less educated, and less likely to have English as a first language compared to other groups (Barrio et al. 2008). Further, Latino immigrants may come from countries in which there is little public awareness and knowledge about developmental disabilities and limited resources to provide services (Mercadante et al. 2009). Therefore, specific disabilities and their symptom descriptions may be completely new concepts to some immigrant families. Taken together, these factors may make the current diagnostic process difficult, particularly when interviews are conducted in English. Notably, even Latinos who are English speaking and/or bilingual, and who were born in the US, may retain some cultural attributes (Almeida et al. 2009), raising questions of cultural equivalence for instruments which have not been adapted and validated with Latinos.

The Autism Diagnostic Interview-Revised and its Use with Latinos

The Autism Diagnostic Interview-Revised (ADI-R) is considered to be a gold standard instrument in the assessment and diagnosis of ASD. The ADI-R is a standardized, semi-structured, investigator-based interview for caregivers of persons with autism (Le Couteur et al. 1989; Lord et al. 1994). Using the ADI-R, the trained interviewer evaluates three functional domains: language and communication; reciprocal social interaction; and restrictive, repetitive and stereotyped behaviors and interests based on parents responses to open-ended questions. The ADI-R includes a scoring algorithm based on DSM-IV/ICD-10 criteria for autism that yields a classification of autism or non-autism. In order to achieve an instrument classification of autism, an individual must meet cut-offs in each symptom domain as well as onset criteria.

The official Spanish version of the ADI-R was translated using the back-translation method (Vrancic et al. 2002). Though this version of the ADI-R is currently in clinical use, the validity of the measure has not been established with English or Spanish speaking Latino populations. As cross-cultural researchers have noted (Bravo et al. 1993; Sanchez et al. 2006), the valid use of instruments across cultures requires more than language translation; a careful process of obtaining cultural equivalence is equally important. In other words, the

format, items, and wording in the Spanish ADI-R need to have the same meaning as the original version. In addition, the validity of the Spanish version of the ADI-R requires that the items function similar to the original ADI-R. That is, the total score of the algorithm in children of Spanish speaking parents should correctly identify autism and exclude non-autism individuals at similar rates as those reported in non-Latino samples. Beyond language, culture and contextual factors may account for differences in the validity of measures. There is emerging evidence that items may not serve the intended function with Spanish and English speaking Latino samples (Magaña and Smith 2006; Overton et al. 2007). For example, Magaña and Smith (2006) found that Latino adolescents and adults with autism had lower levels of restrictive and repetitive behaviors on the ADI-R than White adolescents and adults with diagnoses of autism. Overton et al. (2007) found that ADI-R results were not as sensitive to the level of social impairments among Latino children as clinical evaluations. Notably, these studies did not evaluate individual items from the ADI-R. Our study proposes to build on this limited research by providing a rigorous systematic comparison between Latino and White adolescents and young adults with ASD on each of the items in the ADI-R which will provide important preliminary data needed to assess the validity of the measure with Latino populations.

Developmental Expectation among Latinos

Disorders and symptoms that may be universally based can be expressed or interpreted differently by different groups because of variations in conceptions of the disorder or symptoms (Rutter and Nikapota 2002). Variations across cultures in how these disorders manifest may depend on socio-cultural context (e.g., poverty, poor housing, discrimination, education, and ethnic/cultural differences). Parents across distinct cultural backgrounds have different conceptions of what might be considered abnormal in the child's language, social and behavioral development, and may therefore respond to questions about these areas of development differently (Daley 2004). Despite accounts of how Latino cultural values may affect child developmental outcomes (e.g., Zuniga 1992), little empirical research has been conducted on this topic. The limited body of research on Latino parents has found that Mexican immigrant mothers of low socioeconomic status have a broader definition of what is developmentally “normal,” particularly with respect to language development (García et al. 2000). In contrast, they may have a lower threshold for atypical or limited social presentations as compared to other parents (García et al.). Compared to their European-American counterparts, Latina mothers place a greater emphasis on interpersonal social development and less emphasis on goals related to developing autonomy (Schulze et al. 2001). As a result of these differences, the phenotypic manifestations of social, communication and behavioral impairments on the ADI-R may exhibit a different pattern for Latinos.

The Present Study

In the present study, we compare ADI-R lifetime item and summary scores of Latino adolescents and adults with ASD to a well-matched sample of White adolescents and adults with ASD. Our research question in this study was: What are the differences in item and summary scores of the ADI-R between Latino and White adolescents and adults with ASD? This study is exploratory as the paucity of prior research in this area makes it difficult to generate hypotheses. It is possible that we may find Latino children to be more impaired on Reciprocal Social Interaction items and summary scores than White children based on the importance of social interactions in Latino families cited earlier (e.g., García et al. 2000; Schulze et al. 2001). Based on findings from García and colleagues that Latino mothers may consider a broader range of language development as ‘normal’, we may find that Latinos would have lower scores on communication impairment items than Whites. However, this work is still too preliminary to make directional hypotheses.

Methods

Participants

The present study consisted of 48 Latina mothers of adolescent and adult children with ASD and 96 non-Latino White mothers of similarly-aged children with ASD. The sample was drawn from two larger studies: (1) an ongoing, longitudinal study of adolescents and adults with ASD and their families, *Adolescents and Adults with Autism* (AAA Study; Seltzer et al. 2003, 2010), which was conducted in Wisconsin and Massachusetts (this study included a sub-sample of Latino families), and (2) a cross-sectional study of Latino families of children on the autism spectrum conducted in Wisconsin in which the first author was the PI, *Latino Families of Children on the Autism Spectrum*.

We used Time 1 data from the longitudinal AAA Study. The AAA Study recruited families through service agencies, schools, and clinics. For inclusion in the AAA Study, families had to have a child who was 10 years of age or older and who had received a diagnosis of ASD from a medical, psychological, or educational professional. Diagnosis of ASD was confirmed with the research-administered Autism Diagnostic Interview-Revised (ADI-R; Lord et al. 1994). Initially, 406 families of a son or daughter with ASD were recruited (including 9 Latino children). An additional sample of 25 Latino individuals with an ASD was recruited for inclusion in the AAA study, resulting in a total of 34 Latino cases.

The cross-sectional Latino Families Study recruited families through service agencies, schools, and support groups. For inclusion in the Latino Families Study, the main caregiver was of Latin American descent; families had a child between the ages of 2 and 22 years old and who had received a diagnosis of ASD from a medical, psychological, or educational professional. Diagnosis of ASD was confirmed using the ADI-R. Parents of fifty children/adults with ASD participated in the study.

The Latino cases from the longitudinal AAA study were pooled with those from the cross-sectional Latino Families Study. Of the total pooled Latino cases ($n = 84$), we selected cases who were 10 years of age and older for the present analysis which gave us a sample of 48 total Latino adolescents and adults with an ASD. We then randomly selected 96 White cases from the longitudinal AAA study and matched them to the 48 Latino cases on verbal fluency (verbal = 1), intellectual disability status (ID = 1) and age (adolescent (<22 years) = 1), as these factors may influence the manifestation of autism symptoms, particularly restricted and repetitive behaviors (Bishop et al. 2006; Richler et al. 2010). Additionally, it was important to match on verbal fluency and intellectual disability because there is some evidence that Latinos seek services when their children have more severe disabilities (Magaña et al. 2002) and indeed in our original sample, there was a higher percentage of Latino children who had ID, and were nonverbal.

Table 1 shows a comparison of the two groups on the demographic variables (verbal fluency, whether they had an intellectual disability, and age of the person with ASD) and other variables of interest: gender of the person with ASD, residential status (0 = co-residing with mother, 1 = not residing with mother), and maternal education (high school or less = 1, some college = 2, college = 3). Mothers in the White sample had significantly higher levels of educational attainment than mothers in the Latino sample, $F(1, 142) = 20.68, p < .001$. Children in the Latino sample were more likely to be co-residing with their mothers than children in the White sample, $\chi^2(1, N = 144) = 4.23, p < .05$. As such, maternal educational attainment and child residential status were included as covariates in all analyses.

In the Latino sample, 85 % of the mothers were foreign born and 69 % were interviewed in Spanish. The majority of mothers in the Latino sample were of Mexican (33.3 %) or Puerto

Rican (41.7) descent. The remaining 25 % were from the Caribbean, Central or South American countries.

Procedures

All participants were interviewed in their homes by interviewers who were trained by researchers certified in using the ADI-R for research purposes. All interviews were tape recorded. Inter-rater reliabilities between the interviewers and certified researchers averaged .88. For the Latino participants, interviews were conducted in the language of preference by bilingual, bicultural interviewers.

Measures

The ADI-R is a standardized, investigator-based interview conducted with a primary caregiver that is based on the International Classification of Diseases criteria for autism (ICD-10; World Health Organization 1992), and closely parallels the DSM-IV criteria (American Psychiatric Association 2000). The interviews in the present study included the 36 ADI-R items that comprise the ADI-R lifetime diagnostic algorithm. The interviewer codes behavioral descriptions given by the caregiver as 0 (no abnormality), 1 (possible abnormality), 2 (definite autistic type abnormality), and 3 (severe autistic type abnormality). For these analyses, scores of 3 were recoded to 2, as recommended by Lord et al. (1994). Items within each of the three domains, impairments in social reciprocity, impairments in communication, and repetitive behaviors and restricted interests were summed to create summary scores for each domain. The Spanish version of the ADI-R which was translated and back translated by Vrancic et al. (2002) was used for participants who preferred to be interviewed in Spanish.

Analysis

Separate analyses of covariance (ANCOVA) were conducted for individual items and summary scores in the three domains of the ADI-R (impairments in social reciprocity, impairments in communication, and repetitive behaviors and restricted interests). In each analysis, we controlled for maternal educational attainment and child residential status as these were different between groups. Means, standard deviations, and effect sizes (partial eta-squared) are reported in the tables. As a follow-up analysis, we also explored differences between the two groups in diagnostic classifications on the three ADI-R domains using Chi square analyses.

Results

The aim of the present study was to compare the lifetime ADI-R scores of adolescent and adult Latinos to a well-matched sample of non-Latino Whites. First, we examined differences in the domain of social reciprocity. There were no significant differences in level of total social reciprocity impairments between the two groups (see Table 2). We did find differences between the two groups on three individual social reciprocity impairment items; however, the directions were mixed. For example, Latinos were found to have a significantly higher level of impairment in direct gaze than their White same-age peers. In contrast, Whites were found to have significantly higher levels of impairment in friendship and appropriateness of social interactions than Latinos.

Next, we examined whether there were differences in impairments in the communication domain and found no significant differences between the groups in lifetime impairment of non-verbal communication for the summary score (see Table 3). There was only one significant difference between the two groups on non-verbal communication items: Latinos were found to have a significantly higher level of impairment in imitative social play than

Whites. We also examined scores on verbal communication items for the subset of the sample who were verbal; none of these contrasts were statistically significant at the .05 level.

Finally, we examined differences in restrictive and repetitive behaviors. We found that the Latino group had significantly lower levels of restrictive and repetitive behaviors based on the total scores relative to the White group (see Table 4). The Latino group also had significantly lower levels of restrictive and repetitive behaviors compared to the White group on some of the individual items including circumscribed interests, unusual preoccupations, and compulsions or rituals.

As a follow-up analysis, we investigated whether the Latino and White groups differed in their diagnostic classification based on ADI-R scores. We found that eight Latino adolescents and adults with autism did not meet the cut-off score for autistic disorder compared to only three White adolescents and adults (17 vs. 3 % of individuals), $\chi^2(1, N=144) = 8.32, p < .01$. In each of these cases, the adolescents and adults did not meet criteria in the repetitive behaviors domain. All adolescents and adults met cut-offs in the social reciprocity and communication domains. Even though the effect sizes for item scores were small to medium (partial eta-squares ranging from .03 to .06) in this study, these differences in diagnostic classification due to the repetitive behavior domain highlight the clinical significance of the observed item-level differences.

Discussion

The purpose of this paper was to compare summary and item lifetime scores from the Autism Diagnostic Interview-Revised (ADI-R) between Latino and non-Latino White adolescents and adults. This is a first step in determining whether the ADI-R serves the intended function of assessing autism similarly with Latino populations as with European and European American populations (de Bildt et al. 2004; Howlin et al. 2004; Le Couteur et al. 1989). Because Latinos are the largest minority group in the United States and are underrepresented in receiving autism diagnoses, determining whether diagnostic tools are valid with this population is of critical importance.

The present study had notable strengths in advancing our understanding of the cultural appropriateness of the ADI-R, a gold-standard instrument in assessing autism symptoms. We compared ADI-R scores for a sample of Latino adolescents and adults with ASD to a sample of White similarly-aged children with ASD. The two groups were matched on factors that might influence symptomatology (verbal ability, intellectual disability status, and age), creating a strong control group for the Latino sample. Further, although the two groups differed in levels of maternal education, which may be important with respect to understanding the concepts being conveyed in the interviews, we adjusted for levels of education in our analyses. We also adjusted for residential status which was significantly different between the two groups, with the Latino adolescents and adults being more likely to be living at home. Finally, immigrants and Spanish-speakers are often excluded from autism research and from access to comprehensive diagnostic services (Machalicek et al. 2008; Santarelli et al. 2001). The present study directly addressed this gap by including a Latino sample in which the majority of parents were foreign born and were interviewed in Spanish.

Overall, there were no significant differences in summary scores for the social reciprocity and communication domains between Latinos and non-Latino Whites. Further, the scores on most individual items in these domains were very similar between the two groups. Notably, three items in the social reciprocity domain (direct gaze, appropriateness of social

interactions, and friendships) and one item in the non-verbal communication domain (imitative social play) were significantly different between the groups, although the direction of relationships varied. Latinos were reported to have greater impairment in direct gaze and imitative social play, and *less impairment* in appropriateness of social interactions and friendships. We suggested that Latinos might be reported by their mothers as more impaired than Whites in social reciprocity items because of the importance of close social relationships in Latino families (Fuller and García Coll 2010) and because Latina mothers may be more concerned about the lack of social skills in their children with autism than non-Latina mothers (Schulze et al. 2001). The significant difference in direct gaze is consistent with this; however, the findings for the appropriateness of social interactions and friendship items were counter to this concept, as Latinos had lower scores (or less impairment) than non-Latino Whites. It is unclear whether these differences reflect fewer actual impairments among Latinos or whether Latina mothers simply have a different conception of friendships than non-Latina White mothers. Future research should investigate how Latina mothers conceptualize friendship and social impairment as well as how their parenting goals regarding social relationships may influence their children's social interactions and the development of friendships.

The most consistent pattern of differences between the Latino and White adolescents and adults in the present study was in the domain of restrictive and repetitive behaviors, with Latinos having a significantly lower level of impairment. As with the social impairment findings, it is difficult to determine whether these are actual differences in behaviors, or whether parent interpretation or understanding of the items may vary between the two groups. However, these differences do make a difference in diagnosis of autism as determined by the ADI-R. Despite the fact that all of the children had received a clinical diagnosis of ASD and had scores consistent with being on the spectrum, eight of the Latino children did not meet criteria for autistic disorder based on not meeting the cut-off for restrictive and repetitive behaviors. The three items in which the groups differed—circumscribed interests, unusual preoccupations, and compulsions or rituals—are complex concepts. Because many of the Latino mothers had low levels of education, the reading and vocabulary level of the instrument may make these concepts difficult for the investigator to convey during the interview. An instrument meant to be used with broad populations should always consider the educational level of end-users. Furthermore, the Latino sample was primarily Spanish speaking and the meaning of these items may not be well understood in the Spanish version of the ADI-R. For example, *hobby* (used in the question related to circumscribed interests) was not translated in the Spanish version due to the lack of an exact translation; instead the English word *hobby* was used in the Spanish version. Alternatively, it may be that the Latina mothers in our sample were more tolerant of these behaviors and did not believe them to be as problematic as White mothers.

Limitations of our study include the volunteer nature of our sample which may not be generalizable to other Latino and White groups as there is much diversity within groups among both Latino and White Americans. Related to this, the White sample was primarily of higher SES whereas the Latino sample was primarily of low SES. Although we adjusted for level of education as a proxy for SES, we cannot entirely rule out SES as an explanation for differences. Further, the sample size of the present study was small, which limits the power for the detection of effects; there may be other differences between the two groups in ADI-R items that we were unable to detect for this reason. The small sample size also limits the ability to examine within group differences. Another concern is that lifetime questions in the ADI-R are retrospective and require parents to remember back to when the child was between ages four and five. However, the ADI-R is a widely-used instrument that is considered valid for measuring symptoms in adolescent and adult samples (Taylor and Seltzer 2011; Seltzer et al. 2003) and we would not expect recall to vary by ethnicity.

Though there may be cultural differences in parental expectations and concerns of their children during the period of age four to five. Further research is needed in this area.

These findings highlight the need for validation studies for the use of the ADI-R among Latino populations. Ideally, future research should examine whether the results of the ADI-R match with a clinical diagnosis using a sample of Latino children with ASD and non-ASD developmental diagnoses, and should use qualitative methods to understand parental expectations and concerns of Latino children with ASD. An examination of results using and comparing both the English and Spanish versions would be useful as well.

To understand better why ASD is underdiagnosed among Latinos, future research is also needed to examine the relationships that access to information and awareness, language barriers, cost of diagnostic services and culture may have to this phenomenon.

In summary, the present study found that scores on the majority of items of the ADI-R were similar between Latino and White adolescents and adults with ASD, particularly in the communication and social reciprocity domains. However, significant differences were found in the domain of restricted and repetitive behaviors. These findings suggest that the ADI-R may function similarly for Latinos as it does for other groups; however, future research is needed to further validate the instrument with Latino populations, particularly with respect to the restrictive and repetitive behaviors category.

Acknowledgments

This research was supported by the National Institute on Aging (R01 AG08768; Seltzer, PI); School of Medicine & Public Health, University of Wisconsin-Madison; UW Institute on Race & Ethnicity; and the Waisman Center (P30 HD03352, Seltzer, PI). We wish to thank all of the families for their generous participation.

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Table 1
Demographic variables

	Latino (n = 48)	White (n = 96)
Verbal	52.1 %	52.1 %
Intellectual disability	41.7 %	41.7 %
Child age category (% adolescents)	85.4 %	85.4 %
Child age	15.94 (6.51)	18.06 (6.59)
Child gender (% female)	31.3 %	24.5 %
Child residential status (% co-residing)	89.6 %	75.0 %
Maternal education (% some college or greater)	37.6 %	76.1 %

Table 2
Lifetime impairments in social reciprocity domain and items

	Latino (n = 48)		White (n = 96)		F	Partial η^2
	M	SD	M	SD		
<i>Social reciprocity domain</i>	25.25	.63	25.27	.44	.00	.00
Direct gaze	1.91	.09	1.63	.06	6.78**	.05
Social smiling	1.66	.10	1.65	.07	.01	.00
Range of facial expressions	1.78	.10	1.59	.07	2.69	.02
Interest in people	1.90	.08	1.75	.05	2.23	.02
Response to approaches	1.64	.09	1.54	.06	.87	.01
Showing and directing (attention)	1.89	.07	1.81	.05	.82	.01
Offering to share	1.86	.06	1.93	.04	.87	.01
Seeking to share enjoy	1.83	.08	1.68	.06	2.30	.02
Use of other's body	1.25	.13	1.30	.09	.12	.00
Offers comfort	1.79	.08	1.82	.05	.12	.00
Quality of social overtures	1.74	.08	1.77	.05	.06	.00
Inappropriate facial expressions	1.09	.10	1.33	.07	3.40 [†]	.02
Appropriateness of social overtures	1.72	.06	1.90	.04	5.34*	.04
Friendships	1.30	.11	1.71	.08	8.89**	.06
Imaginative play with peers	1.90	.06	1.85	.04	.40	.00

Adjusted for maternal education attainment and child residential status

** $p < .01$;

* $p < .05$;

[†] $p < .10$

Table 3
Lifetime impairments in non-verbal communication domain/items and verbal communication items

	Latino (n = 48)		White (n = 96)		F	Partial η^2
	M	SD	M	SD		
<i>Non-verbal communication domain</i>	12.31	.30	12.57	.20	.49	.00
Pointing to express interest	1.62	.09	1.73	.06	1.02	.00
Conventional gestures	1.85	.07	1.91	.05	.42	.00
Nodding head	1.62	.09	1.73	.06	1.02	.01
Head shaking	1.52	.10	1.67	.07	1.51	.01
Spontaneous imitation of actions	1.81	.06	1.91	.04	1.73	.01
Imaginative play	1.92	.06	1.86	.04	.81	.01
Imitative social play	1.89	.07	1.72	.05	4.39*	.03
<i>Verbal communication^a</i>	(n = 23)		(n = 46)			
Stereotyped utterances/echolalia	1.25	.17	1.31	.12	.07	.00
Social verbalization/chat	1.32	.21	1.08	.14	.81	.01
Reciprocal conversation	1.00	.16	1.22	.11	1.16	.00
Inappropriate questions/statements	1.17	.19	1.18	.13	.00	.00
Pronominal reversal	.94	.20	1.08	.14	.29	.00
Neologisms/idiosyncratic language	.36	.14	.45	.09	.26	.00

Adjusted for maternal education attainment and child residential status

* $p < .05$

^a Verbal communication items are for verbal participants only

Table 4

Lifetime restricted and repetitive behaviors domain/items

	Latino (n = 48)		White (n = 96)		F	Partial η^2
	M	SD	M	SD		
<i>R&R behavior domain</i>	5.40	.38	6.67	.26	7.22 ^{**}	.05
Circumscribed interests	.65	.13	1.10	.09	7.63 [*]	.05
Unusual pre-occupations	.52	.13	.88	.09	4.82 [*]	.03
Compulsions/rituals	1.01	.13	1.41	.09	6.40 [*]	.04
Hand/finger mannerism	1.17	.13	1.25	.09	.20	.00
Other complex mannerisms	1.00	.14	.91	.10	.26	.00
Repetitive use of objects	1.11	.12	1.14	.08	.05	.00
Unusual sensory interests	.85	.10	.95	.07	.63	.00
Verbal rituals ^a	.94	.19	.94	.13	.00	.00

Adjusted for maternal education attainment and child residential status

* $p < .05$;** $p < .01$