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ADJUSTMENT SCALES FOR CHILDREN AND ADOLESCENTS AND NATIVE AMERICAN INDIANS: FACTORIAL VALIDITY GENERALIZATION FOR OJIBWE YOUTHS

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Replication of the core syndrome factor structure of the *Adjustment Scales for Children and Adolescents* (ASCA; P.A. McDermott, N.C. Marston, & D.H. Stott, 1993) is reported for a sample of 183 Native American Indian (Ojibwe) children and adolescents from North Central Minnesota. The six ASCA core syndromes produced an identical two-factor solution as the standardization data through principal axis analysis using multiple criteria for the number of factors to extract and retain. Varimax, direct oblimin, and promax rotations produced identical results and nearly identical factor-structure coefficients. Coefficients of congruence resulted in an excellent match to the factorial results of the ASCA standardization sample and a large, independent sample. It was concluded that for these Ojibwe students, the ASCA measures two independent dimensions of psychopathology (i.e., Overactivity and Underactivity) that are similar to the conduct problems/externalizing and withdrawal/internalizing dimensions commonly found in the child psychopathology assessment literature. © 2006 Wiley Periodicals, Inc.

Native American Indian children and adolescents have developmental disorders, mood disorders, anxiety disorders, psychoactive substance use disorders, suicide, and behavior disorders at significantly higher rates than the general population (Manson, Bechtold, Novins, & Beals, 1997). Manson et al. (1997) further reported that many studies investigated alcohol and drug use and suicide among Native American Indians, but few studies investigated psychopathology and emotional problems. In a study of Northern Plains American Indians, Beals et al. (1997) found higher rates of simple phobias, major depressive disorder, attention-deficit hyperactivity disorder, and alcohol dependence/abuse based on diagnostic interviews, and recommended population-based samples and representative samples in future studies. Costello, Farmer, Angold, Burns, and Erkanli (1997) also found American Indian children to have significantly greater substance abuse or dependence and its comorbidity with other psychiatric disorders than did White youths, but slightly *lower* overall prevalence of psychiatric disorders than the White sample. No differences in other psychiatric disorders' prevalence were found. Psychiatric diagnoses in the Costello et al. study also were made based on interviews.

Huang and Gibbs (1998) concluded that there was a "need for epidemiological data to indicate the incidence and prevalence of psychological and behavioral disorders among ethnic minority children and adolescents" (pp. 379–380). Manson et al. (1997) also indicated that few epidemiological studies were completed with Native American Indians, and those that had been done suffered from serious flaws in sampling, diagnostic systems, cultural insensitivity, and the fact that Native American Indian social systems had changed a great deal in the 20 years since those early studies were completed. Additionally, *none* of the studies used objective psychometric assessment approaches such as behavior rating scales, personality inventories, or psychopathology instruments, but relied primarily on diagnostic interviews and classification rates from treatment facilities. McShane (1988) also commented on the lack of adequate instrumentation for use

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with Native American Indian children and adolescents. Because studies of psychiatric or behavioral disorders in Native American Indian children and adolescents have used samples that were not nationally representative, generalization of results beyond those limited samples is extremely problematic and psychopathology prevalence for Native American Indians cannot be adequately estimated.

Advances in understanding base rates and prevalence of youth psychopathology have been made with the fairly recent introduction of standardized assessment methods with nationally representative standardization samples (McDermott, 1994; Reynolds & Kamphaus, 1992, 2004). However, specific application of these measures to Native American Indian children and adolescents is problematic, and extreme caution should be exercised due to the extremely small numbers of Native American Indians in the standardization samples and because little is known about the potential differential reliability and validity for various tribes. Systematic examination of behavior rating instruments with large samples of Native American Indian youths similar to what is done in examining potential bias and nondiscriminatory assessment with major cognitive assessment instruments (Elliott, 1990; Kush et al., 2001) is needed. The *Standards for Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, and the National Council on Measurement in Education, 1999) includes cautions for psychologists in the use of assessment instruments that have not been adequately validated with various subgroups within the population.

Diagnostic use of the *Adjustment Scales for Children and Adolescents* (ASCA; McDermott, Marston, & Stott, 1993), a teacher-report behavior-rating scale designed to assess psychopathology for children between 5 and 17 years of age, and other behavior rating scales, with Native American Indian children and adolescents requires extensive study of reliability and validity to support such practice. To date, there have been no independent investigations of the factor structure of the ASCA core syndromes or internal consistency with Native American Indian students. The purpose of the present study was to explore the factor structure and factorial invariance of the ASCA core syndromes in an independent sample of Native American Indian youths and examine both orthogonal and oblique solutions to determine the dependence or independence of the resulting factors. The present study also investigated the internal consistency of ASCA core syndromes and their subtest specificity with a Native American Indian sample.

Method

Participants

Demographic characteristics of the present sample are presented in Table 1. The 183 (49.2% male, 50.8% female) students (Grades K–12) were members of the Ojibwe Indian Tribe in North Central Minnesota. To estimate the socioeconomic status of the sample, federal free/reduced lunch program data were used. As seen in Table 1, almost $\frac{2}{3}$ of the students received free lunch. Most children were not disabled (80.8%); however, the sample included students with various disabilities/exceptionalities highlighted in Table 1. Students with disabilities comprised 6.9% of the ASCA standardization sample; thus, the present sample possessed a greater proportion of students with disabilities (19%). Multidisciplinary evaluation teams using state and federal special education guidelines independently classified students with disabilities. The mean age of the students was 11.86 years (SD = 3.64, range = 5.67–19.18). Students were included if their parents provided informed consent, which resulted in a sample of approximately 24% of the entire Native American/American Indian student population (N = 750).

Data were provided by teacher ratings on the ASCA, with 33 (30%) male and 77 (70%) female teachers responding. Of the 110 participating teachers, 89 (80.9%) were Caucasian,

Table 1
*Sample Demographic Characteristics (*N *= 183)*

Variable	n	%
Sex		
Male	90	49.2
Female	93	50.8
Grade		
K	14	7.7
1	18	9.8
2	17	9.3
3	16	8.7
4	14	7.7
5	15	8.2
6	16	8.7
7	13	7.1
8	16	8.7
9	10	5.5
10	12	6.6
11	13	7.1
12	9	4.9
Free/reduced lunch		
No free/reduced lunch	56	30.6
Reduced lunch	14	7.7
Free lunch	113	61.7
Disability/exceptionality		
Not disabled	148	80.8
Learning disabled	7	3.8
Seriously emotionally disabled	6	3.3
Mentally retarded	6	3.3
Speech/language disabled	7	3.8
Autism	1	0.5
Other health impaired	8	4.4

6 (6.3%) were Native American Indian, 1 (0.9%) was "multiracial," and 14 (12.7%) declined to report their race/ethnicity. Teachers ranged in age from 23 to 61 years ($M = 42.39$, $SD = 8.92$) and ranged in number of years teaching from 1 to 34 ($M = 15.52$, $SD = 7.83$).

Instrument

The ASCA (McDermott et al., 1993) is an objective behavior rating instrument completed by a student's classroom teacher and designed for use with all noninstitutionalized youths ages 5 through 17 years (Grades K–12). The ASCA consists of 156 behavioral descriptions within 29 specific school situations where teachers may observe students' behaviors. Of the 156 items, 97 are scorable for psychopathology and based on factor analyses of standardization data, singularly assigned to one of six core syndromes [Attention-Deficit/Hyperactive (ADH), Solitary Aggressive-Provocative (SAP), Solitary Aggressive-Impulsive (SAI), Oppositional Defiant (OPD), Diffident (DIF), and Avoidant (AVO)] or two supplementary syndromes [Delinquent (DEL) and Lethargic/Hypoactive (LEH)]. The core syndromes combine to form two composite indexes: *Overactivity*

(ADH, SAP, SAI, and OPD syndromes) and *Underactivity* (DIF and AVO syndromes), which are similar to the two-dimensional model (conduct problem/externalizing vs. withdrawal/internalizing) of child psychopathology frequently obtained in the assessment literature (Achenbach, 1991; Achenbach & Edelbrock, 1983; Cicchetti & Toth, 1991; Merrell, 1994, 2002; Quay, 1986; Reynolds & Kamphaus, 1992, 2004).

Extensive evidence for ASCA score reliability and validity is presented in the ASCA manual (McDermott, 1994) and in independent studies. Internal-consistency estimates (Canivez, 2004; McDermott, 1993, 1994), stability estimates (Canivez, Perry, & Weller, 2001; McDermott, 1993, 1994), and interrater-agreement estimates (Canivez & Watkins, 2002; Canivez, Watkins, & Schaefer, 2002; McDermott, 1993, 1994; Watkins & Canivez, 1997) have supported the reliability of ASCA scores.

Evidence of convergent (Canivez & Bordenkircher, 2002; Canivez & Rains, 2002; McDermott, 1993, 1994), divergent (Canivez & Bordenkircher, 2002; Canivez, Neitzel, & Martin, 2005; Canivez & Rains, 2002; McDermott, 1993, 1994, 1995), discriminant (Canivez & Sprouls, 2005; McDermott, 1993, 1994; McDermott et al., 1995), and factorial (Canivez, 2004; McDermott, 1993, 1994) validity of ASCA scores also have been reported. In general, psychometric characteristics of the ASCA are acceptable and meet standards for both group and individual decision making (Canivez, 2001; Salvia & Ysseldyke, 1995).

Procedure

Classroom teachers of Native American Indian children voluntarily completed ASCA rating forms on students whose parents or legal guardians provided informed consent for participation and were paid for their assistance. ASCA forms were collected by a certified school psychologist and returned for scoring and analysis. Trained undergraduate research assistants scored the ASCA rating forms according to the manual and entered raw-score and *T*-score data into the computer for further analyses.

Data Analyses

Exploratory factor analysis was considered for the 97 ASCA problem-behavior items; however; ASCA items are dichotomously scored and considered problematic. Many items deviated significantly from normality (skewness and kurtosis), as is typically observed in pathology-oriented scales (Floyd & Widaman, 1995), and several items had no variability, thereby preventing analysis at the item level.

The ASCA core syndrome *T*-score Pearson product—moment correlation matrix was thus subjected to principal axis exploratory factor analysis with varimax rotation to investigate the orthogonal solution and direct oblimin and promax rotations to investigate oblique solutions using SPSS 11.0.2 for Macintosh OSX. Both oblique and orthogonal rotations were investigated to determine independence of emergent factors. Oblique rotations allow factors to be correlated while orthogonal rotation mathematically forces factors to be uncorrelated. When oblique rotation produces uncorrelated factors, resulting structure coefficients for oblique and orthogonal rotations will be similar.

Principal axis exploratory factor analysis was used due to the nonnormal distributions of scores (Cudeck, 2000; Fabrigar, Wegener, MacCallum, & Strahan, 1999; Tabachnick & Fidell, 2001) and also was the method used in McDermott (1993, 1994) and Canivez (2004). Multiple criteria, as recommended by Gorsuch (1983), were used to determine the number of factors to retain and included eigenvalues > 1 (Guttman, 1954), the scree test (Cattell, 1966), *and* parallel analysis (Horn, 1965). Parallel analysis was included because Thompson and Daniel (1996) indicated that it is usually more accurate. The scree test was used to visually determine the optimum number of factors to retain while parallel analysis indicated factors considered meaningful when the eigenvalues from the sample data were larger than those produced by random data containing the same number of participants and factors (Lautenschlager, 1989). Random data and resulting eigenvalues for parallel analyses were produced using the Monte Carlo PCA for Parallel Analysis computer program (Watkins, 2000), with 100 replications to provide stable eigenvalue estimates. Because the ASCA Underactivity global scale is estimated by only two subscales (DIF and AVO), confirmatory factor analyses was deemed inappropriate because factors should have at least three estimators in the specified model (Kline, 2005).

To examine the factor invariance, or how well the factor solution in the present study matched that of the ASCA standardization sample (McDermott, 1993, 1994), coefficients of congruence (Gorsuch, 1983; Harman, 1976) were calculated using the Coefficient of Congruence Rc computer program (Watkins, 2002). MacCallum, Widaman, Zhang, and Hong (1999) offered "guidelines to interpret the congruence coefficient: .98–1.00 = excellent, .92–.98 = good, .82–.92 = borderline, .68–.82 = poor, and below .68 = terrible" (p. 93).

Results and Discussion

Pearson product—moment correlations, varimax factor structure coefficients, promax factor structure coefficients, eigenvalues, and the percent of variance accounted for are presented in Table 2. Core syndrome intercorrelations were similar to those of McDermott (1993, 1994) and Canivez (2004). Two factors were extracted through principal axis factor analysis based on results from all three factor-selection criteria (eigenvalues 1, the scree test, *and* parallel analysis) (see Figure 1) and rotated using the varimax procedure to achieve an orthogonal solution. The ADH, SAP, SAI, and OPD core syndromes were strongly associated with the first factor (Overactivity) while the DIF and AVO core syndromes were strongly associated with the second factor

Table 2
Intercorrelations and Factor Structure Coefficients for ASCA Core Syndromes T *Scores*

	Correlations						Varimax structure coefficient[a]		Promax structure coefficient[a]	
ASCA core syndrome	ADH	SAP	SAI	OPD	DIF	AVO	OVR	UNR	OVR	UNR
ADH							**.67**	.02	**.67**	.02
SAP	.52						**.77**	−.11	**.77**	−.11
SAI	.36	.46					**.58**	−.07	**.58**	−.07
OPD	.48	.53	.43				**.71**	.10	**.71**	.09
DIF	−.12	−.14	−.09	.00			−.11	**.59**	−.12	**.59**
AVO	.13	−.01	.00	.11	.37		.10	**.66**	.08	**.66**
Eigenvalue							2.42	1.39		
Percent of Variance:										
Common							40.31	23.20		
Cumulative							40.31	63.51		

Note. $N = 183$. ASCA = Adjustment Scales for Children and Adolescents; ADH = Attention Deficit Hyperactive; SAP = Solitary Aggressive (Provocative); SAI = Solitary Aggressive (Impulsive); OPD = Oppositional Defiant; DIF = Diffident; AVO = Avoidant. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .72, and Bartlett's Test of Sphericity was 223.05, $p < .0001$. Communality estimates ranged from .34 to .60 (*Mdn* = .45).

[a]Factor coefficients ≥.40 were considered salient and are in bold. Promax rotated Factor 1 and Factor 2 $r = -.02$. Direct oblimin structure coefficients are available upon request.

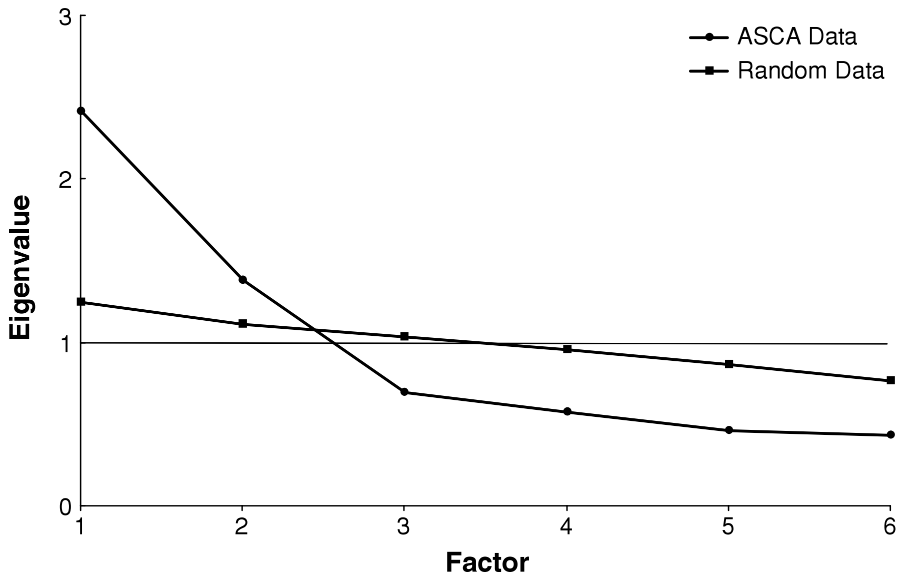

FIGURE 1. Scree plots for ASCA parallel analysis.

(Underactivity). These results are consistent with and replicate those obtained with the ASCA standardization sample (McDermott, 1993, 1994) and a large, independent sample (Canivez, 2004).

Principal axis factor analysis with promax and direct oblimin rotations (oblique solutions) produced almost identical structure coefficients; therefore, only Promax coefficients are presented. As before, two factors were extracted, and the ADH, SAP, SAI, and OPD core syndromes were strongly associated with the first factor (Overactivity) while the DIF and AVO core syndromes were strongly associated with the second factor (Underactivity). Factor structure coefficients for the varimax, oblimin, and promax rotations were almost identical, and the correlation between Factor 1 (Overactivity) and Factor 2 (Underactivity) based on the promax rotation was −.02, strongly supporting the independence of the Overactivity and Underactivity dimensions. The correlation of the Overactivity and Underactivity global syndromes' *T* scores was .04, and also indicated global (broadband) scale independence. Given the very low factor and global scale (OVR-UNR) correlations and the very similar factor structure coefficients, the varimax rotated (orthogonal) solution is clearly the most viable as these factors appear truly independent (Tabachnick & Fidell, 2001). This also replicated the findings of Canivez (2004). Coefficients of congruence (Watkins, 2002) resulted in an "excellent" or "good" (MacCallum et al., 1999, p. 93) match to the factorial results of the ASCA standardization sample (Overactivity Rc = .9978; Underactivity Rc = .9835) and a large, independent sample (Canivez, 2004) (Overactivity Rc = .9967; Underactivity Rc = .9693).

Table 3 presents the descriptive statistics for the ASCA core syndrome *T* scores, internal-consistency estimates, and subtest-specificity estimates. Several scales appeared to deviate from normality. Internal-consistency estimates of the Overactivity syndrome ($r_\alpha = .90$) and the Underactivity syndrome ($r_\alpha = .84$) scores were almost identical to those observed by McDermott (1994) and Canivez (2004). Internal-consistency estimates for the ASCA core syndromes ranged from .44 to .86 and also were almost identical to those observed in the ASCA standardization sample (except for the SAP and SAI core syndromes). Several items of the SAP core syndrome had low

Table 3
T *Score Descriptive Statistics, Core Syndrome Internal-Consistency Reliability, and Subtest Specificity Estimates*

	M	*SD*	Range	Skewness	Kurtosis	r_α	Specificity[a]
ADH	51.57	10.45	39–81	.22	−.75	.86	**.41**
SAP	50.59	10.07	45–74	1.28	−.31	.69	.09
SAI	50.52	8.42	47–75	2.00	2.09	.44	.10
OPD	51.70	11.07	43–99	.93	.43	.75	.23
DIF	52.76	11.33	40–76	.11	−1.33	.80	**.44**
AVO	53.99	11.71	42–99	.55	−.16	.80	**.36**

Note. $N = 183$. ADH = Attention Deficit Hyperactive; SAP = Solitary Aggressive (Provocative); SAI = Solitary Aggressive (Impulsive); OPD = Oppositional Defiant; DIF = Diffident; AVO = Avoidant.
[a]Specificity = r_α − Communality. Specificity estimates exceeding error variance are considered significant and are in bold. Overactivity $r_\alpha = .90$. Underactivity $r_\alpha = .84$.

item variance, and three of the nine SAI items had zero variance, which adversely affected r_α estimates.

Internal-consistency estimates were somewhat lower than those found in other teacher-report behavior-rating scales (Achenbach, 1991; Achenbach & Edelbrock, 1983; Merrell, 1994, 2002; Reynolds & Kamphaus, 1992, 2004), partially because of the dichotomous nature of ASCA items which limits item and total raw-score variability. Other teacher-report rating scales typically have items rated on a 3- or 4-point continuum. Three of the six ASCA core syndromes achieved subtest-specificity estimates exceeding error variance, and another (OPD) was close to exceeding error variance (see Table 3), indicating syndrome interpretability beyond the global factor based score for this sample. The specificity estimates for the SAP and SAI core syndromes also were lower than those found in the ASCA standardization sample, and the low internal-consistency estimates among the SAP and SAI syndromes were likely due to the limited variability (zero variance) at the item level.

Another important finding in the present study is the replication factorial independence ($r = -.02$) of the Overactivity and Underactivity factors with this sample, suggesting that the core syndrome factor structure of the ASCA for this Native American Indian (Ojibwe) sample is identical to the standardization sample. The Overactivity and Underactivity factors are similar to the Externalizing and Internalizing factors frequently reported in the youth psychopathology literature (Achenbach, 1991; Cicchetti & Toth, 1991; Merrell, 1994, 2002, 2003; Quay, 1986; Reynolds & Kamphaus, 1992, 2004), but these behavior rating scales (i.e., CBCL, PKBS, BASC, & BASC-2) often have moderately high correlations between the composite Externalizing and Internalizing scores (rs = .30–.48, Achenbach, 1991; $r = .66$, Merrell, 1994; $r = .66$, Merrell, 2002; rs = .21–.54, Reynolds & Kamphaus, 1992; rs = .39–.51, Reynolds & Kamphaus, 2004), which complicates score interpretation and factor analyses.

In the construction of the ASCA, syndromes such as anxiety and depression were avoided due to their “internalized” nature, which are difficult, or in some instances impossible, for third parties to observe and report. The ASCA Underactivity syndromes focus on specific behaviors indicating shy, timid, distant, and withdrawing characteristics, which are observable and related to “internalizing” dimensions but do not directly measure such internal characteristics. This difference may account for the independence observed among the Overactivity and Underactivity syndromes because many of the observable behaviors are in fact mutually exclusive. Internalizing symptoms not assessed by the ASCA may be better assessed by self-report measures.

Further, the subscale intercorrelations among the ASCA core syndromes in this study as well as in studies by McDermott (1994) and Canivez (2004) also are lower than what is frequently seen in teacher-report measures of child psychopathology, suggesting greater independence and interpretability of the individual scales (i.e., syndromes). This is a distinct advantage of the ASCA over other teacher-report rating scales in that school psychologists may interpret the separate ASCA core and supplementary syndromes as they measure unique variability beyond the common factor and error variance. This is not the case for instruments where some scales have substantial covariance, such as the BASC (i.e., TRS Hyperactivity-Aggression, rs = .80–.84; TRS Hyperactivity-Conduct Problems, rs = .59–.68; Reynolds & Kamphaus, 1992), BASC-2 (i.e., TRS Hyperactivity-Aggression, rs = .80–.84; TRS Hyperactivity-Conduct Problems, rs = .79–.80; Reynolds & Kamphaus, 2004), PKBS (Self-Centered/Explosive-Attention Problems/Overactive, $r = .79$; Antisocial/Aggressive-Attention Problems/Overactive, $r = .78$; Merrell, 1994), and PKBS-2 (Self-Centered/Explosive-Attention Problems/Overactive, $r = .80$; Antisocial/Aggressive-Attention Problems/Overactive, $r = .78$; Merrell, 2002), which significantly limits or prevents the individual scale interpretation.

Participants in the present study were Native American Indian (Ojibwe) students whose parents provided informed consent and represented approximately 24% of the total population of Ojibwe students in the school district. Although parent informed consent was not necessary due to the anonymous nature of teacher ratings, use of archival-data collection, and no procedures directly involved the students; parent informed consent was sought to gain trust in the research process that ultimately would benefit the Native American Indian group as a whole. Unfortunately, the fact that more than 75% of the potential students did not have parental consent severely limited the sample and thus limits the generalization of the present results within and outside of this tribe. In future studies of this nature, it is recommended that random or stratified-random sampling procedures be used to maximize sample size and generalization of results. Limitations also are based on the representativeness of the sample. Specifically, disability, geographic location, and tribal affiliation are limited to the Ojibwe tribe in North Central Minnesota; therefore, caution must be exercised in interpreting these results. As data on additional tribes from different geographic areas are obtained, comparisons between groups will be possible and will help to determine broader generalizability.

Overall, the present study strongly supported the two-factor structure of the ASCA core syndromes, factorial invariance, and the factorial independence of the Overactivity and Underactivity syndromes with a sample of Native American Indian (Ojibwe) students. School psychologists now have evidence that the ASCA measures the same dimensions of youth psychopathology with Native American Indian (Ojibwe) students as those in the general population and can be more confident in using the ASCA with Native American Indian students. With replication of these results with larger samples and different tribes, school and clinical psychologists may use the ASCA with Native American Indian youths with even greater confidence.

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