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Construct validity and parent–child agreement of the six new or modified disorders included in the Spanish version of the Kiddie Schedule for Affective Disorders and Schizophrenia present and Lifetime Version DSM-5 (K-SADS-PL-5)

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ABSTRACT

Changes to the Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-5) incorporate the inclusion or modification of six disorders: Autism Spectrum Disorder, Social Anxiety Disorder, Intermittent Explosive Disorder, Disruptive Mood Dysregulation Disorder, Avoidant/Restrictive Food Intake Disorder and Binge Eating Disorder. The objectives of this study were to assess the construct validity and parent-child agreement of these six disorders in the Spanish language Schedule for Affective Disorders and Schizophrenia for School Age Children Present and Lifetime Version (K-SADS-PL-5) in a clinical population of children and adolescents from Latin America. The Spanish version of the K-SADS-PL was modified to integrate changes made to the DSM-5. Clinicians received training in the K-SADS-PL-5 and 90% agreement between raters was obtained. A total of 80 patients were recruited in four different countries in Latin America. All items from each of the six disorders were included in a factor analysis. Parent-child agreement was calculated for every item of the six disorders, including the effect of sex and age. The factor analysis revealed 6 factors separately grouping the items defining each of the new or modified disorders, with Eigenvalues greater than 2. Very good parent-child agreements ($r > 0.8$) were found for the large majority of the items (93%), even when considering the sex or age of the patient. This independent grouping of disorders suggests that the manner in which the disorders were included into the K-SADS-PL-5 reflects robustly the DSM-5 constructs and displayed a significant inter-informant reliability. These findings support the use of K-SADS-PL-5 as a clinical and research tool to evaluate these new or modified diagnoses.

1. Introduction

The semi-structured diagnostic interview Schedule for Affective Disorders and Schizophrenia for School-Age Children, Present and Lifetime Version (K-SADS-PL), which is based in the Diagnostic and Statistical Manual of Mental Disorders (DSM, fourth edition) (APA, 1994; Kaufman et al., 1997), has been validated in its Spanish version (Ulloa et al., 2006). Recently, the Spanish version of the K-SADS-PL was modified in order to integrate the changes made to the fifth edition (DSM-5) (APA, 2013), especially regarding six new or modified

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disorders: Autism Spectrum Disorder (ASD), Social Anxiety Disorder (SAD), Intermittent Explosive Disorder (IED), Disruptive Mood Dysregulation Disorder (DMDD), Avoidant/Restrictive Food Intake Disorder (ARFID) and Binge Eating Disorder (BED).

1.1. Validity of the six diagnoses

There were several changes in the DSM-5, the manner in which disorders are grouped (i.e. ASD), in their diagnostic criteria (i.e. SAD and IED), as well as the addition of new disorders (i.e. DMDD, ARFID and BED) (APA, 2013). Changes for ASD included the removal of a subdiagnosis, arrangement of diagnostic criteria into two domains (social communication/interaction and restrictive and repetitive behaviors) instead of three and an independent evaluation of symptom severity for each diagnostic domain. These changes have been reported to result in higher specificity, sensitivity and stability for ASD (Frazier et al., 2012; Gibbs et al., 2012; Huerta et al., 2012; Mandy et al., 2012; McPartland et al., 2012; Tahery and Perry, 2012). Changes in the diagnostic criteria for SAD focused on a fear of performance evaluation, making it a generalized disorder rather than a phobia (APA, 2013). The inclusion of these new criteria points towards SAD as a valid diagnosis in children and adolescents (Bögels et al., 2010). Changes in IED diagnostic criteria addressed the lack of definition and frequency of aggressive behavior (APA, 2013); validity studies lead to an improved detection of subjects with recurrent and problematic impulsive aggressive behavior (Coccaro, 2012; Coccaro et al., 2014, 2017). DMDD was incorporated into the DSM-5 in order to provide a diagnostic location for chronic irritability instead of considering it as bipolar non-specific manifestation (Rao, 2014); nevertheless DMDD and bipolar disorder present phenotypes that commonly overlap in clinical settings (Mitchell et al., 2016). Furthermore, DMDD could not be differentiated from Oppositional Defiant Disorder (ODD) in a general population child sample study (Mayes et al., 2016) nor in a clinical research setting (Axelson et al., 2012), which in turn suggests a low diagnostic delimitation of the DMDD construct with other disorders. A previous diagnosis, Feeding Disorder of Infancy and Early Childhood, was rearticulated as Feeding and Eating Disorders (FED) to include subjects of all ages. This FED dimension includes BED and ARFID. An extensive review examining the evidence for BED in reference with DSM-5 diagnostic criteria supports the duration/frequency criterion and emphasizes the importance of loss of control and marked distress as a primary marker around binges (Wilfley et al., 2016). Clinical (Fisher et al., 2014; Nicely et al., 2014) and non-clinical (Kurz et al., 2015) studies have reported that patients with ARFID are distinct from those with other FED. Restrictive eating disturbances in a non-clinical middle childhood sample were evaluated using the Eating Disturbances in Youth-Questionnaire, identifying three variants of early-onset restrictive eating disturbances and weight problems, inadequate overall food consumption, limited accepted amount of food and food avoidance based on a specific underlying fear (Kurz et al., 2016).

Given that these changes have been only recently incorporated and have resulted in large quantitative and qualitative modifications, new validity studies in diagnostic clinical interviews are needed.

1.2. Parent-child agreement

Diagnostic clinical interviews often involve summarizing information from both, parents and their children. Investigations using multi informants have shown a moderate to high agreement between parents and adolescents with ASD about behavioral, emotional and functioning problems (Jepsen et al., 2012). There are no specific reports of parent-child agreement for SAD, but across studies that use different structured or semi-structured interviews appeared that children are better informants describing their mental states, somatic symptoms and relational problems than their parents (Reutersköld et al., 2008; Weems et al., 2011). A similar situation occurs with IED. While there are no studies describing parent-child agreement about this disorder, some studies in youths with Disruptive Behavior Disorders (DBD) have shown a low correlation between parents and offspring reports (Nguyen et al., 1994), yet other reports show that parents provide better information than children describing externalized disorders (Edelbrock et al., 1986). Parent-child agreement in the questionnaire on eating and weight patterns showed no concordance in terms of the number or type of binge eating, overeating episodes or compensatory weight control behaviors (Steinberg et al., 2004). No information was found describing parent–child agreement for neither DMDD nor ARFID. In order to understand the variability between parent-child responses, for instance, in terms of age and sex, inter-informant reliability studies for these six new or modified disorders are needed.

The main objectives of the present research were to establish construct validity and evaluate parent-child agreement for the six new or modified disorders included in the Spanish version of the K-SADS-PL-5.

2. Materials and methods

2.1. Ethical considerations

The present research was approved by the Internal Review Boards of participant institutions. All participants signed the informed assent and consent forms.

2.2. Study participants

The sample was composed of children and adolescents ($n = 80$, 6–18 years old) referred for medical-psychiatric evaluation in any of the 7 clinical sites from the four participating countries (see *Sites Description* below), from February to August 2016. Both, the parent/guardian and the child/adolescent were interviewed for 1 to 4 sessions, each lasting from 30 to 120 min.

Full diagnostic information of subjects in the current sample can be found in a supplementary table.

2.3. Instrument description

The K-SADS-PL-5 is a semi-structured diagnostic interview designed to summarize the information provided by the parent/guardian, child/adolescent and other sources of information into a clinical diagnosis. A trained clinician conducts the interview and uses both parent/guardian and child/adolescent responses to establish the better clinical estimation for each of the symptoms in every disorder. With this interview it is possible to determine temporality, either as current (last six months) or past episodes. This study only took into consideration those identified as current disorders. The K-SADS-PL-5 is integrated by a set of screening questions as well as six supplemental questionnaires. The screening process includes an introductory interview covering the reason for consultation and general patient data as well as a screening section of the primary symptoms of each disorder. When at least one symptom is scored as definitive in the summary, the evaluation of the disorder is completed in the corresponding supplement. In order to fulfill the aims of this research all items for the six new or modified disorders were completed in the screening section. The General Assessment Function Scale (GAF) and the World Health Organization Disability Assessment Schedule (WHODAS) were also integrated into the screening. Supplement 1 includes Depressive and Bipolar Disorders, Supplement 2 includes Psychotic Disorders, Supplement 3 includes Anxiety, Stress and Obsessive Compulsive Disorders, Supplement 4 includes Behavior Impulse and Control Disruptive Disorders, Supplement 5 includes Substance Use Disorders and FED and the supplement 6 includes Neurodevelopmental Disorders.

2.4. Sites description

All sites were clinical settings, for either outpatients, inpatients or both. Sites included three hospitals (two in Mexico City, MX1, MX2, one in Aguascalientes, MX3) and a psychiatric outpatient service in Mexico City, Mexico (MX4), a general hospital in Medellin, Colombia (CO), and psychiatric hospitals in Santiago de Chile, Chile (CL) and Montevideo, Uruguay (UR).

2.5. Procedure

First stage: January 2014 to June 2015. A Latin American international clinical team reviewed and adapted the Spanish version of K-SADS-PL published under the DSM-IV criteria (Ulloa et al., 2006) and generated K-SADS-PL-5.

Second stage: August 2015 to January 2016. Training and consensus were established on the interview by means of a 20 h practical theoretical course, reaching a ≥90% agreement among participants diagnoses.

Third stage: February to July 2016. Each site sought to interview 10 subjects (five children and five adolescents) who were consecutively recruited and interviewed. Parents were present, if interviewing an adolescent, questions were addressed at him/her first while when interviewing a child, parents were asked first. All participants answered all items for the six new or modified diagnoses. In each site, evaluations were coordinated by a child psychiatrist with more than fifteen years of clinical experience while the remaining evaluators were child psychiatrists, last year residents of the specialty and clinical psychologists. Each site coordinator maintained supervision of the interviews and communication with the principal investigator with whom any procedure doubt was resolved.

2.6. Statistical analysis

The current analysis was limited to the six new or modified diagnoses. Demographic and diagnostic data of the subjects were summarized using measures of central tendency and percentages. Construct validity of six new or modified disorders was determined by a factor analysis using generalized least squares method with varimax rotation on the individual items of the six new or modified disorders only. The analysis was performed using the R project software (R Core Team, 2017). A threshold of Eigenvalues ≥2 was chosen. Internal consistency for each category was established by Chronbach's alfa using summary answers. Parent-child agreement for each item was calculated using a Spearman correlation coefficient (r). In order to explore variation in sex (*boys vs. girls*) and age (*children vs. adolescents*), the difference between correlation values (Δr) was calculated and comparisons in which $\Delta r \geq 0.5$ were selected.

3. Results

3.1. Demographics and diagnostic characteristics

A sample of ($n = 80$) children and adolescents was evaluated. From this sample, six subjects were excluded due to being unable to finish the screening and/or supplement interviews. Sites from Mexico contributed with 50 and sites from South America with 24 patients. Socio-demographic characteristics of the final sample are shown in Table 1. Subjects had a mean of 3.66 (± 2.93) comorbid disorders. Most frequently diagnosed disorders were ADHD and ODD present in half the sample. The frequencies of new or modified disorders in the current sample were 3.9% for ASD, 26.3% for SAD, 25% for IED, 22.4% for DMDD, 5.3% for BED and 2.6% for ARFID.

Table 1
Clinical and demographic characteristics.

	Frequency (%)
	Total $n = 74$
Sex	
Male	44 (60)
Female	30 (40)
Age[a]	11.4 (3.2)
Parents are divorced	25
Complications during childbirth	34
History of previous psychiatric treatment	31
GAF[b],[a]	59.1 (16.1)
WHODAS[c].[a]	21.8 (18.9)
Family history of psychiatric illness	
Mother	17
Father	16
Siblings	20

[a] Mean (standard deviation).
[b] General Assessment Functioning.
[c] World Health Organization Disability Assessment Schedule.

3.2. Construct validity and internal consistency

The best-fitted model produced by the factor analysis identified six factors explaining 73.51% of the variance (See Tables 2a and 2b). Each factor contained one of the new or modified disorders. Chronbach's alpha coefficients for each new or modified disorders were ASD = 0.92, SAD = 0.95 IED = 0.94, DMDD = 0.92, BED = 0.93 and ARFID = 0.74.

3.3. Parent-child agreement

Positive high correlations ($r > 0.6$) were found between parent/guardian and child/adolescent answers for most of the items included in the six new or modified disorders of the K-SADS-PL-5. The range of correlation value for each disorder is displayed in Table 3 (see supplementary material for the full set of correlations). Only two small to moderate correlation values were found: (i) item 6 of IED ($r = 0.35$) which relates to the duration of verbal aggression and (ii) item 4 of BED ($r = 0.58$) which relates to the frequency of the binge episodes per week. When comparing the answers by sex and age, a large disparity in the correlation scores between boys and girls ($r_{boy} = 0.42$, $r_{girl} = 1.0$, $\Delta r = 0.58$) and children and adolescents ($r_{child} = 1$, $r_{adolescent} = 0.41$, $\Delta r = 0.59$) with their parent/guardian reports was found for item 4 of BED ("*Binge occurs at least once a week*").

4. Discussion

The first objective of the present study was to establish construct validity for the six new or modified disorders included in the Spanish version of K-SADS-PL-5. The factor analysis revealed that they grouped independently, while the Cronbach's alpha value for each diagnostic category ranged from excellent to acceptable (George and Mallery, 2003). These results suggest that the manner in which the disorders were included into the K-SADS-PL-5 reflect robustly the DSM-5 constructs. To our knowledge, this is the first approach in the process to validate these new disorders as integrated in a semi-structured interview for a clinical population. Similar efforts include the Taiwanese team study, which established convergent and divergent validity but did not report results regarding the six new or modified disorders, even though they were included in the instrument (Chen et al., 2017).

In contrast with other reports (Ghanizadeh et al., 2006; Chen et al., 2017) in which a small number of raters participated, our study integrated a large number of raters from different sites and countries, some of which were involved in the text construction of the new K-SADS-PL-5 and all of which received an intensive course by the principal investigator (FRP), this appeared to have resulted in a highly

Table 2a
Eigenvalues and factorial load per item for each new or modified disorders in the K-SADS-PL-5.

Items *Eigenvalues*	ASD[a] 15.89	IED[b] 7.39	SAD[c] 9.81
Autistic Spectrum Disorder			
1. Stereotyped or repetitive speech, motor movements or use of objects.	0.64		
2. Insistence on sameness, inflexible adherence to routines, ritualized patterns of verbal or nonverbal behavior.	0.72		
3. Highly restricted, fixated interests that are abnormal in intensity or focus.	*0.53*		
4. Deficits in nonverbal communicative behaviors used for social interaction.	*0.56*		
5. Deficits in social-emotional reciprocity.	0.87		
6. Deficits in developing and maintaining relationships appropriate to the developmental level.	0.80		
7. Hyper-or-hypo-reactivity to sensory input or unusual interest in sensory aspects of the environment.	0.71		
8. Motor deficits in performance of skilled movement not limited to social communication.	0.87		
9a. One-sided verbosity.	0.64		
9b. Speech pragmatic deficits.	0.75		
9c. Abnormalities in voice modulation/prosody.	0.68		
9d. Incessant and insensitive pursuit of others.	*0.48*		
10a. Social isolation.	0.78		
10b. Echolalic speech.	0.89		
Intermittent Explosive Disorder			
1a. Recurrent outbursts: Verbal aggression or physical aggression that does not lead to destruction of property or physical injury.		0.77	
1b. Recurrent outbursts: Verbal aggression or physical aggression that involve injury or destruction.		0.90	
2. Aggressive behavior is grossly disproportionate to the magnitude of the psychosocial stressors.		0.85	
3. Age of onset.		0.86	
4. Duration of physical aggression not leading to destruction or injury.		0.73	
5. Duration of physical aggression not leading to destruction or injury.		0.88	
6. Duration of Verbal aggression.		0.70	
7a. Secondary repercussions on social environment.		0.87	
7b. Secondary repercussions on family.		0.73	
7c. Secondary repercussions on academic performance.		0.67	
7d. Marked distress in the individual.		0.61	
7e. Financial consequences.		*0.48*	
7f. Legal consequences.		0.78	
Social Anxiety Disorder			
1. Marked fear or anxiety about one or more social situations.			0.90
2. The individual fears that he or she will act in a way or show anxiety symptoms that will be negatively evaluated.			0.91
3. Revise those situations which cause stress.			0.93
4. Social situations almost always provoke fear or anxiety.			0.87
5. The social situations are avoided or endured with intense fear or anxiety.			0.91
6. Fear of humiliation, embarrassment or rejection.			0.92
7. Intensity of anxious reaction.			0.84
8. The fear, anxiety, or avoidance is persistent, typically lasting for 6 months or more.			0.94
9a. Leads to an impaired relationship with peers.			0.87
9b. Leads to an impaired relationship with family.			*0.53*
9c. Leads to an impaired relationship in school or at work.			0.79

[a] Autism Spectrum Disorder.
[b] Intermittent Explosive Disorder.
[c] Social Anxiety Disorder.

homogenized interview procedure, suggesting that idiosyncratic variations from country to country seem not to have had a significant influence.

The loading for each factor was high, which suggests a robust grouping. The smaller loading values found in the present study may be explained by issues with interview process related to a lack of clarity regarding how the clinician asks a particular question or how this question is interpreted by the interviewee, particularly to abstract terminology like “social contact” or “economic consequences”. Another possible explanation is that loading factor values may be reduced due to the presence of the clinical characteristic in different diagnoses, eg. irritability in DMDD, other internalizing and externalizing disorders (Axelson et al., 2012; Evans et al., 2017); sensorial perception of food in ASD (Cermak et al., 2010; Sharp and Postorino, 2017) and ARFID (Norris et al., 2016). The results of the current study support the inclusion of ASD as part of the K-SADS-PL, which was considered a limitation of the previous version (Leffler et al., 2014), and add validity to the report of Zavaleta-Ramirez et al. (2014) which found good inter-rater reliability for ASD in the K-SADS-PL Spanish version. Present results also increase validity of the remaining new or modified disorders.

Psychiatric assessment through multiple informants can provide a comprehensive and balanced evaluation of a subject's behavior, experience, or functioning, which allows for a more accurate clinical picture (Macintosh and Dissanayake, 2006; Jepsen et al., 2012; Renk, 2005), particularly in a pediatric population. The capacity of an informant to provide a meaningful report on a clinical syndrome may be influenced by factors related to the environment, such as those implied characteristics of the parent or guardian and the subject (Wingenfeld, 2002). In the case of young people, factors such as age, sex, and type of psychopathology may influence the degree of agreement between the reports (Fagan and Fantuzzo, 1999; Renk, 2005; Romano et al., 2005), eg. female adolescents report a larger number of internalizing symptoms than their mothers (Sourander et al., 1999).

In the current study, we found low to moderate agreement only for two items: 6 of IED and 4 of BED. This suggests that, at least for these two items, temporal conceptualization differs in parents and their children. Furthermore, in the case of binges (item 4 of BED) parent-child agreement was higher for girls and for children. The first case may reflect a larger attention of parents to a girl's eating habits (Phares et al., 2004), while the latter may reflect the covert manifestation of binges in adolescents (Stice et al., 1998). The otherwise large inter-informant agreement observed in the current study adds to other reliability studies of these new or modified disorders, such as the one by Regier et al. (2013), which reported, no inter-informant, but good test-retest reliability for ASD and BED, but not for DMDD or other disorders with low prevalence.

Table 2b
Eigenvalues and factorial load per item for each new or modified disorders in the K-SADS-PL-5.

Items *Eigenvalues*	DMDD[a] 3.22	ARFID[b] 2.35	BED[c] 5.52
Disruptive Mood Dysregulation Disorder			
1. Severe recurrent temper outbursts manifested verbally and/or behaviorally that are grossly out of proportion in intensity or duration to the situation or provocation.	0.86		
2. Mood between temper outbursts is persistently irritable or angry most of the day.	0.52		
3. The temper outbursts are inconsistent with developmental level.	0.81		
4. The temper outbursts occur, on average, three or more times per week.	0.83		
5. Temper outbursts occur in more than one place.	0.90		
6. Age of onset.	0.80		
Avoidant Restrictive Food Intake Disorder			
1. Apparent lack of interest in eating or food and avoidance based on the sensory characteristics of food taste, smell or texture.		0.51	
2. Significant loss of weight (or failure to achieve expected weight gain or faltering growth in children).		0.82	
3. Significant nutritional deficiency.		0.83	
4. Dependence on enteral feeding or oral nutritional supplements.		0.80	
Binge-Eating Disorder			
1. Recurrent episodes of binge eating characterized by both consuming an abnormally large amount of food in a short period of time.			0.76
2. Overall, they feel significant distress about their binge eating.			0.81
3a. Consuming food faster than normal.			0.89
3b. Consuming food until uncomfortably full.			0.90
3c. Consuming large amounts of food when not hungry.			0.91
3d. Embarrassment due to the large amounts of food consumed.			0.75
3e. Feeling disgusted, depressed, or guilty after eating a large amount of food.			0.75
4. Binges occur at least once a week.			0.65

[a] Disruptive Mood Dysregulation Disorder.
[b] Avoidant/Restrictive Food Intake Disorder.
[c] Binge Eating Disorder.

Table 3
Range values of parent-child agreement for individual items of each disorder (*r*).

Disorders	Parent-child agreement (range, *r*)
Autism Spectrum Disorder	0.71–1
Intermittent Explosive Disorder	0.35–1
Social Anxiety Disorder	0.82–1
Disruptive Mood Dysregulation Disorder	0.94–1
Avoidant/Restrictive Food Intake Disorder	0.89–1
Binge-Eating Disorder	0.57–0.94

4.1. Limitations

Limitations of the current study include a small sample size for some less prevalent diagnoses and a bias for more mothers than fathers as informants, which may limit our representation of the real inter-rater variability.

5. Conclusions

All of the six new or modified disorders included in the K-SADS-PL-5 had factor loadings consistent with the DSM-5 proposal and displayed a significant parent-child agreement. This suggests that the K-SADS-PL-5 is a useful tool for clinical and research purposes around these new or modified disorders.

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Conflicts of interest

A. Rodríguez-Delgado, L. Villavicencio, J. Palacio, C. Montiel, P. Mayer, F. Félix, M. Larraguibel, L. Viola, S. Ortiz, S. Fernández, A. Jaímes, M.Feria, L. Sosa, have no conflict of interest to disclose.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.jpsychires.2018.02.029.

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