Attention-Deficit/Hyperactivity Disorder Symptom Expression: A Comparison of Individual Age at Onset Using Item Response Theory

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ABSTRACT

Background: The *DSM-IV* age at onset criterion for attention-deficit/hyperactivity disorder (ADHD) has been a subject of debate. In *DSM-5*, the required age at onset (ie, the age by which impairing symptoms must have been present) has increased from 7 years to 12 years. The present study examined measurement properties of ADHD symptoms according to age at onset.

Method: Data were derived from the 2004–2005 National Epidemiologic Survey on Alcohol and Related Conditions, which included 34,653 US participants. Among participants with a lifetime *DSM-IV* diagnosis of ADHD (assessed using the Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV), we compared the psychometric properties of the 18 ADHD symptoms according to 3 categories of age at onset (≤ 7 years, > 7 and ≤ 12 years, and > 12 and ≤ 18 years). A 2-parameter item response model was used to estimate differential item functioning (DIF) between these groups.

Results: 364 participants with a lifetime *DSM-IV* diagnosis of ADHD had an age at onset ≤ 7 years, 252 had an age at onset > 7 and ≤ 12 years, and 148 had an age at onset > 12 and ≤ 18 years. In both dimensions of ADHD (ie, inattention and hyperactivity-impulsivity), there was no significant DIF between age at onset groups.

Conclusions: Expression of *DSM-IV* ADHD symptoms was not affected by age at onset in the 3 groups considered. This study provides psychometric support to the change in the age criterion introduced by *DSM-5* and further suggests that the age at onset criterion could be extended to 18 years without changing the psychometric properties of the ADHD symptoms.

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Attention-deficit/hyperactivity disorder (ADHD) is a childhood-onset behavioral disorder that is associated with a wide range of functional impairments[1] and has an estimated worldwide prevalence exceeding 5% in school-age children.[2] Impairing symptoms of ADHD have been estimated to persist in up to 65% of cases diagnosed in childhood.[3]

According to the *Diagnostic and Statistical Manual of Mental Disorders,* Fifth Edition (*DSM-5*),[4] an individual must present with symptoms of inattention and/or hyperactivity-impulsivity associated with some impairment before the age of 12 years, compared with 7 years in the previous version of the *DSM*. Indeed, almost as soon as *DSM-IV* was published, the ADHD age at onset criterion became a subject of intense debate.[5] Numerous authors have supported revising the current age at onset criterion by extending the upper limit to 12[5,6] and even 18 years,[1,7–12] mainly for 2 reasons. First, no study comparing subjects with a *DSM* diagnosis of ADHD and an age at onset of 7 years or less to those with an age at onset after 7 years has reported differences in terms of course, severity, or treatment response.[5] Second, prospective studies have highlighted that a substantial proportion of ADHD subjects make errors in reporting the age at onset of ADHD. In fact, previous studies[12,13] suggest that nearly one-half of the ADHD participants with an age at onset of 7 years or less reported an age at onset after 7 years when reassessed retrospectively. Thus, extending the age at onset criterion would limit the risk of retrospective recall and reduce false-negatives.[5] However, the psychometric properties of the ADHD symptoms might depend on the age at onset. It is therefore critical to generate empirical evidence to support the extension of the age at onset to 12 years[4] or even 18 years, as previously suggested.[1,7–12] Therefore, in this study, we considered the following ages at onset: ≤ 7 years, > 7 years and ≤ 12 years, and > 12 years and ≤ 18 years. For ease of reference, we will indicate these ages at onset as early age at onset (EAO), late age at onset (LAO), and very late age at onset (VLAO), respectively, while recognizing that this is non-official labeling.

In the present study, we used an item response theory (IRT)–based approach that has been conducted in various studies to determine the psychometric properties of *DSM-IV* symptoms of several mental disorders.[14–16] A 2-parameter IRT model provides information regarding the point on a latent trait at which an item has a 50% probability of endorsement (item severity parameter) and how rapidly an item's probability of endorsement changes across the latent trait (item discrimination parameter). Advantages of using an IRT-based approach over other statistical methodologies include the possibility of examining the likelihood that a particular symptom will be endorsed at a particular level of severity. Controlling for overall symptom severity among groups is critical because it is unclear whether any differential symptom expression reported in the literature[5] is due to true phenomenological differences

between age at onset groups or whether such differences are reflective of greater overall symptom severity in one group versus another.

With the use of a large nationally representative sample, the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), our aim was to compare item severity and discrimination parameters (ie, differential item functioning [DIF]) of ADHD symptoms between the EAO and LAO groups and between the EAO and VLAO groups along 2 latent ADHD traits (inattention and hyperactivity-impulsivity). We hypothesized that there is no significant difference in the psychometric properties of *DSM-IV* ADHD symptoms between age at onset groups.

Clinical Points

- This study provides psychometric support to the change in the age at onset criterion introduced in *DSM-5* and further suggests that the age at onset could be extended to 18 years without modifying the psychometric properties of attention-deficit/hyperactivity disorder symptoms.
- Considerations beyond these statistical properties should be taken into account before considering further modifications of the maximum age at symptom onset.

METHOD

NESARC Sample

Data were drawn from the 2004–2005 NESARC, the second wave that followed the Wave 1 NESARC, conducted in 2001–2002 and described in detail elsewhere.[17,18] The Wave 1 NESARC was a nationally representative survey of the population of the United States conducted by the US Census Bureau under the direction of the National Institute on Alcohol Abuse and Alcoholism.[19] The target population included the civilian noninstitutionalized population, aged 18 years and older, residing in the United States. Face-to-face personal interviews were conducted with 43,093 individuals. The overall survey response rate was 81%. Blacks, Hispanics, and young adults (aged 18–24 years) were oversampled[19] because these groups have been underrepresented in previous comorbidity surveys in the United States.[17] Data were weighted at the individual and household levels to adjust for oversampling and nonresponse on demographic variables and to be representative of the US civilian population based on the 2000 census. Excluding respondents not eligible for the Wave 2 interview (eg, because they were deceased or were mentally or physically impaired), the Wave 2 response rate was 86.7%, reflecting 34,653 completed Wave 2 interviews.[20] The cumulative response rate at Wave 2 was 70.2%. As in Wave 1, the Wave 2 NESARC data were weighted to reflect design characteristics of the NESARC survey and to account for oversampling.[20] These weights were not used in the current analyses. The research protocol, including written informed consent procedures, received full ethical review and approval from the US Census Bureau and the Office of Management and Budget.[17,18]

ADHD Clinical Assessment

ADHD diagnosis was assessed according to the *DSM-IV* criteria (except the age at onset criterion, which was set at 18 years for the purpose of this study) by using the Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV). This instrument is a valid and reliable fully structured diagnostic interview designed for use by professional interviewers who are not clinicians.[18] Specifically, participants were asked 20 symptom questions operationalizing the 18 *DSM-IV* ADHD criteria.[21] Consistent with *DSM-IV* criteria, lifetime and childhood AUDADIS-IV diagnosis of ADHD required the respondent to meet the symptom threshold of 6 or more *DSM-IV* symptoms of either inattention or hyperactivity-impulsivity or both that have persisted for at least 6 months to a degree that the symptoms interfere significantly with social, school, or work functioning. Test-retest reliability for *DSM-IV* ADHD was good ($\kappa = 0.71$).[22] Internal consistency reliability of the ADHD symptom items was excellent (Cronbach $\alpha = 0.89$).[22]

Data Analysis

We first converted the 20 questions corresponding to the diagnostic criteria of ADHD into the 18 items following *DSM-IV* criteria. The 2 questions "often very active when not supposed to be" and "often feel restless" were converted into 1 criterion, as were the items "often interrupt people" and "often interrupt activities that had already started." Comparisons of the prevalence of each symptom across age at onset groups were performed using χ^2 tests. Second, we conducted confirmatory factor analyses in both dimensions of ADHD and in the 3 age at onset groups separately to determine if the symptoms met the unidimensionality assumption. Factorial analyses were calculated using the Mplus statistical software program.[23] Because ADHD symptoms are assessed as 2 separate dimensions in the *DSM* (ie, inattention and hyperactivity-impulsivity), all analyses in the present study were performed separately for these 2 dimensions.

Item Response Theory

A 2-parameter IRT model was conducted on each dimension separately (ie, inattention and hyperactivity-impulsivity) and on each age at onset group.[24] The IRT model estimates parameters describing the relationship between the probability of an item response (eg, endorsement of the item "easily distracted from play or work") and an individual's level of the latent trait (in this example, the inattentive dimension). The 2-parameter IRT model estimates (1) a severity parameter to determine the point along the latent trait at which a symptom has a probability above 50% to be endorsed[25,26] and (2) a discrimination parameter to describe how rapidly the probability of observing the item changes across increasing levels of the latent trait[15] (ie, the slope of the item response function). The severity parameter is reflective of the likelihood that a given symptom will occur at a given severity level, whereas the discrimination parameter allows identification of whether a given symptom is a good or poor indicator of the latent trait.[27] Once IRT parameters for

Table 1. Prevalence of *DSM-IV* ADHD Symptoms in the Early (≤ 7 years), Late (> 7 and ≤ 12 years), and Very Late (> 12 and ≤ 18 years) Age at Onset Groups[a]

DSM-IV Symptom	Early Age at Onset (n = 364), %	Late Age at Onset (n = 252), %	Very Late Age at Onset (n = 148), %	χ^2_2	*P* Value[b]
Inattention dimension					
Lose things	47.79	48.61	47.59	0.05	.974
Trouble paying attention	84.62	77.38	79.05	5.62	.060
Forgetful	69.78	65.87	67.12	1.11	.576
Not listen	86.54	79.76	77.70	7.81	.020
Lose interest in work	75.00	71.83	66.22	4.08	.130
Easily distracted	89.84	86.11	83.11	4.78	.092
Avoid things requiring concentration	84.89	83.73	77.70	3.97	.137
Difficulty organizing tasks	58.40	60.96	59.46	0.40	.818
Leave homework undone	81.04	84.92	79.05	2.54	.280
Hyperactivity-impulsivity dimension					
Very active/feel restless	85.67	79.76	80.41	4.31	.116
On the go	74.52	74.90	74.83	0.01	.993
Trouble doing quiet activities	60.22	59.00	59.00	0.95	.622
Fidget or squirm	81.94	75.40	74.32	5.44	.066
Get up from seat	63.81	59.76	47.30	11.91	**< .003**
Extremely talkative	63.54	63.75	55.41	3.42	.181
Blurt out answers	58.29	58.40	55.78	0.32	.853
Interrupt people or activities	63.74	30.71	50.00	8.34	.015
Difficulty awaiting turn	52.49	45.24	41.89	5.90	.052
Subtype					
Inattentive	34.58	34.43	42.25	5.18[c]	.27
Hyperactive-impulsive	21.04	23.36	23.94		
Combined	44.38	42.21	33.80		

[a]Percentages are unweighted.
[b]Significant *P* value (adjusted using the Benjamini-Hochberg procedure) indicated in bold.
[c]$df = 4$.
Abbreviation: ADHD = attention-deficit/hyperactivity disorder.

each item were estimated, Spearman rank order correlation coefficient was used to evaluate the ordering of the severity and discrimination parameters between the different groups, for each latent trait.

Differential Item Functioning

DIF analysis was conducted using the software IRTLRDIF version 2.0[28] to examine whether the ADHD symptom function was similar between the different age at onset groups, following a method previously described by McBride et al.[29] The DIF approach compares 2 groups (the reference group and the focal group) and utilizes information about the measurement properties of the set of items simultaneously.[14] Concerning the current analyses, the focal groups comprised individuals with LAO and VLAO, whereas the reference group included those with EAO. Analyses were conducted iteratively to determine which item function differed across age at onset groups and which item was DIF free. To explore for DIF, the discrimination and severity parameters for each age at onset group were constrained to be equal across all 9 criteria of each ADHD dimension. For each item, the likelihood ratio test statistic (G^2 test; $df = 2$) was calculated. The aim was to compare the model with the parameter estimates constrained to be equal between the reference and the focal group with a model that frees the parameters to be estimated separately between the 2 groups. If the omnibus test was significant, likelihood ratio tests (G^2 test; $df = 1$) were then conducted to identify if the DIF was present in the discrimination, the severity, or both parameters of the item. Due to multiple comparisons implemented in this study, we set α at .05 and used the Benjamini-Hochberg procedure to adjust *P* values for all tests with 1 degree of freedom.[30,31] Small differences in severity between groups could be statistically significant but may not be clinically meaningful.[14] Thus, it was decided a priori that only differences higher than 0.25 in symptom severity, which can be interpreted as one-quarter of the "standard unit difference between the value of the (underlying) trait necessary to have a 50-50 chance of responding positively in one group compared to another,"[32(pp405–406)] would be considered as clinically meaningful. Minimum sample size for DIF analyses is usually considered in the range of 100–200 subjects per group.[33] On the basis of a simulation study, Scott et al[34] recommended a minimum of 200 participants per group to ensure adequate performance (ie, 80% power). Finally, the test information function (TIF) and the standard error of measurement (SEM; equal to the inverse square root of the TIF) were estimated in each group and on each latent trait. The TIF is a graphic representation of the total quantity of information yielded by a set of items at each latent trait level. The SEM is related to the reliability of the measurement (the SEM is equal to the square root of 1 minus reliability; eg, a SEM of 0.55 is equal to an internal consistency of 0.70).[35] The TIF and the SEM represent the information and precision of a set of items across different levels of a latent trait.

Table 2. Fit Statistics for the Unidimensional Model in the Early (≤ 7 years), Late (> 7 and ≤ 12 years), and Very Late (> 12 and ≤ 18 years) Age at Onset Groups and in Both Dimensions of ADHD (inattention and hyperactivity-impulsivity)

	Early Age at Onset (n = 364)		Late Age at Onset (n = 252)		Very Late Age at Onset (n = 148)	
Fit Indices	Inattention Dimension	Hyperactivity-Impulsivity Dimension	Inattention Dimension	Hyperactivity-Impulsivity Dimension	Inattention Dimension	Hyperactivity-Impulsivity Dimension
χ^2 Test of model fit						
χ^2	75	193	63	92	89	65
Degrees of freedom	27	27	27	27	27	27
P value	< .001	< .001	< .001	< .001	< .001	< .001
Comparative fit index	0.93	0.90	0.91	0.96	0.82	0.93
Tucker-Lewis index	0.91	0.86	0.89	0.95	0.76	0.91
Root mean square error of approximation	0.07	0.13	0.07	0.10	0.12	0.10

Abbreviation: ADHD = attention-deficit/hyperactivity disorder.

Table 3. Differential Item Functioning for ADHD Symptoms in the Early (< 7 years) vs Late (> 7 and < 12 years) and Early vs Very Late (< 18 years) Age at Onset Groups[a]

	Early Age at Onset (n = 364)			Late Age at Onset (n = 252)			Very Late Age at Onset (n = 148)		
DSM-IV Symptom	Severity Parameter	Discrimination Parameter	G^2_2	Severity Parameter	Discrimination Parameter	G^2_2	Severity Parameter	Discrimination Parameter	
Inattention dimension									
Lose things	0.13	1.03	1.7	−0.10	1.18	2.5	−0.13	1.55	
Trouble paying attention	−1.25	2.44	5.9	−0.88	4.05	0.7	−1.11	3.32	
Forgetful	−0.63	2.22	0.8	−0.62	2.82	0.8	−0.75	2.30	
Not listen	−1.68	1.51	3.3	−1.43	1.40	2.9	−1.53	1.22	
Lose interest in work	−1.17	1.17	0.7	−1.32	0.92	2.9	−1.20	0.77	
Easily distracted	−2.31	1.15	1.1	−2.21	1.05	1.9	−2.15	0.99	
Avoid things requiring concentration	−1.42	1.77	5.8	−2.32	0.86	1.2	−1.37	1.51	
Difficulty organizing tasks	−0.31	1.39	3.7	−0.63	1.19	3.3	−0.66	1.22	
Leave homework undone	−1.38	1.38	7.3	−2.62	0.78	1.4	−1.79	1.05	
Hyperactivity-impulsivity dimension									
Very active/feel restless	−1.31	2.38	0.9	−1.16	2.67	0.9	−1.20	3.17	
On the go	−0.92	1.61	3.2	−1.02	2.03	3.6	−1.35	1.32	
Trouble doing quiet activities	−0.42	1.19	0.7	−0.57	1.18	0.6	−0.56	1.23	
Fidget or squirm	−1.12	2.15	0.8	−1.06	1.97	2.5	−0.95	3.40	
Get up from seat	−0.43	2.20	0.3	−0.40	2.04	5.9	−0.17	1.54	
Extremely talkative	−0.49	1.53	1.3	−0.59	1.73	0.1	−0.49	1.65	
Blurt out answers	−0.24	2.16	1.4	−0.36	1.82	4.3	−0.51	1.67	
Interrupt people or activities	−0.50	1.61	0.8	−0.53	1.33	2.2	−0.29	1.52	
Difficulty awaiting turn	−0.08	1.79	3.3	0.13	1.97	1.7	−0.08	2.63	
Dimension	Latent Trait Mean (SD)			Latent Trait Mean (SD)			Latent Trait Mean (SD)		
Inattention	0.07 (0.97)			−0.03 (0.99)			−0.12 (1.08)		
Hyperactivity-impulsivity	0.08 (1.00)			−0.02 (1.03)			−0.17 (0.94)		

[a]Differences between groups were evaluated using tests with *df* = 1. All *P* values for tests with *df* = 1 adjusted using the Benjamini-Hochberg procedure were nonsignificant. The G^2 test with *df* = 2 evaluates differences between the age at onset ≤ 7 years group and the other groups in both severity and discrimination parameters.

Abbreviation: ADHD = attention-deficit/hyperactivity disorder.

RESULTS

Sample

Of the 807 individuals with a lifetime *DSM-IV* diagnosis of ADHD at Wave 2, we identified 364 participants (45.1%) with an EAO, 252 (31.2%) with an LAO, and 148 (18.3%) with a VLAO. Data on age at onset were missing for 43 participants (5.3%) with a lifetime diagnosis of ADHD.

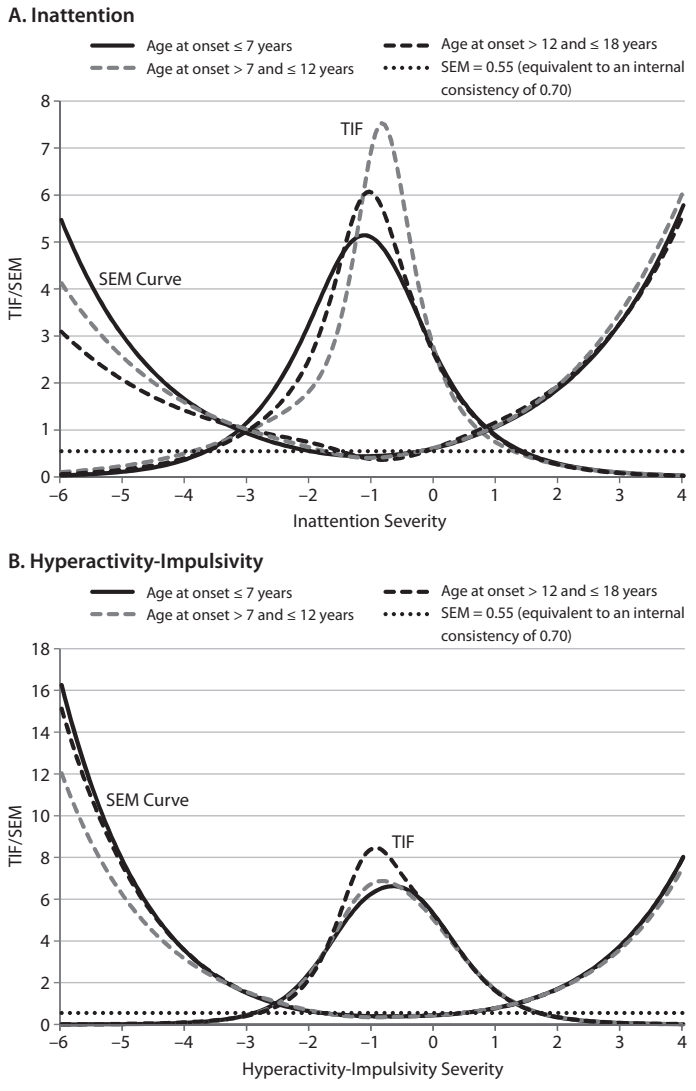
Endorsement Rates

The endorsement rates of all symptoms of ADHD were greater than 30.7% in each group (Table 1). Using the Benjamini-Hochberg procedure, *P* values for χ^2 tests comparing prevalence rates among groups were found to be nonsignificant except for the item "get up from seat" (63.81% in EAO, 59.76% in LAO, and 47.30% in VLAO; *P* = .0026). The endorsement rates were notably different between the EAO and VLAO groups (χ^2 test = 13.69; *P* = .002; χ^2 test comparing LAO and VLAO = 6.44; *P* = .04).

Factor Analyses

Confirmatory factor analysis was performed to examine the dimensional properties of the symptoms of ADHD in both dimensions of ADHD symptoms separately (Table 2). For both dimensions and the 3 age at onset groups, the χ^2 values were significant. However, the χ^2 statistic is known

Figure 1. Test Information Function (TIF) and Standard Error of Measurement (SEM) for the (A) Inattention and (B) Hyperactivity-Impulsivity Dimensions in the Early, Late, and Very Late Age at Onset Groups



to be highly sensitive to large sample sizes and may have overestimated the lack of fit of the structural model in this study.[36] The other fit indices (comparative fit index, Tucker-Lewis index, and root mean square error of approximation) indicated an adequate fit to the data.

IRT Item Parameters

The 2-parameter IRT models were conducted on 2 separate latent traits corresponding to the *DSM-IV* dimensions, inattention and hyperactivity-impulsivity (Table 3).

IRT analysis of the inattention dimension. We found no significant DIF on IRT parameters. The ranking of IRT parameters was similar between EAO and LAO groups (Spearman correlation coefficients were 0.82 for severity parameters [differences of rank (dor) < 4] and 0.63 for discrimination parameters [dor > 3 only for the items "lose things" (dor = 4) and "avoid things requiring concentration" (dor = 5)]) and EAO and VLAO groups (Spearman correlation coefficients were 0.93 for severity parameters [dor < 4] and 0.53 for discrimination parameters [dor > 3 only for the item "lose things" (dor = 6)]).

IRT analysis of the hyperactivity-impulsivity dimension. There was no significant DIF on IRT parameters. Spearman correlation coefficients were 0.92 and 0.68 for severity parameters and 0.73 and 0.65 for discrimination parameters, for EAO versus LAO and EAO versus VLAO, respectively. Differences of IRT parameters rank were < 4, except for the discrimination parameters of the item "get up from seat" for EAO versus VLAO (dor = 4).

Test Information Function

The TIF and the SEM for the latent traits of both the inattention and hyperactivity-impulsivity dimensions are presented in Figure 1. For both latent traits, the SEM curves indicate that the measurement in the range for which there was acceptable SEM (ie, SEM < 0.55) was similar across groups.

DISCUSSION

The present study sought to examine measurement properties of ADHD symptoms according to age at onset. The endorsement rates of the symptoms of ADHD were not significantly different across age at onset groups except for the symptom "get up from seat" (hyperactivity-impulsivity dimension), which was more frequent in participants with an EAO than in those with a VLAO. This result could be accounted for by the fact that the EAO group showed a significantly higher level of the latent trait hyperactivity-impulsivity than the VLAO group (Wald test = 6.95; $P = .009$). Another explanation could be that this item performs differently in EAO and VLAO groups. Although the DIF test was not significant, the discrimination parameter was numerically lower in the VLAO group, suggesting a better discrimination for the EAO compared to the VLAO group. Moreover, the sample size of the VLAO group was smaller than the size previously recommended (ie, 200 subjects per group[34]). Therefore, the power to detect this difference may have been insufficient in our study. Results from the current study support that the psychometric properties of the ADHD symptoms in participants with EAO are remarkably similar to those with LAO and VLAO. Indeed, in both dimensions of ADHD (inattention and hyperactivity-impulsivity), no differential item functioning was significant, and the ordering of the severity and discrimination parameters was similar across age at onset groups.

Our study indicates that only 45.1% of the participants who met the *DSM-IV* symptoms of ADHD reported an age at onset before 7 years. This result should be considered in light of the important clinical implications of extending the age at onset in the diagnostic criteria.[6] First, the extension of the age at onset criterion from 7 years to 18 years would result in

a doubling of the ADHD prevalence in our sample.[6] Second, although this extension may have the potential to reduce bias recall and thus the number of false-negatives,[12,13] it may also lead to an increase in the number of false-positives.[37] Although our study would support an extension of the age at onset criterion up to 18 years based on the psychometric properties of the ADHD symptoms, considerations beyond statistical properties must be taken into account for psychiatry nosology. An extension of the age at onset criterion up to 18 years raises other issues, especially for a disorder that is conceptualized as a neurodevelopmental disorder emerging during childhood. The revision of the current ADHD age at onset criterion by extending the upper limit to age 12, as recently acknowledged in *DSM-5*, is prudent (by limiting an increase of false-positives) and preserves the notion that ADHD emerges during early childhood.[6] Our study provides psychometric support to the choice of the *DSM-5* committee.

Our results should be considered in light of some limitations. A first limitation involves the retrospective nature of the assessment of lifetime ADHD symptoms. Our findings should be further examined in studies assessing prospectively current ADHD symptoms among youth of different ages. In addition, errors in reporting ADHD symptoms may have occurred in our study. Indeed, several studies indicate that retrospective report can lead to underestimation[38] or overestimation[39] of ADHD prevalence. However, reliability and validity of the retrospective report of ADHD symptoms have been shown as adequate in several studies.[40,41] Second, symptoms of ADHD among participants with symptoms below a diagnostic threshold were not available, thus limiting the full examination of item functioning. Third, the data are cross-sectional, and important information about social contextual influences, cognitive development, and clinical course (eg, length of illness, medication regimen), which may shape the incidence of symptoms, was not available in NESARC.[42,43] Future longitudinal studies should take the potential influence of these factors into account. Fourth, ADHD diagnosis was assessed following *DSM-IV* criteria, except for the age at onset criterion, which was set at 18 years for the purpose of this study. This could have led to decreases in the test-retest reliability of ADHD diagnosis and internal consistency reliability of ADHD symptom items. However, our findings suggest that symptom expression of ADHD was not affected by age at onset. Last, although NESARC has a nationally representative sample, it is uncertain how findings from the present study would be similar or different if enriched correctional or clinical samples were employed. In particular, information on institutionalized individuals, eg, those in the hospital or in prison (for whom ADHD symptoms expression might be different than that in the general population[44]) was unavailable, thus limiting the generalizability of our findings.[45,46]

Despite these limitations, the present study, using a methodology grounded in IRT, suggests that symptom expression of ADHD is not affected by age at onset. This study provides psychometric support to the age at onset criterion (ie, 12 years), recently modified in the *DSM-5* and further suggests that the age at onset could be extended to 18 years without changing the psychometric properties of the diagnostic criteria.

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