

## 1 Abstract

2 **Background:** Acculturation has been identified as one determinant of health behavior and  
3 outcome among ethnic minorities. The high prevalence of lifestyle related chronic diseases and  
4 risk factors among Korean immigrants calls for a valid short acculturation scale to use in clinical  
5 practice and health research settings. **Objectives:** To validate the psychometric properties of a  
6 Short Acculturation Scale originally developed for Hispanics (SASH) after translating the scale  
7 to Korean (SAS-K) to determine its suitability for use with Korean immigrants. **Methods:** A  
8 self-administered questionnaire was completed by 143 Korean immigrants with type 2 diabetes  
9 aged 30-80 from a Korean community in Southern California. Confirmatory factor analysis,  
10 criterion validity, and internal reliability were utilized to evaluate the psychometric properties of  
11 the SAS-K. **Results:** A second order confirmatory factor analysis confirmed a three-factor  
12 structure [ $\chi^2(51) = 121.49, p < .001, CFI = .950, SRMR = .055, RMSEA = .099$ ]. The SAS-K  
13 was positively associated with length of residence, age of arrival, and English proficiency.  
14 Reliability for the total SAS-K was .93. Cronbach's alpha coefficients for each subscale of the  
15 SAS-K ranged from .80 (social relations) to .95 (media). **Discussion:** The 12- item, easy to use  
16 SAS-K demonstrated satisfactory reliability and validity and thus is an appropriate instrument for  
17 measuring acculturation in Korean immigrants. The short nature and ease of administration of  
18 the SAS-K makes it an ideal choice for healthcare providers and researchers to quickly and  
19 easily assess acculturation levels, and further the development and use of more culture-  
20 appropriate interventions.

21 **Key Words:** short acculturation scale, psychometric validation, Korean immigrants

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## Psychometric Validation of a Short Acculturation Scale for Korean Immigrants

Acculturation refers to the process in which the attitudes and behaviors of persons from one culture are modified as a result of contact with a different culture (Moyerman & Forman, 1992). Studies have shown that acculturation is a determinant of health behaviors and risk factors in ethnic minority populations (Kandula, Kersey, & Lurie, 2004; Salant & Lauderdale, 2003; Singh & Miller, 2004). Acculturation has been associated with health risk factors such as smoking, obesity, lack of physical activity, unhealthy diet among Latinos and Asians (Gomez, Kelsey, Glaser, Lee, & Sidney, 2004; Lara, Gamboa, Kharamanian, Morales, Bautista, 2005). The direction of association between acculturation and health, however, has not been consistent throughout these studies. For example, whereas less acculturation was related to a greater risk of diabetes among Mexican and Arab Americans (Hazuda, Haffner, Stern, & Eifler, 1988; Jaber, Brown, Hammad, Zhu, & Herman, 2003), more acculturation was associated with increased risk of diabetes in Japanese Americans (Huang, Rodriguez, Burchfiel, Chyou, & Curb, 1996; Gomez et al., 2004). Acculturation was not related to diabetes self-care behaviors in elderly Mexican American and Chinese American patients with type 2 diabetes (Fisher et al., 2004; Wen, Shepherd, & Parchman, 2004). As such, acculturation continues to be one of the important variables of interest in studies of ethnic minorities' health (Palaniappan et al., 2010; Venkat Narayan et al., 2010).

Korean immigrants are the 4th largest Asian American subgroup among Asian adults over 18 years of age in the US (Barnes, Adams, & Powell-Griner, 2008) and the majority (78%) of Korean immigrants are first generation immigrants (US Census Bureau, 2001). Whereas Korean immigrants are reported to have a high prevalence of lifestyle-related chronic diseases such as diabetes and hypertension, and risk factors such as smoking and obesity (Kim, Juon, Hill,

1 Post, & Kim, 2001; Cho & Juon, 2006; Lew et al. 2001), few studies have examined the  
2 relationship between acculturation and health within Korean immigrants. One potential  
3 hindrance to closing this gap in knowledge is the lack of an appropriately validated short and  
4 easy- to- administer acculturation measure for Korean immigrants that can be used in clinical and  
5 research settings.

6         The Short Acculturations Scale for Hispanics (SASH) (Marin, Sabogal, VanOss Marin,  
7 Otero-Sabogal, & Perez-Stable, 1987), widely used among various Hispanic populations in  
8 health care research, has demonstrated sound psychometric properties. The scale has also been  
9 validated for Filipino-American population with individuals recruited from clinic settings (De la  
10 Cruz, Padilla, & Butts, 1998) and a group of foreign-born Chinese Americans (Gupta & Yick,  
11 2001). Therefore, the SASH served as an appropriate starting point for the development of a  
12 short acculturation scale specific to Korean immigrants.

13         One potential concern during creation of this translated scale is that the process of  
14 translating an instrument for use in different ethnic groups has the possibility of introducing  
15 distortion in the semantic and conceptual meanings of items (Streiner & Norman, 1989). Even if  
16 linguistic equivalence is achieved through an appropriate translation technique, a translated  
17 instrument may not be functionally equivalent to the original due to cultural differences (Hsueh,  
18 Phillips, Cheng, & Picot, 2005). Therefore, it is important that all translated instruments be  
19 validated for psychometric properties, regardless of the psychometric properties of the original  
20 scale (Byrne & Campbell, 1999). Pounonen and Ashton (1998) suggested that the following  
21 psychometric properties be assessed in a translated version of a measure to determine whether a  
22 scale is applicable and adequate in a new population: scale mean, variance, reliability, criterion  
23 validity, and construct validity. When the psychometric properties of a translated version are

1 similar to those of the original, the translated instrument is regarded as a valid instrument  
2 (Paunonen & Ashton, 1998).

3 The purpose of this study was to validate the Korean translated SASH, a Short  
4 Acculturation Scale for Koreans (SAS-K). In following the guidelines proposed by Paunonen  
5 and Ashton (1998), the specific aims of our study were (a) to compare the mean and variance of  
6 scores on the three subscales between the SASH English and Korean versions; (b) to compare  
7 the reliability of the English and Korean versions; (c) to examine the criterion validity of the  
8 SAS-K; and (d) to examine the construct validity of the SAS-K. Our goal in developing the  
9 SAS-K was to provide a tool for healthcare providers and researchers to determine varying  
10 acculturation levels within Korean immigrants.

## 11 Method

### 12 *Design, Sample, and Setting*

13 The data presented herein are part of a larger cross-sectional study of the perception of  
14 heart disease risk (Choi, Rankin, Stewart, & Oka, 2008). A convenience sample of 143  
15 immigrant Korean men and women with type 2 diabetes participated in the study. Participants  
16 were recruited with flyers and posters from a variety of community sites in a West Coast Korean  
17 community. The participants were self-identified as Korean-born immigrants with a diagnosis of  
18 type 2 diabetes for at least a year and able to speak, read, and write in Korean. The study was  
19 approved by a university institutional review board, and all participants provided written  
20 informed consent. After consenting, participants were asked to complete a series of  
21 questionnaires in Korean. A bilingual researcher was available throughout data collection to  
22 assist participants with any questions. Participants were compensated with a free finger stick  
23 blood test for glucose control and cholesterol, worth approximately \$30.

## 1 *Instruments*

2           Of the questionnaires completed by participants, this study will focus on demographics,  
3 the SAS- K, and the English language proficiency scale. In addition to typical demographic  
4 questions such as age, gender, and income, participants were also asked items that could be seen  
5 as a proxy of acculturation, such as age of arrival and years lived in the US.

6           Similar to the translation technique used in creating the Spanish-language version of the  
7 SASH, double-translation (Brislin, 1986; Brislin, Lonner & Thorndike, 1973) was used to  
8 translate the English version of the SASH into the Korean-language SAS-K. Any discrepancies  
9 in translations were resolved by the consensus of three bilingual Korean immigrants – two health  
10 care professionals and a volunteer translator at a medical center near the Korean community. The  
11 instrument was then pilot tested with five diabetic patients from the same community that the  
12 main sample would be drawn to determine if there were any issues with the instrument such as  
13 the wording of questions or instructions, or the Korean translation. Based on the feedback of the  
14 pilot-test participants, the Korean language version (SAS-K) underwent two modifications by the  
15 bilingual Korean immigrant panel reviewers mentioned above prior to psychometric testing to  
16 ensure the equivalence of the English and Korean versions.

17           As in the original SASH, the SAS-K consists of 12 items that measure a person's  
18 acculturation level (Marin et al., 1987). It has three subscales: (a) language (5 items), (b) media  
19 (3 items), and (c) ethnic-social relations (4 items) (Table 1). The responses are measured on a  
20 five-point Likert-type format, ranging from 1 point (*Only Spanish*) to 5 points (*Only English*).  
21 The responses provided by each respondent can be averaged across items (range of scores is 1  
22 through 5). The mean score can be used as an interval scale, where scores close to 5 indicate high  
23 levels of acculturation and those close to 1 indicate little acculturation. According to guidelines

1 presented on the website of the original authors (Marin et al., 1995), an average of 2.99 can be  
2 used to differentiate the less acculturated respondents (average score between 1 and 2.99) and the  
3 more acculturated (average score above 2.99).

4 Marin and colleagues (1987) developed and tested the SASH in a multi-cultural, multi-  
5 generational immigrant sample (363 Hispanics and 228 non-Hispanic whites ages from 15 to 75).  
6 Both Hispanic and Non-Hispanic samples shared similar socio-demographic characteristics: the  
7 mean age was 31.2 years for Hispanics and 38.8 years for non-Hispanics, and the mean level of  
8 education was 12.3 years for Hispanics and 14.7 years for non-Hispanics. The sample consisted  
9 of 62% and 57% females for the Hispanic and non-Hispanic groups, respectively. Seventy  
10 percent of the Hispanics were foreign born and had on average lived in the US 14.7 years. The  
11 original scale demonstrated good psychometric properties. The reliabilities of three subscales and  
12 overall scale for the SASH were adequate to good, with Cronbach's alpha coefficients ranging  
13 between .78 and .92. Using exploratory factor analysis, the developers identified three  
14 individually meaningful subscales, language use, media, and ethnic social relations. The scale  
15 has been widely used in health care research with Hispanic populations and has a reported  
16 reliability of .92 in that population (Marin et al., 1987). To the best of the researchers'  
17 knowledge, it has not been used in a Korean sample until the present study. Cronbach's alpha for  
18 the SAS-K for this study was .93.

19 Third, the English Language Proficiency Scale consists of 4 items and measures how well  
20 one can speak, understand, read, and write in English on a 5-point Likert scale (not at all, poorly,  
21 fairly well, well, very well). Higher scores indicate a higher level of English language  
22 proficiency. This scale is based on the Interagency Language Roundtable (ILR) scale, a set of

1 descriptions of abilities to communicate in a language (Clark & Clifford, 1988). Cronbach's  
2 alpha for this scale was .99 in this study.

### 3 *Analysis of Data*

4 Due to the nature of data collection, there were no missing data; therefore analyses were  
5 performed on all 143 cases. To create subscale and total acculturation scores, respective means  
6 were calculated. Means and variations were calculated to examine descriptive statistics.

7 Cronbach's alpha was used to measure internal validity. Generally, the larger coefficient alpha,  
8 the more reliable the measure (Cronbach, 1987).

9 Criterion validity was measured using correlations with  $\alpha = .05$  (two-tailed). Criterion  
10 validity coefficients between SAS-K, length of residence, English proficiency, and age of arrival  
11 were assessed. As length of residence is proportional to a respondent's age, we calculated a ratio  
12 of length of residence in the US divided by the individual's age (similar to the strategy used in  
13 the validation of the SASH; Marin et al., 1987).

14 As exploratory factor analysis had already been completed with the SAS-H (Marin et al.,  
15 1987), construct validity was assessed via confirmatory factor analysis (CFA). A second-order  
16 CFA was performed with three subscales as first-order factors. The two most popular methods  
17 for evaluating model fit are the  $\chi^2$  goodness of fit statistic and fit indices (Hu & Bentler, 1999).  
18 As the  $\chi^2$  statistic is based on comparing the covariance structure of the ideal theoretical model  
19 with the observed covariance structure, other fit indexes are often used to aid in the evaluation of  
20 model fit. Common fit indexes include the root mean square error of approximation (RMSEA),  
21 comparative fit index (CFI), and standardized root mean squared residual (SRMR) among others.  
22 As the traditional cutoff of .06 for the RMSEA is known to over-reject properly specified models  
23 in small sample sizes (Hu & Bentler, 1999), CFI and SRMR were used to evaluate model fit. A

1 value of .95 or greater on the CFI, and a value of .08 or less on the SRMR suggest good fit (Hu  
2 & Bentler, 1999). Model identification was confirmed via the three-indicator rule (Bollen, 1989),  
3 which specifies that a multifactor model is identified when each latent factor has three or more  
4 indicators, indicators load only on one factor, and no residual error terms are correlated.

## 5 Results

### 6 *Sample description*

7 The sample consisted of 51.7% women and the mean age was 62.4 years (SD = 12.8;  
8 range = 30 to 80). More than half of the sample (62%) was married and over one half (57%) had  
9 a college education or better. The mean duration of living in the United States was 21.7 years  
10 (SD = 9.2). More than half (52.4%) had annual household income of less than \$20,000.

### 11 *SAS-K Means and Standard Deviations (Variance)*

12 Using the guidelines presented above for the interpretation of acculturative level, on  
13 average, participants rated themselves below 2.99 on all three subscales, and the total  
14 acculturation scale. Information about the variance of the original SASH was not available in the  
15 original publication and could not be obtained from the authors. However, a recently published  
16 study that used SASH in a sample of first generation Hispanic immigrants with depression  
17 presented similar subscale and total scale means and SDs to those of the SAS-K (Table 2).  
18 Whereas statistical significance of mean differences could not be tested, visual inspection shows  
19 that relative to Hispanics in the original SASH validation study, Korean participants scored  
20 lower on the three acculturation subscales, as well as total acculturation (Table 2).

### 21 *Reliability*

22 A summary of reliability findings are shown in Table 3. The reliability coefficient for the  
23 media subscale was slightly larger in the SAS-K than in the SASH. Reliability coefficients for

1 the language use and ethnic/social relations subscales are nearly identical in both the SASH and  
2 SAS-K. Cronbach's alpha coefficients for the total scales were nearly identical in the SASH and  
3 SAS-K as well.

#### 4 *Criterion and Construct Validity*

5 With regard to criterion validity, significant correlations between length of residence and  
6 age of arrival were found with all three subscales and total score of the SAS-K (Table 3). That is,  
7 participants with higher scores on the SAS-K, and thus could be classified as more acculturated,  
8 had lived in the US longer and arrived at a younger age than those with lower scores on the SAS-  
9 K. These results were similar to findings with the SASH, though coefficients for length of  
10 residence were slightly smaller on the SAS-K. Coefficients were roughly similar between age of  
11 arrival and both the SASH and the SAS-K. Additionally, English proficiency was positively  
12 associated with all three subscales and total score of the SAS-K. This means that participants  
13 who reported greater English proficiency scored higher on the SAS-K than those with lesser  
14 English proficiency.

15 Regarding construct validity, a second-order confirmatory factor analysis showed  
16 adequate model fit [ $\chi^2(51) = 121.49, p < .001; CFI = .950, SRMR = .055, RMSEA = .099$ ].  
17 Whereas the RMSEA suggests inadequate model fit, as noted before the RMSEA is known to  
18 over-reject properly specified models in small sample sizes (Hu & Bentler, 1999). As can be  
19 seen in Figure 1, all items loaded positively on the same factors as the SASH (all significant at  $p$   
20  $< .001$ ), suggesting that both the SASH and SAS-K possess similar factor structures.

#### 21 Discussion

22 The findings of the current study suggest that the SAS-K is an appropriate instrument to  
23 measure acculturation among Korean immigrants with diabetes. The mean scores on the three

1 subscales and overall acculturation were lower in this sample than in the SASH. These  
2 differences in means in the SASH and SAS-K may be due in part to differences in sample  
3 characteristics. In the SAS-K, the sample consisted entirely of first-generation immigrants,  
4 compared to only 70% first-generation immigrants in the SASH validation sample.  
5 Unfortunately, we were unable to compare our obtained ranges and SDs with those of original  
6 SASH as we were unable to obtain this information through the original publication or from the  
7 authors. Significant correlations of SAS-K with length of residence, age of arrival, and English  
8 proficiency provided sufficient criterion validity and suggested that the SAS-K measures  
9 acculturation as expected.

10         The SAS-K demonstrated good internal consistency, with alphas ranging from .80 to .95.  
11 When comparing overall and subscale alphas, internal consistency was comparable between  
12 SASH and SAS-K measures, with the sole exception being that the alpha was moderately higher  
13 on the SAS-K than on the SASH for the “Media” subscale. We can only speculate as to the  
14 reason for this discrepancy. One possibility is that Korean immigrants may view different types  
15 of media as more of a single source of information than Hispanic immigrants. A second, more  
16 likely possibility of this difference may be due in part to the homogenous nature of the Korean  
17 immigrant sample. As noted before, whereas the SASH was validated with a sample consisting  
18 of only 70% first-generation immigrants, the SAS-K was validated on a sample consisting  
19 entirely of first-generation immigrants. Whereas both samples demonstrated adequate levels of  
20 internal consistency, this difference in sample composition may have resulted in lower  
21 agreement among the “Media” items for the Hispanic group, as well as the higher mean levels of  
22 acculturation.



- 1 include exploring measurement equivalence across different Asian subgroups and other ethnic
- 2 populations to support cross-cultural research. Further research should also work toward
- 3 integrating acculturation levels with the development and implementation of more culture-
- 4 appropriate interventions.

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Figure Legends

*Figure 1.* The second-order confirmatory factor analysis for the SAS-K. SAS-K = Short Acculturation Scale – Korean version.

Table 1

*Factor Loadings and Factor Structure for the SASH*

Items	SASH Factors		
	1	2	3
Factor 1: Language Use/ Ethnic Loyalty			
SASH 1: Language Spoken	0.70	0.50	0.18
SASH 2: Language as Child	0.71	0.12	0.13
SASH 3: Language at Home	0.66	0.36	0.10
SASH 4: Thinking Language	0.69	0.48	0.18
SASH 5: Language with Friends	0.68	0.49	0.22
Factor 2: Media			
SASH 6: Language TV	0.34	0.78	0.19
SASH 7: Language Radio	0.27	0.78	0.23
SASH 8: Preferred Media	0.21	0.81	0.25
Factor 3: Ethnic Social Relations			
SASH 9: Ethnicity Friends	0.53	0.22	0.61
SASH 10: Ethnicity Parties	0.36	0.22	0.69
SASH 11: Ethnicity Visitors	0.51	0.13	0.66
SASH 12: Ethnicity Children's Friends	-0.07	0.34	0.71

*Note.* SASH = original version of the short acculturation scale for hispanics. Adapted from "Development of a Short Acculturation Scale for Hispanics," by G. Marin, F. Sabogal, B. Marin, R. Otero-Sabogal, and E. Perez-Stable, 1987, *Hispanic Journal of Behavioral Sciences*, 9, pp. 183-205.

Table 2

*Mean and SD of Scores in the SASH and the SAS-K*

	SASH <sup>a</sup>		SASH-cc <sup>b</sup>		SAS-K	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Language Subscale	2.35	--	1.38	0.45	1.41	0.58
Media Subscale	3.57	--	1.95	0.91	1.77	0.87
Ethnic Social Relations Subcale	2.62	--	2.19	0.57	1.60	0.53
Total	2.72	--	1.79	0.50	1.56	0.56

*Note.* SASH = original version of the short acculturation scale for Hispanics; SASH-cc = SASH administered in a community clinic sample; SAS-K = SAS in Korean.

<sup>a</sup>Original SASH developed by Marin, Sabogal, Marin, & Perez-Stable, (1987).

<sup>b</sup>Original SASH administered with a community clinic sample of depressed first-generation Latino immigrants (Santiago-Rivera, Kanger, Busch, Rusch, Reyes, West, et al., 2010).

Table 3

*Summary of Validity and Reliability Analyses in the SASH and the SAS-K*

Criterion	SASH <sup>a</sup>				SAS-K			
	All Items	Factor 1 "Language"	Factor 2 "Media"	Factor 3 "Social Relations"	All Items	Factor 1 "Language"	Factor 2 "Media"	Factor 3 "Social Relations"
Reliability								
Alpha	0.92	0.90	0.86	0.78	0.93	0.89	0.95	0.80
Validity <sup>b</sup>								
Length of Residence	0.70	0.76	0.46	0.50	0.51	0.46	0.41	0.48
English Proficiency	--	--	--	--	0.74	0.64	0.67	0.67
Age of Arrival	-0.69	-0.72	-0.58	-0.46	-0.62	-0.56	-0.52	-0.58

*Note.* SASH = original version of the short acculturation scale for Hispanics; SAS-K = SAS in Korean.

<sup>a</sup>Original SASH developed by Marin, Sabogal, Marin, & Perez-Stable, (1987).

<sup>b</sup>All correlations significant at  $p < .001$ .

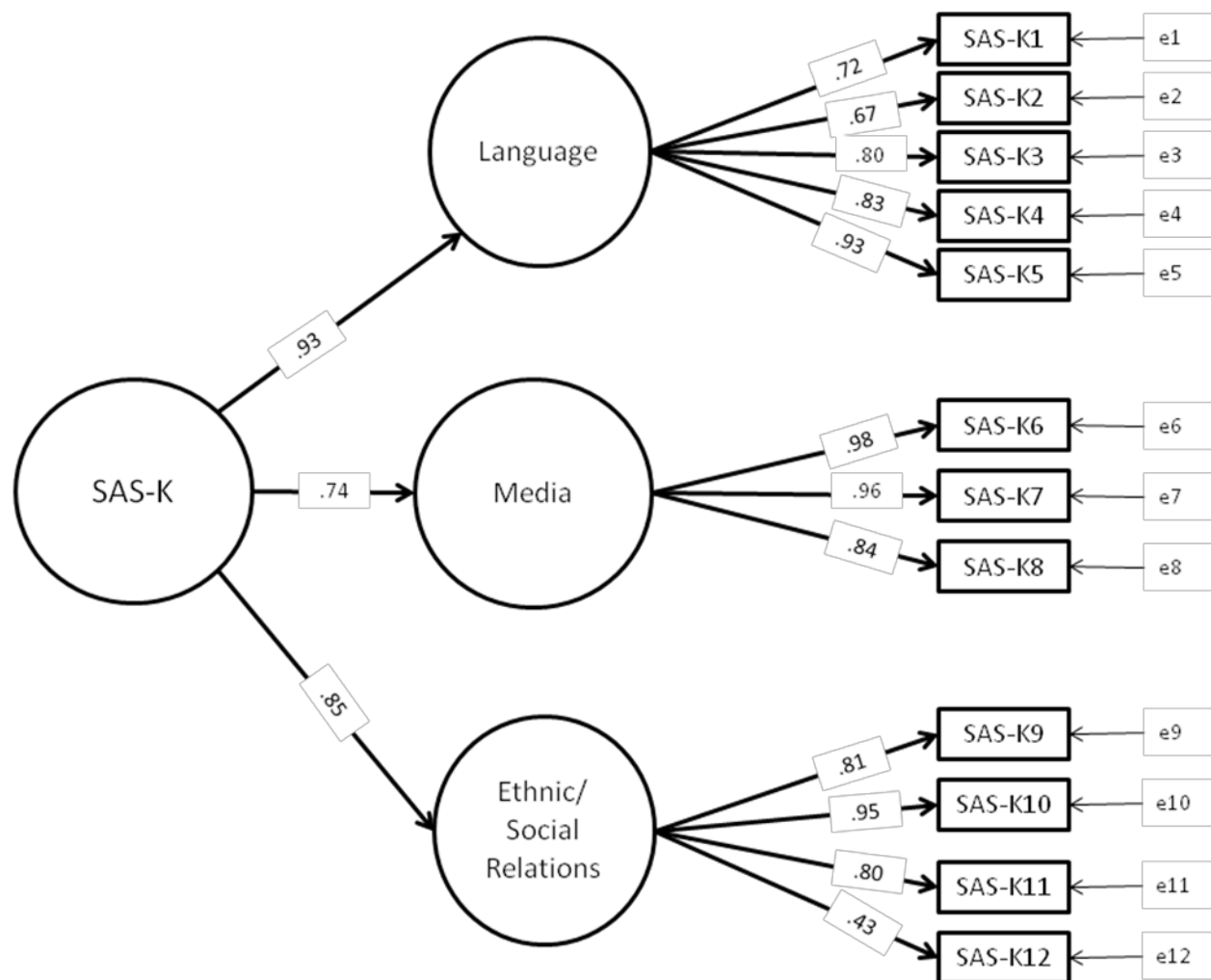


Figure 1. The second-order confirmatory factor analysis for the SAS-K. SAS-K = Short Acculturation Scale – Korean version.