Acculturation, Mental Health, and Quality of Life among Hispanic Childhood Cancer Survivors: A Latent Class Analysis

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Objective: Acculturation appears to be an important aspect of the association between ethnicity and disease, but it has not been explored in depth among childhood cancer survivors (CCS). The purpose of our study was to identify distinct acculturative profiles among Hispanic CCS and to assess differences in quality of life and depressive symptoms.

Design: Latent class analysis was used to identify distinct acculturative profiles using 9 indicator items reflecting Hispanic and Anglo cultural orientation. Multinomial logistic regression was performed to explore differences in depressive symptoms and quality of life between acculturation classes.

Setting and Participants: Participants were diagnosed in Los Angeles County, California, USA between 2000-2007 and were recruited for the study in 2009.

Main Outcome Measures: Center for Epidemiologic Studies depression scale and the PedsQL 4.0 quality of life scale.

Results: Three distinct acculturation classes emerged. All classes displayed a high probability of endorsing all Anglo orientation items. One class additionally demonstrated a high probability of endorsing all Hispanic orientation items and was labeled bicultural (40%); another demonstrated low probability of endorsing the Hispanic items so was labeled assimilated (32%); and the last demonstrated a high probability of endorsing only the Hispanic items related to language use and was labeled linguistically Hispanic/culturally Anglo (LH) (28%).

Conclusions: The assimilated group had significantly more depressive symptoms and lower quality of life than the other two groups. This may indicate that loss of the

Introduction

Mortality rates of childhood cancers have been decreasing, with 5-year survival rates now reaching approximately 80% overall.[1] Childhood cancer survivors (CCS) face increased risk of psychosocial issues and lower quality of life compared with their healthy peers due to numerous factors, such as late effects from their treatments,[2,3] or social isolation.[2] Racial disparities also persist in survival of childhood cancers; for example, Hispanic children have one of the lowest survival rates after treatment for acute lymphoblastic leukemia.[3] Improved understanding of factors that promote healthy survivorship and mitigate psychosocial morbidity among CCS is needed in an effort to reduce racial/ethnic disparities and ensure healthier long-term survival.

Prior research among CCS largely focuses on clinical, demographic, and behavioral correlates of health. For example, race/ethnicity has been shown to affect health outcomes, with minorities exhibiting poorer health outcomes compared with non-Hispanic Whites.[4] Cultural factors may partially account for such disparities. Acculturation, referring to a process of changes experienced by immigrants in a new culture may be one such factor. Acculturation is thought to entail distinct processes (orientation toward the dominant culture, and toward one's heritage culture) that can be independently measured to accurately capture these subgroups. Berry[5] named four distinct acculturation typologies: bicultural (orienting toward both cultures); assimilated (adopting the dominant culture and forgoing one's heritage culture); separated

(the opposite of assimilation); and marginalized (losing all cultural identity). This typology approach fosters a greater understanding of the impact of acculturation on health outcomes.

American/Anglo acculturation can be a risk factor for poor mental health among Hispanic youth.[6] This may be due to stress, discrimination, or stigma associated with lin-

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guistic challenges,[7,8] or due to the loss of protective factors inherent in the Hispanic culture. Biculturalism can be protective of mental health, perhaps due to decreased discrimination, increased social support, or stronger coping skills to navigate diverse cultural contexts.[8] Quality of life may also be affected by Hispanic cultural values, such as family connectedness (eg, familism), responses to a diagnosis (eg, fatalism), or beliefs about showing emotional support.[7,9]

Hispanics represent a disproportionately large percentage of CCS cases in Los Angeles[10] and exhibit an increased risk of incidence and decreased rates of survival of certain childhood cancers.[11] Despite the fact that acculturation appears to be an important correlate of health, it has not been explored as thoroughly among CCS. The purpose of our study was to use a latent class analysis to identify distinct acculturation classes and differences, relative to mental health and quality of life among a sample of Hispanic CSS.

Methods

Participants and Procedures

Participants were from Project Forward, a multi-ethnic study of CCS diagnosed at aged ≤18 years between 2000-2007 at two children's hospitals in LA County and aged between 14 and 25 years at the time of the survey. All participants who self-identified as Hispanic were included in our study. Surveys were mailed in English or both English and Spanish (for those with Spanish surnames). All study procedures were approved by state and local human subjects research committees. Complete details of study procedures are detailed in Milam et al (2015).[10]

Measures

Acculturation

Participants who self-identified as Hispanic responded to a 13-item version of the Acculturation Rating Scale for Mexican Americans-II.[12] This version includes items focused primarily on language and cultural preferences such as "I enjoy speaking Spanish" or "I enjoy English language movies." Questions were asked separately for each culture (Hispanic and Anglo). Cronbach's alpha for the Hispanic and Anglo subscales was .92 and .68, respectively.

Depressive Symptoms

The Center for Epidemiologic Studies depression scale (CES-D) assessed prior week depressive symptoms.[13] Cronbach's alpha for this scale was .92.

Quality of Life

The PedsQL 4.0 assessed problems related to physical, emotional, social, and school functioning.[14] Items were transformed to a 0-100 scale, with higher scores indicating greater QoL. Cronbach's alpha for the PedsQL in this sample was .93.

Statistical Analyses

Given the low internal consistency for the Anglo orientation subscale, a confirmatory factor analysis (CFA) was performed to identify items for inclusion in the LCA to ensure that items reflected just two factors: Anglo and Hispanic orientation. Anglo orientation items with factor loadings <.60 were discarded. CFA was performed in Stata version 14 (StataCorp, College Station, TX).

Indicators for the LCA were dichotomized where 0 = "not at all," "very little" or "moderately," and 1 = "very much" or "almost always." Models were iteratively fit, progressing from one to four classes. Better fitting models are suggested by lower values for the Akaike Information

Criterion (AIC) and Bayesian Information Criterion (BIC), higher entropy (a measure of how distinct classes are from one another) values. The Lo-Mendell-Rubin likelihood ratio test was also considered, which tests the null hypothesis that the *k* number of classes being modeled is not a better fit than *k*-1 classes. Interpretability and parsimony were also considered when selecting the best model. Mplus (Version 6.11) was used for the LCA (Muthén & Muthén, Los Angeles, CA).

A probability of membership in each class was calculated for each individual based on their responses to each indicator item, and for the prediction model, class was set based on their highest probability. Measurement error in the probability of class membership is accounted for in the predictive analysis.[15] This predictive model was a multinomial logistic regression of the categorical latent classes on each continuous predictor (depressive symptoms and quality of life), so odds ratios are obtained for each predictor, for each outcome class relative to a referent class.

RESULTS

CFA results indicated that four items from the Anglo acculturation subscale did not adequately load onto the Anglo factor, resulting in three Anglo items retained in the LCA. All six Hispanic items had factor loadings >.80 so all were retained as latent class indicators.

The analytic sample consisted of 131 Hispanic CCS (Table 1). Comparative model fit indices are pre-

sented in Table 2. Results suggested that a 3-class model fit the data best.

Class Descriptions

All classes displayed a high probability of endorsing all Anglo items. One class also demonstrated a high probability (>.5) of endorsing all Hispanic items; this class was named bicultural. Another class showed a high probability of endorsing the Spanish language items but a low probability of endorsing all other Hispanic items; this group was named linguistically Hispanic/culturally Anglo (hereafter abbreviated to LH). The final class had a low probability of endorsing any Hispanic items; this class was named assimilated. Probabilities of endorsing each acculturation item, conditional on group membership, are presented in Figure 1.

Depressive symptoms and quality of life were assessed as potential predictors of class membership. Estimates from this model are presented in Table 3. The assimilated group had significantly higher odds of greater depressive symptoms and lower quality of life than the LH or bicultural groups.

DISCUSSION

To our knowledge, this was the first attempt to explore the relationship between ethnicity and disease via the existence of acculturative typologies in a sample of Hispanic CCS. Three distinct classes emerged from this analysis with a marked absence of a "marginalized" group,

Table 1. Descriptive statistics of the analytic sample

	Mean (SD)	Range
Years since diagnosis	7.91 (2.00)	5-11
Current age	20.42 (2.53)	16-26
	N (%)	
Male	69 (52.67)	
Cancer site group		
Leukemia	46 (34.85)	
Lymphoma	29 (21.97)	
Brain & other nervous system	16 (12.12)	
Other	40 (31.06)	

Table 2. Model-fit indices for latent class analysis

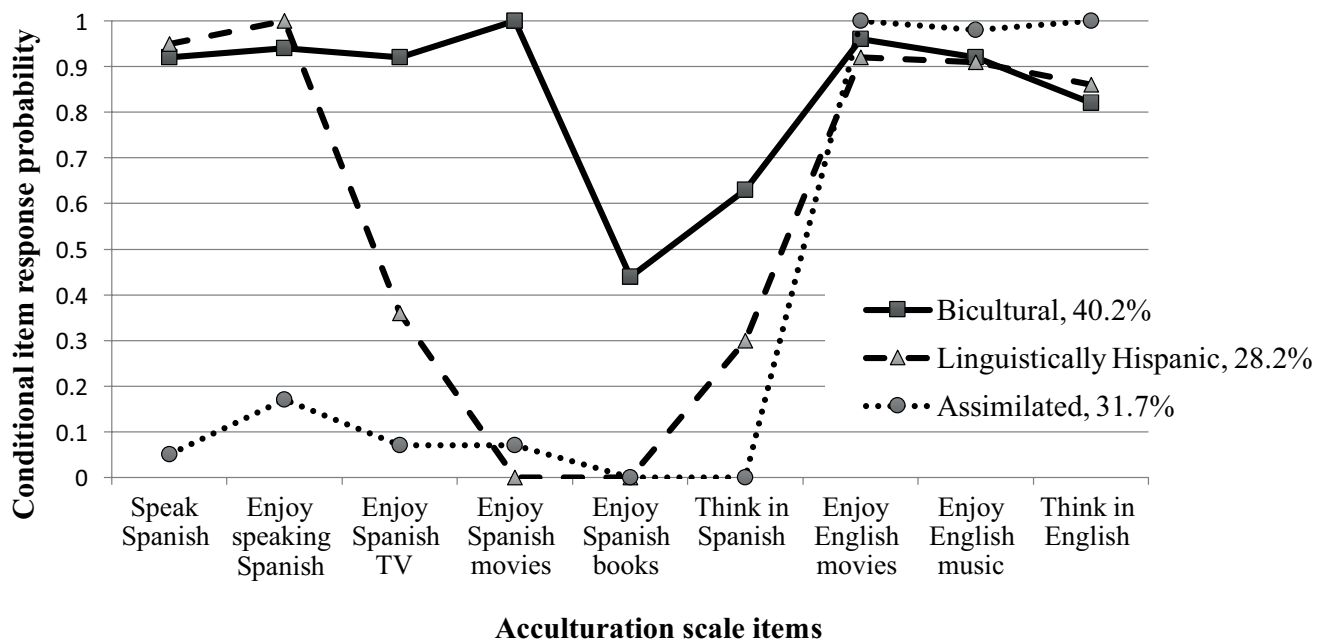|	Number of classes			
Variable	1	2	3	4
No. of parameters	9	19	29	39
Log likelihood	-580.167	-466.865	-437.13	-421.522
AIC	1178.333	971.729	932.261	921.044
BIC	1204.210	1026.358	1015.642	1033.177
N-adjusted BIC	1175.744	966.263	923.917	909.823
Lo-Mendell-Rubin comparison		2 vs 1	3 vs 2	4 vs 3
P-value		<.0001	<.0001	.16
Entropy		.89	.93	.97

Figure 1. Acculturation scale items

consistent with previous latent class/ profile analyses of Hispanic young adults.[16,17] Orientation toward the Anglo culture was consistent across classes, which is likely reflective of generational status, given that 87% of Hispanic CCS in this sample were born in the United States. However, variation was identified in orientation toward the Hispanic culture.

The bicultural and assimilated groups that emerged in this study were consistent with two of Berry's suggested typologies, and were

named accordingly to demonstrate continuity with this theory. However, the finding of a distinct group that appears culturally Anglo yet identifies with only linguistic aspects of their heritage culture is novel. Previous person-centered analyses have identified variations of Berry's typologies, but none that appeared predominantly assimilated while still reporting frequent use and enjoyment of their heritage language. The acculturative classes identified in our study may be reflective of contextual

factors such as the ethnic density of neighborhoods. Living in neighborhoods with a high proportion of Spanish-speaking individuals who are not English proficient may impact adolescent acculturation, given that language accounts for a substantial amount of the variance in some comprehensive acculturation measures.[18]

Neither depression nor quality of life differed significantly between the LH group and the bicultural group. This may indicate that those who identify only with the linguistic aspect of the Hispanic culture may still experience the health-protective effect of being bicultural. This group may consist of participants who prefer the Anglo culture, but are still connected to Hispanic family, friends, and/ or community members, and speak Spanish frequently either by choice

Table 3. Multinomial logistic regression of class membership on depressive symptoms and quality of life

Variable	Class comparisons- odds ratio (P)		
	LH vs A	B vs A	B vs LH
Depression	.94 (.005)	.96 (.039)	1.03 (.180)
Quality of life	1.04 (.005)	1.05 (<.001)	1.01 (.526)

LH, linguistically Hispanic/culturally Anglo; B, bicultural; A,assimilated

or possibly as "language brokers," translators between monolingual speakers, such as first-generation parents who have not learned English.[19] Preferring the Anglo culture while still regularly speaking and enjoying Spanish may reflect sustained engagement with one's heritage culture and exposure to its protective factors. Among Mexican Americans, perceiving linguistic and socioemotional benefits from language brokering has also been positively associated with adolescent resilience

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and negatively associated with depressive symptoms,[20] which supports our finding of greater mental health and quality of life in the LH group.

Limitations

The low internal consistency of the Anglo acculturation subscale was a notable limitation. However, the inclusion of three Anglo items still allowed us to account for Anglo cultural orientation and to compare it across latent classes. Additionally, the data used were cross-sectional, so future research should explore how acculturative groups differ on distal

outcomes such as mental and behavioral health at multiple time points.

Cross-cultural validity is a potential limitation of self-report measures of depressive symptoms due to cultural variations in perceptions of mental illness[20] and/or unique expressions of feelings based on the language used in assessment.[21] However, a recent multi-site study of the measurement properties of the CES-D in a large sample of Hispanic/Latino adults in the United States found acceptable measurement invariance across subgroups, suggesting that differences in depressive symptom scores likely reflect true differences in symptoms.[22]

Conclusion

More assimilated Hispanic CCS reported greater depressive symptoms and lower quality of life, suggesting that loss of one's Hispanic culture might be associated with poorer health outcomes. Interventions targeting mental health and wellbeing among CCS should pay particular attention to Hispanics who do not identify with their heritage culture. These findings shed new light on cultural characteristics that may be importantly related to psychosocial health, with implications for support programs for Hispanics CCS and their families, as well as for potential areas of further inquiry in studies of ethnicity and disease among cancer survivors.

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