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Abstract

The purpose of the current study was to investigate the reliability and validity of the Adapted Coping Operations Preference Enquiry (COPE) Scale with deaf college students. The Adapted COPE identifies 15 strategies for managing stressors. 117 deaf college students from Gallaudet University, between the ages of 18 and 25, participated in the present study. When used with this sample, the majority of the Adapted COPE subscales evidenced high or moderate internal consistency reliability, except for the Mental Disengagement and Active Coping subscales. To investigate structural validity, principle component analysis was conducted utilizing quartimax rotation. Initial analyses retained 17 factors and failed to replicate the intended subscale structure of the measure. Post-hoc t-tests indicated that responses to the Original COPE by hearing participants and the Adapted COPE by deaf participants were largely similar, except for the Substance Use subscale, with significantly higher mean scores in the deaf sample. This suggests that the psychometric analyses of the original COPE scale indicate a need for additional restructuring of the measure.

Keywords: coping, psychometrics, deaf

Coping and its relationship to various psychological processes, personality characteristics, and physical and mental health outcomes has been extensively studied (e.g., Epstein, 1992; Herrald & Tomaka, 2002; Plante, Yancey, Sherman, & Muertin, 2000). Numerous coping strategies have been shown to be conducive to one's ability to cope with life-changing events. Using humor as a coping strategy, for instance, has been linked to rapid cardiovascular recovery and increased immunity (Herald & Tomaka, 2002). Also, utilizing one consistent form of coping has been shown to be more effective than vacillating between multiple coping strategies (Fauerbach, Lawrence, Bryant, & Smith, 2002). In a study of burn victims, those who alternated between venting and blocking emotions were more likely to have poorer health outcomes and depression than those who maintained one coping strategy (Fauerbach et. al., 2002).

Coping research has also investigated psychological growth in potentially traumatic experiences, such as limb amputation and burning incidents (Fauerbach et. al., 2002; Oaksford, Frude, & Cuddihy, 2005). Those who utilized coping strategies, such as support seeking, humor, and religion were

able to adapt to the trauma, had a greater commitment to personal goals and greater well-being, and exhibited lower levels of psychological distress (Ellison, 1991; Oaksford, Frude, & Cuddihy, 2005; Plante et al., 2000; Ross, 1990).

An individual's coping strategy tends to remain consistent from one situation to the next (Lazarus, Gruen, & DeLongis, 1986). It is therefore important to measure current coping behavior to predict how individuals will cope with future events. Such measurement can also help to determine the most effective coping strategies for unique populations and inform the work that professionals do with these populations.

Coping and Mental Health in Deaf Individuals

"Deaf" is a label that refers to a heterogeneous mix of individuals with varying levels of hearing loss, age of onset, and etiologies (Gallaudet National Summary, 2008). In terms of identity, some deaf individuals identify as culturally Deaf, defining themselves as members of the Deaf culture through a unifying language (American Sign Language) and set of values (Lane, Hoffmeister, & Bahan, 1996). These culturally Deaf individuals identify themselves as a cultural and linguistic minority rather than as a population with a disability (Lane, Hoffmeister, & Bahan, 1996). Other individuals identify as medically deaf rather than culturally Deaf, hard of hearing, or bicultural (Leigh, 2009). It is important to consider the diversity in the deaf population when drawing generalizations from research with deaf individuals.

Research on coping strategies in a deaf population has been limited. Such research is greatly needed, since deaf individuals not only face everyday stressors that hearing people face, but also additional stressors related to being deaf in a hearing society. These stressors may include inaccessibility of information, isolation due to communication barriers, and stress related to membership in a cultural and linguistic minority group (Jones, Ouellette, & Kang, 2006). For instance, deaf individuals may face underemployment or unemployment due to communication barriers and limited options for accessible job training (Long, 1992; Schirmer, 2001). Deaf adults may face low socioeconomic status and have "low status" jobs as a consequence, causing additional stressors (Cohen & Williamson, 1998, as cited in Jones, Ouellette, & Kang, 2006).

Deaf adults have reported feelings of isolation due to limitations in communication, missing information, and a sense of being different (Bain, Scott, & Steinberg, 2004; Oliva, 2004). Feelings of isolation depend heavily on communication preferences of deaf individuals and their corresponding environment. Charlson, Strong, and Gold (1992) found that deaf students in mainstream schools were more likely to feel disconnected from teachers and peers. This study also found that in a residential school, deaf students had improved accessibility to education and greater potential for social relationships with other deaf peers. Yet, students at residential settings were more likely to feel disconnected from their families if they lived on campus during the week. The connections that deaf individuals develop as children through school, peer groups, and family, as well as the language they acquire, impact the support systems they utilize later in life (Tidball, 1990).

Coping can be categorized as problem-focused coping (e.g. planning, seeking instrumental social support) and emotion-focused coping (e.g. acceptance, positive reinterpretation, seeking emotional social support) (Carver, Scheier, & Weintraub, 1989; Lazarus & Folkman, 1984). Problem-focused coping strategies that deaf people may utilize to manage these unique stressors include self-advocacy, improving speech-reading and speaking skills, modification of the environment to ensure clear communication, use of assistive listening devices, use of sign language, involvement of activities, building relationships with deaf peers, and ensuring workplace accommodations were in place (Bain, Scott, & Steinberg, 2004; Rogers, Muir, & Evenson, 2003). Emotion-focused strategies specific to deaf stressors include developing a positive self-image, denying problems, and maintaining contact with deaf peers, a good sense of humor, a sense of caring, and supportive family environment (Charlson, Strong, & Gold, 1992; Rogers, Muir, & Evenson, 2003).

A strong Deaf identity has also been shown to act as a buffer against feelings of isolation and worthlessness (Charlson, Strong, & Gold, 1992; Tidball, 1990). The additional stressors that deaf individuals must manage in their lifetime may have a positive effect later in life. Deaf senior citizens have been shown to approach the retirement process with less stress than hearing peers (Tidball, 1990). One reason for this may be that deaf senior citizens have already developed effective coping strategies in response to greater stress in their lifetime (Tidball, 1990). Overall, deaf adults who identify with the Deaf community and spend much of their time with other deaf people often have higher self-esteem than those who do not (Bat-

Chava, 1993; 1994; Hintermair, 2008; Jambor & Elliott, 2005). Self-esteem has been found to be a powerful mediator in coping ability, especially in deaf individuals (Rogers, Muir, & Evenson, 2003).

Assessing Coping Skills in Deaf Individuals

There has been little systematic investigation of stress and coping in deaf individuals. Kordus (1998) used the COPE Scale, a popular measure of coping (Carver, Scheier, & Weintraub, 1989) (see below for a description of the scale) to examine coping effectiveness in deaf individuals with HIV/AIDS. She adapted this measure to be administered to a deaf sample, but did not test it for reliability and validity with deaf individuals. Adams (2000) investigated the reliability and validity of a measure called the Problem-Focus Style of Coping (PF-SOC) with deaf individuals. Adams found this to be a partially valid and reliable instrument to be used with deaf people. Jambor and Elliott (2005) investigated self-esteem and coping strategies among deaf college students using a self-report questionnaire that included deafness-related factors, identification with the Deaf world, self-esteem, coping strategies, and demographic variables. The authors constructed this questionnaire but did not examine its reliability or validity.

Considering this limited research, it is clear that research investigating the measures that assess stress and coping in deaf individuals is necessary, particularly when trying to assess their resilience in view of life stresses. Such measures must be relevant for the unique cultural, linguistic, and accessibility needs of a deaf population. Such measures can lead to identifying those individuals who can benefit from positive coping strategies, which may be taught. The COPE, which was used in the Kordus (1998) study, is one such measure with potential for use in this population if its reliability and validity can be demonstrated.

Reliability and Validity of the Original COPE Scale

The original COPE scale is a broad measure of coping strategies that people may use at one time or another, including problem-focused and emotion-focused forms of coping and other forms of coping that may be deemed as adaptive or maladaptive. It contains 60 items comprising 15 subscales, with four items per subscale. These subscales are labeled as follows: Positive Interpretation and Growth, Mental Disengagement, Focus on and Venting Emotions, Use of Instrumental Social Support, Active

Coping, Denial, Religious Coping, Humor, Behavioral Disengagement, Restraint, Use of Emotional Social Support, Substance Use (also labeled as Alcohol/Drug Use), Acceptance, Suppression of Competing Activities, and Planning. Participants are instructed to rate on a Likert scale how often they engage in each item while under stress: 1 = "I usually don't do this at all;" 2 = "I usually do this a little bit;" 3 = "I usually do this a medium amount;" and 4 = "I usually do this a lot." This measure takes approximately 5-10 minutes to administer.

The researchers who investigated the original COPE Scale for internal consistency found that the Cronbach's alpha reliability coefficients for each scale were greater than .6 (an acceptable level) with one exception (Carver, Scheier, & Weintraub, 1989). Test-retest correlations also suggested that the COPE Scale was relatively stable. Additionally, an exploratory factor analysis of the original COPE scale yielded 14 factors with item loadings on each factor ranging from .19 to .95. The weakest items of this factor analysis in the Carver, Scheier, and Weintraub (1989) study occurred in Positive Reinterpretation and Growth (.19) and Mental Disengagement (.23), while the strongest loadings occurred within the Turning to Religion factor (.88 and .95). The 15th factor, Humor, was added to the COPE following a study by Carver, Scheier, and Weintraub (1989), but was never tested for reliability and validity.

As a further assessment of the reliability of the COPE, correlations among the subscales were computed. Correlations were all low (ranging from .00 to .45), indicating distinct subscales, except for Active Coping, which correlated with Planning (.67), and Seeking Instrumental Social Support, which was correlated with Seeking Emotional Social Support (.69) (Carver, Scheier, & Weintraub, 1989).

To determine convergent and discriminant validity, the original COPE scales were correlated with selected personality measures (Carver, Scheier, & Weintraub, 1989). The researchers reported that the pattern of associations obtained generally produced the hypothesized results. For instance, Active Coping and Planning were significantly correlated with several conceptually related personality qualities, such as optimism and self-esteem. Divergent validity was also demonstrated by negative correlations between the COPE scales and theoretically opposing personality measures, such as behavioral disengagement and control.

Based on their psychometric findings described above, Carver, Scheier, and Weintraub (1989) concluded that the original COPE was sufficiently reliable and valid for the investigation of coping skills.

Purpose of the Study

The purpose of the current study was to investigate the reliability and validity of an adapted version of the COPE scale when used with deaf college students. In accordance with the original study by Carver, Scheier, and Weintraub (1989), reliability of the Adapted COPE was investigated utilizing measures of internal consistency. Validity within the current sample was investigated via exploratory factor analysis to determine whether items loaded on their intended subscales.

Method

Participants

Students at Gallaudet University who identified themselves as culturally Deaf, deaf, or hard of hearing were invited to participate in the current study. Participants were between the ages of 18 and 25, without additional physical or mental disabilities. The age limit was used as an inclusion criterion to align with the reliability and validity study of the original COPE scale by Carver, Scheier, and Weintraub (1989).

According to conventional standards of factor analysis, sample size should be determined based on the number of items on the questionnaire (Tabachnick & Fidell, 1996). Tabachnick and Fidell (1996) recommend that 2 to 20 subjects should be recruited per questionnaire item. The researchers opted to utilize Tabachnick and Fidell's (1996) recommendation for number of participants in order to maintain a smaller, homogenous sample with strong internal validity. Thus, in order to obtain at least two participants per item, considering a total of 60 items, 120 undergraduate students attending a four-year university for Deaf and hard of hearing students were recruited for the current study.

Three participants were disqualified from the study because they exceeded the age limit. This resulted in a total of 117 participants: 22 males and 95 females. The mean age was 20.75 years, with a range of 18 to 25 years. Additional participant characteristics are listed in Table 1.

Table 1. Demographic characteristics of the sample

Demographic Characteristics		Percent of the Sample (n=120)
Family Heritage	Caucasian	67.5%
	African American/Black	9.2%
	Hispanic/Latino	10.0%
	Asian American	6.7%
	Other	2.5%
Deaf Identity	deaf (Medical Definition)	57
	Deaf (Culturally Deaf)	38
	Hard of Hearing:	12
	Late Deafened	2
Onset of Deafness	Born Deaf	69.2%
	Before Age 2	16.6%
	After Age 2	14.2%
Preferred Communication Mode	American Sign Language	73.3%
	Pidgin Sign Language	5.0%
	Spoken English	3.3%
	Total Communication	2.5%
	Simultaneous Communication	5%
	Other	

Measures

The Adapted Coping Operations Preference Enquiry (COPE). The COPE scale was first revised for deaf readers by Kordus (1998), who simplified lengthy English statements to accommodate deaf participants (Kelly & Barac-Cikoja, 2007). Kordus also revised phrases that included figurative language, such as changing "*36. I kid around about it*" to "*36. I joke around about it.*" Considering that for culturally Deaf individuals, the primary language is American Sign Language, English skills can and do vary widely (Moores, 2001). For this reason, measures are reviewed for English clarity and simplicity, and adapted as needed to ensure that deaf readers understand the items. These adapted measures need to be assessed for reliability, and in fact such adapted measures have demonstrated acceptable internal consistencies using deaf college student samples (Leigh & Anthony-Tolbert, 2001).

With permission from the original researcher, Dr. Charles Carver (personal communication, September 20, 2006), the current study made several additional revisions in consultation with an English professor at a deaf university and a deaf research advisor, thus resulting in the Adapted COPE Scale. These changes were made in order to create more direct phrases and statements that would be more readily understood by a deaf population while maintaining the overall meaning of the original questionnaire.

Demographic Questionnaire. A brief 19-item demographic questionnaire that assessed variables such as age, gender, educational background, ethnic background, degree of hearing loss, hearing status, and preferred mode of communication was also administered to gain background information. Additional items also included family background, educational background, and mental health background.

Procedures

After obtaining IRB approval and permission to adapt the COPE scale as originally developed by Carver, Scheier, and Weintraub (1989), participants were recruited with flyers posted on campus and information sent via campus-wide email. Following email correspondence, participants were scheduled to meet the investigator or research assistant who matched the communication styles of the participants (e.g., American Sign Language, Signed Exact English, Signed English, Simultaneous Communication). They were then informed of the purpose of the study, the procedures involved, and the confidentiality of all information. Participants then completed the brief demographic survey and the Adapted COPE scale. These measures required approximately 30 minutes to complete. Participants were given 10 dollars as compensation.

Results

Responses from all questionnaires were entered into the SPSS statistical program. Adapted COPE data were then analyzed for internal consistency and factor structure.

Descriptive Statistics

The Adapted COPE identifies various strategies for managing stressors represented by 15 subscales. The possible scores for each subscale ranged

from four to 16. Means and standard deviations are reported in Table 2.

Table 2. Descriptive statistics of Adapted COPE Subscales

Subscale	Mean	Standard Deviation
Positive Reinterpretation and Growth	13.50	1.96
Acceptance	12.16	2.16
Planning	12.07	2.06
Use of Instrumental Support	12.06	2.74
Use of Emotional Social Support	11.90	2.81
Active Coping	11.47	1.89
Mental Disengagement	10.67	1.91
Focus On and Venting of Emotions	10.53	2.51
Restraint	9.79	2.01
Suppression of Competing Activities	9.46	2.32
Humor	9.29	2.96
Religious Coping	7.57	3.59
Behavioral Disengagement	7.12	1.91
Denial	6.54	2.27
Substance Use	5.85	2.86

Reliability

In order to investigate reliability of the Adapted COPE, the internal consistency of each subscale was computed using Cronbach's alpha. An alpha value of $\geq$ 0.70 was considered high and a value of $\geq$ 0.50 was considered moderate.

In the current sample, the majority of Adapted COPE subscales evidenced high or moderate internal consistency (see Table 3). Subscales measuring Focus on and Venting of Emotions, Use of Instrumental Social Support, Denial, Religious Coping, Humor, Use of Emotional Social Support, and Substance Use evidenced high internal consistency. Subscales measuring Positive Reinterpretation and Growth, Behavioral Disengagement, Restraint, Acceptance, Suppression of Competing Activities, and Planning evidenced moderate internal consistency.

However, the Mental Disengagement and Active Coping subscales were found to have low internal consistency. Additional analyses were conducted to determine if any particular items from these two subscales significantly contributed to the low levels of internal consistency. This was done in order to provide justification for altering or deleting those particular items for deaf populations. For the Mental Disengagement subscale, internal consistency did not significantly improve with the deletion of any particular item. However, on the Active Coping scale, the deletion of item #25 ("I take additional action to try to get rid of the problem") resulted in an increase in Cronbach's alpha, from .417 to .597.

Table 3. Internal consistency reliability of the Adapted COPE with a sample of deaf undergraduates

Scale	Cronbach's Alpha
Substance Use	.924**
Religious Coping	.915**
Humor	.847**
Use of Instrumental Support	.800**
Use of Emotional Social Support	.790**
Denial	.759**
Focus On and Venting of Emotions	.734**
Positive Reinterpretation and Growth	.690 *
Suppression of Competing Activities	.672*
Acceptance	.645*
Planning	.617*
Behavioral Disengagement	.559*
Restraint	.554*
Active Coping	.417
Mental Disengagement	.279

Note. ** = High internal consistency; * = Moderate internal consistency

Factor Structure

To determine the structural validity of the Adapted COPE scale with a deaf undergraduate sample, exploratory factor analysis was conducted. Principle component analysis was conducted utilizing quartimax rotation, as the subscales were not independent. The initial analysis retained 17 factors,

determined using eigenvalue (Eig=1), variance, and scree plot. These factors accounted for 73.9% of the total variance.

Table 4. Exploratory factor analysis, quartimax rotation – factor loadings for Adapted COPE subscales

Factor	Items loading above .40	Intended COPE scale
1	4*, 5, 11, 14*, 21, 23*, 29, 30, 44,45, 52, 59	Use of instrumental support, Use of emotional support, acceptance, Positive reinterpretation and growth, Active coping
2	12, 26, 35, 53	Substance use
3	7, 18, 48, 60	Religious coping
4	3, 4*, 17, 23*, 28, 34, 46	Focus on venting of emotions, Use of emotional social support, Use of instrumental social support
5	8, 20, 36, 50	Humor
6	27, 40, 51, 57	Denial, Behavioral Disengagement
7	15, 19, 22*, 32, 33, 43, 47	Suppression of competing activities, Planning, Restraint, Mental disengagement, Active coping
8	10, 22*, 41	Restraint
9	24, 37, 39°	Behavioral disengagement, Planning
10	25, 56	Active coping, Planning
11	54	Acceptance
12	42, 55	Suppression of competing activities
13	16	Mental disengagement
14	2, 37°	Mental disengagement, behavioral disengagement
15	9	Behavioral disengagement
16	31	Mental disengagement
17	13, 14*	Acceptance

Note. * = Item loaded on multiple scales, ° = Negative loading

A rule of thumb for determining if an item loads on a factor is a rotated factor loading of at least .40 (Garson, 2008). Therefore, an item is listed as loading on a factor if its factor loading was .40 or above. Item loadings

onto the 17 factors are listed in Table 4. The Substance Abuse, Religious Coping, and Humor scales each loaded cleanly as in previously studied samples. Instrumental Social Support, Emotional Social Support, Focus on and Venting of Emotions, Restraint, and Denial generally loaded together, but individual items were split among factors. The Positive Reinterpretation and Growth, Mental Disengagement, Active Coping, Behavioral Disengagement, Acceptance, and Planning scales of the COPE did not load together, with items split among the factors.

Post-hoc analyses

Post-hoc t-tests were conducted with reliable and valid subscales to assess whether or not there were differences between hearing participants' responses to the Original COPE and the present sample's responses to the Adapted COPE. None of the subscales of the COPE were found to be different between the two populations, except for Substance Use (also known as Alcohol-Drug Use) subscale, $t(119) = 5.96, p < .05$, on which the current sample of deaf participants (mean = 5.85) scored higher than the original hearing participants (mean = 1.38).

Discussion

The objective of the current study was to investigate the utility of the Adapted COPE Scale with a sample of deaf undergraduate students. Using a sample of 117 respondents, data were analyzed for internal consistency reliability and structural validity.

Reliability

Overall, the subscales of the Adapted COPE scale demonstrated acceptable internal consistency within this sample of deaf undergraduates, with seven of the 15 scales exhibiting Cronbach's alpha values above .70, which reflects high internal consistency. Six of the 15 scales demonstrated moderate internal consistency, exhibiting Cronbach's alpha values above .50. Due to the limited power in conducting research with a small sample size, moderate internal consistency was considered reliable for the purposes of the current study.

While the majority of subscales evidenced reliability within this sample, two did not: Mental Disengagement and Active Coping. This

finding is comparable to the original reliability and validity study, in which these subscales yielded the lowest Cronbach's alpha values (.45 and .62, respectively) (Carver, Scheier, & Weintraub, 1989). Therefore, the low levels of internal consistency in these subscales are likely due to weaknesses of the original COPE subscales. In fact, the authors of the original COPE study noted that the Mental Disengagement scale was described as a multiple-act criterion, which involves repeated observations of different behaviors, causing expected lower reliability (Fishbein & Ajzen, 1974).

Additionally, it should be noted that two of the subscales (Substance Use and Religious Coping) evidenced Cronbach's alpha values above .90. Generally speaking, internal consistencies that are this high typically indicate scales that contain redundant items. In other words, the items are too highly correlated and may be querying the identical information. These extremely high internal consistencies suggest that these particular scales may contain unnecessary items that can be deleted in future revisions of the measure.

Although two Adapted COPE subscales evidenced low levels of internal consistency and there was indication of some redundancy, the majority of subscales reliably measure coping behaviors within this sample of deaf undergraduates. To ensure the consistency of all the subscales, further research should be conducted with a larger sample of deaf adults, as well as the general population.

Validity

The current exploratory factor analysis provided little support for the structural validity of the Adapted COPE when used with deaf undergraduates. Of the 17 factors retained, 12 of the intended scales were split across these factors. Only items measuring Substance Use, Religious Coping, and Humor loaded together as the original measure intended. However, as mentioned above, the Substance Use and Religious Coping subscales evidenced internal consistency values that suggested redundancy. Therefore, the items from these intended subscales may be loaded cleanly because they are asking highly overlapping questions.

Additionally, items from several intended subscales loaded onto one combined factor. As can be seen in Table 3, the factors pulled scales into more general categories, such as emotion-focused coping, problem-focused coping, or the less healthy coping skills of venting and disengaging as

described by the original validity and reliability study (Carver, Scheier, & Weintraub, 1989). For example, items intended to measure Use of Instrumental Social Support and Use of Emotional Social Support loaded on one factor. While the separation of these two types of support is understandable in theory, seeking social support of any type converged during factor analysis of this sample. Interestingly, when the results from the Carver, Scheier, and Weintraub (1989) study were investigated further, it was found that "loadings for seeking social support for instrumental reasons and seeking support for emotional reasons come from a single factor that incorporated both scales" (1989, p. 272). This joint loading also occurred with Active Coping and Planning items, which loaded on one scale. It is not readily apparent why these subscales were not combined into more general subscales after the original psychometric analyses. However, the current data align with the original COPE psychometric analyses, indicating the need to restructure the COPE with fewer, more general subscales for both deaf and hearing populations. As the COPE continues to be used in research studies (C. Carver, personal communication, June 8, 2007), there is a real need to restructure this measure.

In addition to creating more general, comprehensive subscales, a restructuring of the COPE would also lend itself to more effective psychometric analyses. Given that each scale of the Adapted COPE was comprised of only four items, even one item loading on another scale significantly affects the structural validity, as at least three item loadings are required to create a factor. Returning to the original COPE, it was found that five of the subscales (Active Coping, Positive Reinterpretation and Growth, Acceptance, Behavioral Disengagement, and Mental Disengagement) contained items with loadings well below the standard of .40. Additionally, the large number of subscales (15) and relatively small sample size likely affected the current researchers' ability to replicate the structure of the COPE.

With regard to the post-hoc *t*-tests comparing hearing and deaf participant responses, it is possible that deaf individuals may be more at risk for abusing substances as a coping mechanism. This may be due to educational difficulties, lack of positive deaf role models, communication barriers, lack of appropriate drug education, fewer social supports, and lack of access to drug abuse prevention resources (Guthmann, Sandberg, & Dickinson, 2010; Titus, Schiller, & Guthmann, 2008). These factors may result in differences in the structure of coping strategies between deaf and

hearing groups; however, further research should be conducted in order to understand the factors behind deaf individuals' use of substances for coping purposes.

Limitations and Future Directions

The current study is limited by the relatively small number of participants which is a result of a small undergraduate cohort from which to recruit. It may be that using the minimum number of participants per item returned factors with poor reliability and contributed to the discrepancies in item loading onto the expected subscales. Even though Tabachnick and Fidell (1996) recommended that two to 20 subjects should be recruited per questionnaire item, as explained in the Participant section, this resulted in a relatively small sample size for computing factor analysis. Tabachnick and Fidell (2007) later recommended 300 cases for computing a factor analysis. However, considering the small recruitment pool, it is often unrealistic to collect a sample of 300 participants while still upholding internal validity. The current data, therefore, provide preliminary information on which future research with larger samples of deaf participants can build.

As stated above, the psychometric analyses of the original COPE scale indicated a need for additional restructuring of the measure. The current results with deaf undergraduates indicate the need for a similar restructuring. Therefore, future research should seek to restructure the COPE scale based on results from exploratory factor analysis, ultimately resulting in a smaller number of scales that more accurately measure general aspects of coping.

While efforts were made to maintain the meaning of the original COPE items, certain items of the Adapted COPE were worded differently and may have impacted the resulting factor structure. Additionally, the samples were not demographically matched, other than that both samples consisted of college students. A larger sample in future research should strive to recruit demographically matched samples. It is important to note that the current sample is comprised of deaf students between the ages of 18 and 25. Therefore, the current data on reliability and validity of the Adapted COPE is likely not generalizable to adult members of the Deaf community above this age range, or deaf individuals who have not pursued higher education. Future research should recruit deaf community members in order to ascertain the internal consistency and structural validity of the Adapted COPE in a more general, community-based sample. By validating all of the subscales

of the Adapted COPE, researchers can obtain more complete data on deaf individuals' use of both adaptive and maladaptive coping mechanisms, providing a fuller picture of the experiences and needs of our deaf clients.

Deaf college students constitute a unique sample in that being deaf or hard of hearing may indicate different or additional stressors to cope with on a daily basis. In this way, deaf students may have developed unique coping skills that are not mentioned in the original or Adapted COPE scales. This could make the measures comparatively insensitive and less applicable to deaf people as the measures currently exist, unless aspects of these unique coping skills are incorporated. Future research would do well to investigate the types of stressors that deaf and hard of hearing individuals encounter, and the coping strategies they typically utilize to become resilient. This type of research would better inform the literature regarding how deaf individuals cope in their daily lives. growth following lower limb amputation.

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