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Factor structure of the CES-D (Center for Epidemiologic Studies Depression Scale) among Filipino-American adolescents*

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Abstract The present study used factor analytic procedures to examine the factor structure of the CES-D among Filipino-American adolescents residing in rural and small town Hawaii. A total of 243 Filipino-American high school students completed the 20-item scale, and maximum likelihood analyses were employed to obtain a final solution. The results indicated that two factors provide a reasonably good fit: factor I combined depressed affect, somatic-retardation and interpersonal items, and factor II consisted of the remaining four positive affect items. The overlap of depressed affect and somatic symptoms support previous findings found among Asian American adults and other ethnic minority adolescents. The loading of the interpersonal items on the first factor is more unusual and suggests that interpersonal factors are not distinguished from depressed affect for the Filipino-American adolescent group. The usefulness of the CES-D as a tool to gain an understanding of the concept of depression across cultures is discussed.

Introduction

There is a growing interest in epidemiological studies that examine the relationship between ethnic minority status and levels of psychopathology. These studies commonly rely on self-report, standardized instruments which measure psychiatric symptomatology in non-clinical populations (Beals et al. 1991; Kuo 1984; Manson et al. 1990; Swanson et al. 1992; Ying 1988). There are numerous benefits in employing self-report, standardized instruments, as they can be easily administered to large groups, can be reliably scored, and may allow for statistical comparisons between ethnic groups. A weakness of using standardized measurements, however, is in the typical statistical assumption that the concepts and expressions of psychological disorders are uniform across cultural groups. This may be an ethnocentric assumption when considering differences between cultural groups (Marsella et al. 1985).

Several studies relying on culturally diverse samples have questioned the assumption of universal concepts of psychological disorders, thereby challenging the validity of the standardized measures for use with non-Western populations. Research findings on depressive disorders, for example, suggest that non-Western groups may report more somatic symptoms than White Americans (Kleinman 1977; Marsella et al. 1985). This emphasis on the somatic component has been found among Chinese (Chang 1985; Cheung et al. 1981; Kleinman 1982; Kleinman and Kleinman 1985), Filipinos (Crittenden et al. 1992; Flaskerud and Soldevilla 1986), Vietnamese (Flaskerud and Soldevilla 1986), and Laotians (Westermeyer et al. 1983). Because of the findings of consistent cultural differences, it has been suggested that researchers address the issue of validity across cultures in using standardized instruments to measure psychopathology in non-Western cultural groups (Marsella 1985; Takeuchi et al. 1989). Failure to consider unique cultural variables may lead to inaccurate estimates of psychopathology among cultural minority groups (Sue and Sue 1987).

CES-D measure

One of the most frequently used standardized measures of depression is the Center for Epidemiologic Studies on

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Depression (CES-D), a self-administered instrument, consisting of 20 items, which is designed to measure the level of depressive symptomatology in community populations. Although the CES-D was designed primarily as a measure of depressive symptoms, (e.g., feel blue, feel depressed, etc) it also includes items that measure self-esteem and social withdrawal (e.g., feel lonely, life is a failure, etc).

Numerous studies have addressed the issue of cross-cultural validity of the CES-D for American ethnic minority groups, using the statistical procedure of factor analysis. In the original study, Radloff (1977) administered the CES-D to African- and European-Americans and obtained a similar four-factor solution for both groups, including the depressed affect (DA), somatic-retardation (Som), happy (H), and interpersonal (I) factors. While Thorson and Powell (1993) obtained a five-factor solution for an adult sample, other studies have replicated Radloff's (1977) four-factor solution (Clark et al. 1981; Golding and Aneshensel 1989; Roberts 1980), including a recent study using a Korean version of the CES-D (Noh et al. 1995). However, findings on other Asian-American adult samples have challenged the universality of the four-factor structure solution. Factor analysis results for Chinese- and Japanese-American adults obtained a three-factor solution, combining the somatic-retardation and depressed affect items into a single factor (Kuo 1984; Ying 1988). The factor solutions for Korean- and Filipino-Americans in Kuo's study also combined depressed affect and somatic-retardation items and consisted of only two factors.

More recent research has examined the dimensionality of the CES-D among adolescents, and the results of confirmatory factor analysis with a predominantly Caucasian adolescent sample replicated the four-factor solution similar to original adult solutions (Roberts et al. 1990). However, findings among other American ethnic minority adolescent groups suggest cultural differences in the concept of depression. Similar to the studies with the Asian-American adults (Kuo 1984; Ying 1988), studies of Native American and Mexican-American adolescents obtained a three-factor solution, and also failed to make a distinction between the depressed affect and somatic-retardation items (Dick et al. 1994; Roberts and Sobhan 1992). Exploratory factor analysis results for American Indian adolescents also obtained a three-factor solution, which included a strong general factor (Manson et al. 1990). These findings suggest that ethnic minority adolescents' responses may result in slightly different factor structures than the four-factor solution commonly obtained with Caucasian adult and adolescent samples.

Present study

Filipinos represent the second largest Asian ethnic group in the United States, and due to high levels of immigration, are expected to be the largest Asian group in the United States by the year 2000 (1990 US Census; Bourier and Agresta 1987). In Hawaii, Filipinos are the fourth largest ethnic group and represented 52% of the state's total number of immigrants between the years 1988 and 1992 (Department of Business, Economic Development and Tourism 1994). While little is known about the existing mental health situation of Filipino-Americans, a few studies suggest that Filipino adults have higher rates of depression and higher levels of depressive symptomatology when compared to European-Americans (Kuo 1988; Tompar-Tiu and Sustento-Seneriches 1995). Filipinos may be at high risk for psychological problems due to the large number of stressors facing the immigrant sector of this group such as poverty, separation from family, and cultural adjustments (Ponce 1980; Tompar-Tiu and Sustento-Seneriches 1995). Adjustment difficulties of Filipino adolescents residing in Hawaii are evidenced by the fact that they represent 47% of the gang membership on the island of Oahu, have high rates of educational deficiencies, and are less likely to complete high school when compared to other Asian ethnic groups in Hawaii (Chesney-Lind et al. 1992; Werner et al. 1971). Filipinos are geographically defined as Asians, but have a unique culture, more heavily influenced than the cultures of other Asian groups by Spanish and American colonization (Kuo 1984). Therefore, it is possible that Filipinos may differ from other Asian groups in their conceptualization of psychological disorders; this is supported by Kuo's finding that Filipinos factor pattern of depressive symptoms (as measured by the CES-D) differed the most from other Asian groups. One possible explanation for the Filipino pattern may lie in the influences of the Catholic church on beliefs, since the Philippines is the only Asian country that is predominantly Catholic. The increasing size of the Filipino population in the United States, as well as the high rates of immigration, the high levels of depression, and the possibility of a unique conceptualization of psychological disorders, indicate a need to develop a reliable and valid instrument that can measure depressive symptomatology in this ethnic group.

The present study will examine the psychometric properties of the adult version of the CES-D in a sample of adolescent Filipino-Americans residing in Hawaii. While a child version has been developed (CES-DC; Weissman et al. 1980), the adult version will be used in the present study, as it has been found to be a valid and reliable measure of depression among adolescents (Beals et al. 1991; Garrison et al. 1988; Radloff 1991; Roberts et al. 1990). We will examine the reliability of the CES-D for this group, as well as determining the factor structure of the CES-D. We will test whether the Filipino factor solution differs from the four-factor solution found in previous studies. We predict that the respondents in this sample will fail to distinguish between the depressed affect and somatic items, as did Asian-American adults and other ethnic minority adolescent samples.

Subjects and methods

The data presented in this paper are part of a longitudinal epidemiologic study of mental health status of high school students in Hawaii. A large sample of students completed a questionnaire containing a number of psychological inventories, as well as measures of sociodemographic and risk factors during the spring of 1994.

Subjects

Data were obtained from students attending four high schools in small towns and small cities in rural Hawaii and included grades 9–12. As the original study was designed to examine the mental health of Native Hawaiian adolescents, data were obtained from schools with large Native Hawaiian samples. Responses of students who reported any Hawaiian ethnicity were excluded from these analyses, and have been reported elsewhere (Andrade et al. 1994; Makini et al. 1996; Nahulu et al. 1996; Yuen et al. 1996). Participation in the study was voluntary, and implied parental consent was obtained for all students. Two weeks prior to the survey, information describing the survey was mailed to every parent, along with an addressed postcard. Parents were instructed to return the postcards to indicate refusal for their child's participation. Students also read and signed a consent form prior to completing the survey, and were informed that participation was voluntary, and that they could refuse participation at any time during the survey. Administration of the questionnaire was monitored by the members of the research team to ensure adherence to the protocol. A total of 60% of the student population of the four schools sampled participated in the study, which included a total of 285 students who reported the ethnicity of both biological parents as Filipino. A total of 243 of these students completed all 20 CES-D items and were included in the present study (42 Filipino-American students had one or more CES-D items with missing scores and were excluded from further analyses). The age range for the Filipino group was 14–19 years, with a mean age of 15.8 (SD = 1.21). While we have no measure of Filipino cultural identity or data about place of birth, data regarding the question "What language is primarily spoken in your home?" suggest that many students retain a strong Filipino and "local" island cultural background. Students were allowed to choose more than one category and more students selected Pidgin English (46%) (an English dialect of Hawaii) and "other language" (40%) than standard English (35%). Written in responses for "other language" included various Filipino languages such as Tagalog and Ilokano.

Measures

A self-report questionnaire was administered during class time and students were assured that their responses were confidential. The questionnaire included numerous measures and took approximately 1 h to complete. Information concerning the CES-D results and sociodemographic information will be included in the present study.

The CES-D scale (adult version) format followed that used by Radloff (1977), including the fixed category choices ranging from "rarely or none of the time (0–1 day)" to "most or all of the time (5–7 days)" in response to the 20 original items. Four items – "I felt that I was just as good as other people", "I feel hopeful about the future", "I was happy," and "I enjoyed life" – were reverse scored. The measures were administered in English.

Results

Initial testing of factor invariance

LISREL-7 computer program (Joreskog and Sorbom, 1988) was used to examine the similarity between the Filipino factor solution and the most commonly obtained four-factor solution (Clark et al. 1981; Noh et al. 1992; Radloff 1977; Roberts et al. 1990). Results of the LISREL-7 analyses indicate that a four-factor solution is a less than reasonable fit for our Filipino sample. A second confirmatory analysis was conducted based on the three-factor structure obtained for Native American and Mexican-American adolescent groups (Dick et al. 1994; Roberts and Sobhan 1992), and this model was also found to be a less than reasonable fit.

Factor structure

In order to determine an appropriate factor structure for our sample, we employed a maximum likelihood factor analysis, followed by a promax oblique rotation, to obtain a final solution. At this point we chose exploratory analysis, because no previous study has examined the factor structure of Filipino-American adolescents, and the two-factor solution obtained from a Filipino adult sample differed from that of other ethnic samples (Kuo 1984). The maximum likelihood analysis was selected as it provided better estimates of the number of factors than the principal components method.

The promax solution was compared to a varimax solution, as used in the study by Radloff (1977), and no major differences were found in the basic factor structures. For the two-factor solution, factor I combines three of Radloff's original four factors – depressed affect, interpersonal, and somatic-retardation – while factor II represents positive affect (Table 1). All 20 items had factor loadings of at least 0.40 for one factor, resulting in a particularly clean solution. The item "everything I did was an effort" loaded on the positive affect factor, similar to findings with other ethnic minority adolescent groups examined by Beals et al. (1991). Factor I accounted for 15.6% of the variance, while factor II accounted for 5.6%. The internal reliability of the CES-D for this sample was relatively high (Chronbach's alpha = 0.89). The alpha value for factor I was high (0.92), while the internal validity of factor II resulted in a low alpha value of 0.35.

Discussion

The CES-D proved to have high reliability for the Filipino group (alpha = 0.89). In addressing the issue of validity, however, the results suggest a more complex picture. Although the original factor solution obtained by Radloff (1977) included four distinct factors (depressed affect, somatic-retardation, interpersonal and positive affect), the present Filipino-American adolescent sample consisted of two factors. Factor I contained 15 of the 20 total CES-D items, combining the depressed affect and the somatic-retardation items as found in previous studies, as well as including the interpersonal items ("people were unfriendly" and "people dislike

Table 1 Major factor loadings of the Center for Epidemiologic Studies Depression Scale (CES-D) items for 243 Filipino-American adolescents for a two-factor model. The loadings for each item based on the Radloff (1977) original factor structure are given in parentheses (*Som* somatic-retardation, *DA* depressed affect, *PA* positive affect, *IP* interpersonal). Items 4, 8, 12, and 16 are reverse scored

	Factor I	Factor II
1. Felt bothered (Som)	**0.52**	0.03
2. Had poor appetite (Som)	**0.42**	−0.05
3. Felt blue (DA)	**0.73**	−0.04
4. Felt good as others (PA)	−0.09	**0.64**
5. Trouble keeping my mind (Som) on what doing	**0.63**	0.07
6. Felt depressed (DA)	**0.83**	0.06
7. Everything was effort (Som)	0.20	**−0.61**
8. Felt hopeful (PA)	−0.11	**0.60**
9. Life was a failure (DA)	**0.66**	0.08
10. Felt fearful (DA)	**0.68**	−0.12
11. Sleep restless (Som)	**0.57**	−0.03
12. Felt happy (PA)	0.22	**0.61**
13. Talked less (Som)	**0.54**	−0.22
14. Felt lonely (DA)	**0.77**	0.07
15. People were unfriendly (IP)	**0.49**	0.01
16. Enjoyed life (PA)	0.22	**0.61**
17. Had crying spells (DA)	**0.76**	−0.04
18. Felt sad (DA)	**0.80**	0.04
19. People disliked me (IP)	**0.66**	0.05
20. Couldn't get going (Som)	**0.73**	0

me''). In other words, the depression construct among Filipino Americans, as measured by the CES-D, differs in this one way from the other ethnic groups previously studied.

Although the lack of distinction between depressed affect items (i.e., feel blue, feel depressed, etc) and somatic-retardation items (sleep restless, poor appetite, etc), supports previous findings among other Asian-American groups (Kuo 1984; Ying 1988), the failure to make a distinction between the depressed affect and somatic-retardation items from the interpersonal items (i.e., people dislike, people unfriendly) has not been found, even among other Asian-American groups. The importance of addressing interpersonal factors in the mental health of Filipinos is demonstrated in the research of Tompar-Tiu and Sustento-Seneriches (1995), who found that clinically depressed Filipino-Americans were more likely to be geographically separated or alienated from family members than non-depressed Filipino-Americans. The present findings support the observations of Anderson (1983) that Filipinos have the perception that separation from family can create illness, as well as the suggestion by Marsella (1985) that harmonious interpersonal relationships are believed to be essential to good mental health for many non-Western cultural groups.

Another difference in the factor analytic results involved the item ''everything is an effort,'' which factored with the ''positive affect'' items for the Filipino-American solution, and not with the ''somatic-retardation'' factor as found by Radloff (1977). This factor pattern is consistent with results from Native American adolescents (Dick et al. 1994). As suggested by Dick et al. it is possible that adolescents perceive the term ''effort'' as a positive quality, in relation to being goal oriented.

The results of this study suggest that the Filipino-American concept of depression may differ in some aspects from that of European-Americans. It is important, however, to be aware of several limitations of these analyses. First, the sample is quite small and includes only students from rural Hawaii (small towns and small cities); therefore, is not representative of the general Filipino-American population, which is concentrated in urban and suburban areas (The State of Hawaii Data Book, 1993–1994). According to Irvine and Carroll (1980), samples should be representative and sample size must be sufficient in order to generalize claims of cross-cultural construct validity from the results of factor analysis. The second limitation is the failure to determine ''place of birth,'' which makes it impossible to determine whether immigrant Filipinos differ from American born Filipinos in their factor structure on the CES-D. A third limitation is that information was not obtained about the students' specific sub-ethnic group. This may be an important variable, since the Ilokano sub-ethnic group in California appears to have lower levels of depression than Tagalog and Visayan Filipinos (Tomapar-Tiu and Sustento-Seneriches 1995). A fourth limitation is that the present sample included only adolescents; thus, a future study is needed to examine the factor structure of the CES-D among Filipino-American adults. And finally, these analyses should be replicated with a Filipino-American sample from the continental United States, as Filipino-Americans residing in Hawaii may not be representative of Filipino-Americans in general.

Conclusion

The CES-D proved to be a reliable measure of depression for the Filipino-American sample. However, results for Filipino-Americans differ from the results obtained for European-American samples, and the validity of the CES-D is questionable with the current sample. Consistent with findings from other Asian groups, Filipino-Americans fail to distinguish depressed affect from somatic-retardation symptoms. What is unique to the present sample, however, is the inclusion of interpersonal items within the same factor as depressed affect and somatic-retardation symptoms. The present study suggests that the CES-D can be used as a vehicle for further understanding cultural variations in the concept of depression.

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