Carrying books is a daily activity that crosses sex, ethnic and national boundaries, which makes it a useful topic through which to examine behavioral differences found in human beings. It has been over 10 years since the last published research on book carrying patterns appeared (McKelvie, 1993). Because of this gap, one primary motivation of this study was to update important past findings in order to identify possible changes in carrying behavior that may have happened due to social changes over time. It is possible that these changes may reflect shifts in gender roles that have occurred. In our first study, we expanded research in this area by examining the relationship between book carrying styles, gender, and body shape. In our second study, we examined cultural and psychological factors that could influence behavior, such as acculturation, self-esteem, and gender identification.

Jenni and Jenni (1976) pioneered the research on book carrying behavior. They observed people in all age groups, from children to adults over the course of 6 years and found that women carried books closer to their body (Type II, see bottom row of Figure 1), whereas men carried books at their side (Type I, see top row of Figure 1). They also found that these sex differences were present in countries other than the United States (Costa Rica and El Salvador). In the same year, Hanaway and Burghardt (1976) examined age and sex differences in book carrying behavior. They proposed that body size and physical strength might account for differences in carrying behaviors. However, neither variable made a statistically significant difference.

Because book weight was not considered in Hanaway and Burghardt’s (1976) study, Spottswood

These two experiments examined factors that influence book-carrying behaviors in college-aged women and men. In Experiment 1, 500 college students carrying books were observed naturalistically and their body size noted. Results showed that book carrying is a gendered activity, with men and women using distinct styles of book carrying. Body size was not a significant influence. In Experiment 2, the influence of gender identification, self-esteem, and acculturation on book carrying behaviors was examined in laboratory with 100 students. Using the Bem Sex Role Inventory (Bern, 1975), the results showed that those with feminine gender identification scores preferred a different carrying style than participants with masculine gender identification scores. Also, each sex found their preferred style to be a more physically comfortable way to carry books. We found that acculturation and self-esteem were not significant influences on book carrying.

Author Note. Sarah M. Sherman and MindyLynn Tayet, Department of Psychology, California State University Long Beach.

Sarah M. Sherman is now at the College of Osteopathic Medicine of the Pacific, Western University. MindyLynn Tayet is now at the Department of Counseling, Educational, and Developmental Psychology, Eastern Washington University.

This paper is based upon an undergraduate senior thesis by MindyLynn Tayet as well as a research poster presented at the 2005 Western Psychological Association Conference in Portland, OR. We would like to thank our advisor, Dr. William Kelemen, for his invaluable assistance in conducting this study and in manuscript preparation. Thank you to P. Spottswood and G. Burghardt for permission to use a figure from their 1976 book carrying article.

Correspondence concerning this article should be addressed to Sarah Sherman, Department of Psychology, California State University Long Beach, Long Beach, California 90840. Email: sarahmsherman@gmail.com

Faculty sponsor: William Kelemen, California State University, Long Beach
and Burghardt (1976) examined the interaction between handgrip and weight of books. Again, neither of these variables accounted for the sexually dimorphic behaviors observed. Although men had stronger handgrips than women, both men and women carried similar book loads. Carrying behavior was not significantly altered because the weights examined were manageable for both men and women despite potential discrepancies in handgrip. They concluded that the carrying style chosen by the participants was due only to preference.

More recently, McKelvie (1993) replicated Jenni and Jenni’s (1976) study to see if the number of women who used styles that have been most associated with men (e.g., Type I) would increase. Observing undergraduate students, McKelvie showed that women continued to use Type II carrying styles (53%), but not to the extent found by Jenni and Jenni’s work (82%). Thus, it is possible that book carrying behavior has continued to change during the time since this work was completed.

Because grip strength and book weight have been ruled out as contributing factors to sexually dimorphic book carrying methods, we examined the influence of body shape (i.e., height and weight) on this behavior. In this study, the definition of “book” includes only large (approximately 8 by 11 inches), heavy books such as textbooks. In the first (observational) experiment, we noted the book carrying styles and body shapes of 500 men and women at a large university. We hypothesized that women would favor Type II carrying styles, whereas men would favor Type I carrying styles. We were also interested in any possible changes in book carrying styles that have occurred since the last research was conducted in 1993 by McKelvie, hypothesizing that more women would use the traditionally masculine Type I carrying styles. Klaczynski, Goold, and Mudry (2004) found that self-esteem and negative attitudes toward obesity are negatively correlated. They found that women are more likely than men to believe they do not have control over their weight, and women internalize cultural messages regarding the importance of thinness to personal success more than men. We thought that larger women would be more sensitive to how their body shape is negatively viewed by society at large, and would clutch their books closer to their body in an unconscious display of self-protection. Thus, we hypothesized that petite women would prefer Type I carrying styles over Type II, while full-figured women would prefer Type II carrying styles.

Experiment 1

Method

Participants. Five hundred students attending California State University, Long Beach (CSULB) were observed. CSULB’s overall gender breakdown in 2003 was 60.6% women and 39.4% men (California State University, Long Beach, Institutional Research, 2003). We over-sampled men to achieve a balance of 50% men and women (n = 250 each). The age of the students observed was estimated to be 18 and over. All participants were observed over a 2-month period during the Spring 2004 semester.

Materials and procedure. This naturalistic observation was conducted using Spottswood and Burghart’s (1976) coding design (see Figure 1). Six distinct book-carrying styles were identified. Both men and women were categorized using one of these six styles. To further simplify these six styles, Styles 1-3 have been referred to as Type I and Styles 4-6 have been referred to as Type II. To judge body shape, Stunkard, Sorensen, and Schulsinger’s (1983) code chart was used. This scale described pictorially seven different body types for each sex, ranging in size from a thin, extremely

---

underweight body shape (body type A) to a large, obese body shape (body type G).

Two female observers sat on benches and viewed students at four separate highly populated locations on campus, including a library, two courtyards, and a bookstore. Participants were watched as unobtrusively as possible, with the observers wearing sunglasses in attempts to conceal their examinations from participants. Inter-rater reliability was calculated between the two female observers during a pilot study before data collection and once weekly during collecting periods. The reliability, calculated as percent agreement, was never below 90% for classification of sex, body shape, and book carrying style. When a participant was identified carrying a book in a specific style, the participant was first identified as a man or woman, then body shape was determined using the code chart developed by Stunkard et al. (1983), and finally the participant’s book carrying style was classified according to Spottswood and Burghardt’s (1976) code chart. If a person changed the way he or she carried a book at any point while being observed, the researchers recorded only the first carrying style the student displayed, but such changes were very infrequent.

Results

Overall, Type I was the modal carrying style used by both men and women (n = 316). The male students more frequently used carrying styles 1, 2 and 3 (see Table 1) whereas the women in the study more frequently used carrying styles 4 and 5. No students used style 6. This difference across the six styles was statistically significant, $\chi^2 (5) = 264.62, p < .05$. Women used Type II carrying styles 72% of the time (n = 179) and Type I only 28% of the time (see Table 2). The men used Type I carrying styles 98% of the time (n = 245) and Type II only 2% of the time. When comparing the general Type I and Type II carrying behaviors, a significant difference was found between men and women, $\chi^2 (1) = 260.35, p < .05$. To example possible changes over time, we compared the Type I and II results found by Jenni and Jenni (1976) and McKelvie (1993) with the results from the present study (see Table 2). We found a significant difference in women’s carrying styles over time, $\chi^2 (2) = 20.29, p < .05$; yet no significant difference in men’s carrying styles, $\chi^2 (2) = 5.47, p < .05$. In each of these three studies, men consistently used the Type I carrying style over 90% of the time, yet women’s carrying behavior was less consistent. Women preferred Type II in each of the studies, but the degree of the preference fluxed from 82% in 1976 (Jenni & Jenni), to 53% in 1993 (McKelvie), and to 71% in 2004.

The body shapes of women and men were observed using Stunkard et al.’s (1983) code chart on a scale of A to G. Women of all body shapes used Type II more, and men of all body shapes used Type I more often. Body type C, a moderately slender body size was the modal shape observed for both men and women. Body shape did not have a significant effect on female $\chi^2 (6) = 7.72, p > .05$] or male $\chi^2 (6) = 10.63, p > .05$] students’ use of either Type I or Type II carrying styles.

Discussion

Overall, women used Type II carrying styles more frequently than men, whereas men used Type I carrying styles more often. This finding supported our main hypothesis. Although there have been changes in many societal norms that have occurred since Jenni

### Table 1

<table>
<thead>
<tr>
<th>Style</th>
<th>Type I</th>
<th>Type II</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>189</td>
<td>58</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>31</td>
<td>12</td>
</tr>
<tr>
<td>Type II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>160</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table 2

<table>
<thead>
<tr>
<th>Study</th>
<th>Type I</th>
<th>Type II</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jenni &amp; Jenni (1976)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>96%</td>
<td>4%</td>
<td>100%</td>
</tr>
<tr>
<td>Women</td>
<td>18%</td>
<td>82%</td>
<td>100%</td>
</tr>
<tr>
<td>McKelvie (1993)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>91%</td>
<td>9%</td>
<td>100%</td>
</tr>
<tr>
<td>Women</td>
<td>47%</td>
<td>53%</td>
<td>100%</td>
</tr>
<tr>
<td>Present Study (2004)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>98% (245)</td>
<td>02% (5)</td>
<td>100% (250)</td>
</tr>
<tr>
<td>Women</td>
<td>28% (71)</td>
<td>71% (179)</td>
<td>100% (250)</td>
</tr>
</tbody>
</table>
and Jenni’s (1976) work, particularly in male/female gender roles, this study demonstrates that book-carrying behaviors have not changed drastically over the past 10 years. We did not find that more women are using the traditionally male typical Type I carrying styles, as hypothesized. In fact, we found an increase in the number of women carrying in the female-typical Type I style, results which more closely align with Jenni and Jenni’s findings than those obtained by McKelvie (1993). Women were observed using Type II carrying styles 82% of the time by Jenni and Jenni, 53% of the time by McKelvie, and 72% of the time in the present study. Our hypothesis that body shape would have a significant effect on book carrying behavior, specifically that slender women would prefer Type I carrying styles, was not supported.

This discrepancy between our findings and McKelvie’s (1993) might be due in part to our operational definition of a “book” as a large textbook approximately 8 by 11 inches, whereas McKelvie included materials like novels, notebooks, and binders. Although the inter-rater reliability for both observers was high, one threat to internal validity may have been expectancy, because the experimenters also served as observers. As experimenters, we had certain expectations about how participants would act, which could have influenced how we categorized book carrying styles and/or the body shape of a participant. Expectancy was controlled in the second experiment because the experimenters did not make subjective observations or judgments. Instead, participants determined their comfort level for each of the six carrying styles and responded accordingly.

**Experiment 2**

In another article examining previous research, Jenni (1976) suggested that sex differences in book carrying behavior may be due to social pressures and rigid gender roles. According to the evolutionary theory of gender differences, genes that were selected by evolutionary pressures on ancestral women and men caused gender differences (Geary, 1998). Research conducted on gender differences have demonstrated that men score higher on measures of general physical self-concept that do women (Kломстен, Skaalvik, & Espnes, 2004; Marsh, 1989). One area of behavior that has many established sex differences is physical movement and body gestures. For example, limp wrist, arm flutter, flexed elbow, handclasp, and palming are seen as feminine gestures (Reckers & Rudy, 1978). Accordingly, it is not a stretch to suggest that certain book carrying behaviors are viewed as inherently feminine or masculine.

The notion that people have a strong need for self-esteem plays a central role in theories of human social behavior. An individual’s physical body is one of many influences on self-esteem. Dissatisfaction with the body is associated with low self-esteem among men and women alike (Cash, Winstead, & Janda, 1986; McCaulay, Mintz, & Glenn, 1988). Conversely, satisfaction with one’s body is associated with happiness (Berscheid, Walster, & Bohrnstedt, 1973). Research conducted by Goldenberg, McCoy, Pyszczynski, Greenberg, and Solomon (2000) found that participants with high esteem identified higher with their bodies than those with low esteem.

In Experiment 2 of the present study, we set out to further examine the influence of self-esteem, gender identification, and acculturation on book carrying. The effects of self-esteem and gender identification on book carrying behavior have not previously been examined. Our main hypothesis was that participants with feminine gender identification would prefer carrying books in the Type I styles, and that participants who were classified as having a masculine gender identification would prefer Type I carrying styles, regardless of their sex. Jenni and Jenni (1976) studied the possible mitigating effects that culture may have on this behavior, but they only included participants from three countries (Costa Rica, El Salvador, and the United States). We tried to identify any culture effects by measuring participant’s level of identification with any culture outside of the United States.

**Method**

**Participants.** Experiment 2 was performed using 32 men and 68 women enrolled at California State University, Long Beach. The age of the participants ranged from 18 to 50 years ($M = 20.86, SD = 4.91$). The ethnic breakdown of participants was 9% Asian/Pacific Islander; 6% Black, non-Hispanic; 35% Hispanic; 37% White, non-Hispanic; 7% Multiracial; and 6% of another racial origin.

**Materials and procedure.** Upon arrival, participants provided informed consent and received general instructions. All participants completed an identical series of tests and questionnaires. The first test that participants received was the Rosenberg Self-Esteem Scale (Rosenberg, 1965), a measure of global self-esteem. Participants read 10 statements, (e.g., “I wish I could have more respect for myself”) and ranked how each statement pertained to their feelings about themselves, from *strongly agree to strongly disagree*. The Rosenberg scale has high reliability; with a Cronbach’s alpha of .74 (McCarthy & Hoge, 1983). Next, the Bem Sex-Role Inventory (1975) was administered, which is a 60-question test that classifies participants accord-
ing to gender role identification. Gender role identification is divided into four groups: feminine, masculine, androgynous, and undifferentiated. Participants ranked how much they felt each statement described themselves on a Likert scale from 1 to 7, with 1 being Never or almost never true of me and 7 being Always or almost always true of me. The Bem Inventory includes statements such as “Eager to soothe hurt feelings” and “Aggressive” and has a high reliability, Masculinity coefficient alpha = .86; Femininity coefficient alpha = .82 (Holt & Ellis, 1998).

After these two questionnaires, participants were presented with photographs of a college-aged man or a college-aged woman carrying a textbook in each of the six carrying styles. Women were shown the female model whereas men were shown the male model. The photos depicted Asian American students, the modal minority group at CSULB (California State University, Long Beach, Institutional Research, 2003). Participants were asked to rank the six carrying styles on a scale of 1 through 6—marking 6 for their most preferred and 1 for their least preferred style. We determined participant’s preferred carrying type (I or II) by noting their top ranked carrying style (from 1 to 6) and classifying them accordingly. For instance, if a participant ranked style 1, 2, or 3 as their most preferred carrying style, we classified them as preferring the Type I carrying style. Next, they indicated their perceived comfort level when carrying books in the six carrying styles by giving each carrying style a numerical score on a Likert scale from 1 to 5. The most comfortable carrying style corresponded with the number 5, and the least comfortable carrying style corresponded with the number 1.

Finally, participants filled out a demographic questionnaire, which asked for their native language as well as their degree of identification with a culture other than that of the United States, from 0 to 100%. A 0% score would indicate the participant identified only with American culture, 50% would indicate the participant identified half with American culture and half with another, while 100% would indicate identification only with another culture. Participants also filled in a description of other cultures they identified with, if any.

Results

Students’ preferred style of book carrying varied according to their score on the Ben Sex Role Inventory, as hypothesized (see Figure 2). For Type II scores, a significant effect of sex role was observed using a 2 (carrying type) x 4 (gender identity) ANOVA, $F(3, 96) = 3.45, p < 0.5$. Tukey’s post-hoc test confirmed that students with feminine gender identification scores preferred Type II carrying styles more than participants with masculine gender identification scores. No significant effect was observed for Type I scores, although a nonsignificant trend in the expected direction emerged (see Figure 2). In regard to perceived comfort, using a paired-sample t test, men rated Type I ($M = 3.76, SD = .54$) significantly higher than Type II ($M = 2.20, SD = .75$), $t(31) = 9.85, p < 0.5$; whereas women rated Type II ($M = 3.23, SD = .50$) significantly higher than Type I ($M = 2.92, SD = .66$), $t(67) = -2.95, p < 0.5$.

Self-esteem was not significantly correlated with preferred carrying Type I ($r = .11, p > 0.5$) or Type II ($r = -.12, p > 0.5$). This finding may be due in part to the lack of variability in scores ($M = 3.34, SD = .43$). However, it is interesting to note that Type I preference resulted in a positive correlation with self-esteem, whereas Type II preference resulted in a negative correlation with self-esteem, but neither of these correlations were significant. Our participants identified highly with the American culture more than they identified with any other ($M = 34.35, SD = 25.49$). This may explain somewhat why the participants’ self-reported degree of acculturation did not have a significant correlation with book carrying behavior for either Type I ($r = -.04, p > 0.5$) or Type II ($r = .09, p > 0.5$).

FIGURE 2

Mean preference for Types I and II by score on the Bem Sex Role Inventory, using the Hybrid Method for classifying individuals. No participant identified Style 6 as their most preferred book carrying style, so Style 6 was omitted from the scale.
Discussion

The present study confirmed past research, that men and women carry their books in a significantly different manner. Further, we found that body shape, self-esteem, and acculturation were not significant factors on book carrying preference. In the second experiment, it was found that gender identification and perceived physical comfort significantly affected the way a man or woman chose to carry his or her books.

Results concerning self-esteem and acculturation should be examined in greater depth in the future with a more diverse participant group. Because participants from the second experiment reported such a high mean self-esteem score (M = 3.34, SD = .43, on a scale of 1 to 4), one suspects that the students wanted to present themselves in a favorable light. It might be helpful in the future to use a more effective measure of self-esteem with more detailed questions. To further examine the influence of acculturation on carrying behavior, it would be beneficial to have many participants who identify to a high degree with a culture outside the United States. In this study, we did not have many participants who identified over 50% with another culture. Also, it may be beneficial to study book carrying behavior in a broad range of countries that are less influenced by Western culture to achieve a better understanding of how this gendered behavior may be mitigated by culture. Finally, the order of the questionnaires was not counterbalanced, which could lead to potential order effects and is a limitation to our results.

During their studies on book carrying behavior for all school-age subjects, Jenni and Jenni (1976) and Hanaway and Burghardt (1976) found that women changed their carrying styles over time, specifically during puberty, whereas male carrying behavior remained constant regardless of type. Thommen, Reith and Steffen (1993) questioned what caused women to make this change in their carrying behavior when men are not affected. In the future, another topic to be explored is why women’s carrying style changes in conjunction with puberty, a time of great physical, emotional as well as social change and growth in both sexes. Perhaps the development of stronger social expectations for the two sexes leads girls to conform to more “gender appropriate” behaviors, including book carrying behavior.

Book carrying is such a ubiquitous act that goes largely unnoticed, yet conveys much about gender and social norms. We know that men and women differ in their preferred book carrying styles, yet the reason is still unknown. It is important to continue to eliminate those variables that do not contribute to this difference, to best understand the behavior itself. The true reasons for the various distinctions between the sexes may be established once we demystify the divergent behaviors.

References