Journal of Social and Clinical Psychology, Vol. 21, No. 5, 2002, pp. 566-579

# SOCIAL COMPARISON AND BODY IMAGE: AN INVESTIGATION OF BODY COMPARISON PROCESSES USING MULTIDIMENSIONAL SCALING

ERIK FISHER
*University of South Florida*

MICHAEL DUNN
*University of Central Florida*

J. KEVIN THOMPSON
*University of South Florida*

A total of 1,760 females and males were assessed for cognitive social comparison processes regarding physical appearance. Participants ranged in age from middle school (7th and 8th graders) to college juniors and seniors. Multidimensional scaling techniques were used as the analytical strategy. The results revealed the existence of two primary comparison dimensions: weight/non-weight and muscle/non-muscle. Males and females differed substantially in the cognitive organization of appearance comparison schemas along these two dimensions. Females emphasized body sites and parts along the weight/non-weight continuum whereas, for males, body areas along the muscle/non-muscle dimension were emphasized. Essentially no developmental trends were identified: comparison schemas for 7th graders through college seniors were virtually identical. The findings are discussed in light of the emerging role of body comparison tendencies as a potential risk factor for body image and eating disturbances.

Prospective studies clearly indicate that body image disturbance is a causal risk factor for the development of eating disorders (Stice, 2001; Thompson, 1996; Thompson & Smolak, 2001). For this reason, researchers have begun to focus on the delineation of possible risk factors for the development of body image problems (Thompson, Heinberg, Altabe, &

---

Address correspondence to J. Kevin Thompson, PhD, Department of Psychology, University of South Florida, Tampa, FL 33620-8200, E-mail: Thompson@chuma1.cas.usf.edu

Tantleff-Dunn, 1999). Such efforts to identify upstream variables are seen as essential to the formation of effective preventive and early intervention programs (Thompson & Stice, 2001). Included in such potential formative influences are factors such as menarcheal timing, negative verbal feedback regarding appearance (i.e., teasing), low self-esteem, exposure to idealized media images of attractiveness, internalization of societal messages of attractiveness, and heightened appearance comparison tendencies (Shisslak & Crago, 2001). Several of these putative risk factors have generated interest among clinicians and researchers, with a good deal of effort directed at understanding the complex process of appearance social comparison.

Social comparison theory has a long and rich history and has guided inquiry in diverse topic areas for almost 50 years. Festinger (1954) offered the initial theoretical structure for social comparison theory and noted that it was an innate process whereby individuals gather information regarding some feature or attribute. In the area of body image disturbance, a social comparison model has had an impact on various types of research, ranging from basic laboratory to clinical intervention (Cash, 1996,1997; Thompson, 1996). In a seminal study in this area, Cash, Cash, and Butters (1983) exposed women to pictures of photos from magazines in three distinct conditions: physically attractive only, physically attractive and noted as professional models, and not physically attractive. Participants exposed to the physically attractive only condition rated their own attractiveness as lower than did participants in the other two conditions. Cash et al. (1983) suggested that the specificity of this contrast effect indicated the greater importance of peers, as opposed to professional models, as an appearance comparison target (i.e., a particularistic as opposed to universalistic target).

Additional work stimulated by social comparison theory has also indicated that the process may be an important component of body image disturbances. Heinberg and Thompson (1992) asked 297 women and men to rate the importance of different comparison groups (i.e., peers, family, celebrities, etc.) and related the ratings to levels to body dissatisfaction. For women, but not men, there were significant positive associations among target importance ratings and body dissatisfaction. Interestingly, the correlations were similar for peer and celebrity comparison groups. Heinberg and Thompson (1995) found that women exposed to a compilation of commercials pre-selected to contain idealized images of female attractiveness had negative changes in mood and body satisfaction ratings compared to a control group that viewed non-appearance-related commercials. In a second study, social comparison was directly manipulated via instructions designed to foster appearance comparison or distract participants from the content of the video

(Cattarin, Thompson, Thomas, & Williams, 2000). Participants in the comparison condition reported a higher level of self-to-model comparison than participants in either the distraction or neutral instructional groups. There was also a marginally significant effect suggesting that participants in the comparison condition who viewed the appearance video became more dissatisfied with their bodies than participants in the neutral or distraction condition.

Although appearance comparison has been conceptualized as a potential risk factor for the development of body image disturbances (Thompson et al., 1999), little is known about the basic cognitive properties that underlie this complex intrapersonal process. In recent years, methods used by cognitive researchers have been applied to clinical disorders to help illuminate such aspects of cognition as basic memory organization, biases, and schematicity (Cash & Labarge, 1996; Altabe & Thompson, 1996). Interestingly, one strategy that holds great promise for helping understand the basic semantic structure of psychological phenomena, multidimensional scaling (MDS), was suggested over ten years ago by Vitousek and Hollon (1990) as ideal for furthering our understanding of eating- and weight-related disturbances. MDS refers to a family of mathematical algorithms that compute maps of the relationships among items (stimuli) based on similarities or differences. MDS solutions have been validated as a proxy for network structure by a number of studies. Among memory researchers, semantic network structure has been visually modeled by applying multidimensional scaling (Kruskal & Wish, 1991) to data obtained using category generation techniques (e.g., Battig & Montague, 1969). For example, word lists organized using MDS are better recalled than control lists (Cooke, Durso, & Schvaneveldt, 1986), and distances among category elements in an MDS stimulus configuration predict inter-item proximity in free recall (Caramazza, Hersh, & Torgerson, 1976) and reaction times to categorical judgments (Rips, Shoben, & Smith, 1973; Shoben, 1976).

In the realm of alcohol expectancies, MDS and related techniques (Preference Mapping or PREFMAP; Carroll, 1972; and hierarchical clustering) have been used to model both network structure and process. Alcohol expectancy networks have been modeled for adults of varying drinking habits (Dunn & Earleywine, 2001; Rather & Goldman, 1994; Rather, Goldman, Roehrich, & Brannick, 1992), as well as for children (Dunn & Goldman, 1996, 1998; Dunn & Yniguez, 1999). Expectancies were assessed with a Likert scale-based survey and items were mapped into network format with a variant of MDS known as Individual Differences Scaling (INDSCAL). Group preference vectors that modeled hypothetical association pathways through the memory network were found to vary with drinking habits in adults and children. The authors concluded that changes in cognitive organization and activation that occurred as children approached drinking initiation might influence the eventual time of initiation and level of drinking for each child. Additional work has found that likely patterns of activation are alterable in children through exposure to advertising (Dunn & Yniguez, 1999) and in college students through exposure to expectancy challenge interventions with subsequent changes in alcohol consumption (Dunn, Lau, & Cruz, 2000). Finally, MDS-based findings have been validated with more direct measures of memory contents (Dunn & Goldman, 2000) recommended by cognitive scientists (Nelson, Bennett, Gee, Schreiber, & McKinney, 1993).

The application of the MDS strategy to the study of appearance comparison processes may not only further our basic understanding of the cognitive properties of this aspect of social comparison, but also potentially prove useful in the development of more accurate assessment techniques and optimal treatment approaches. Recent studies with male and female samples, ranging in age from childhood through adulthood, offer findings that suggest that the underlying comparison structure may differ as a function of gender. Specifically, several studies indicate that the body image issues of girls and women largely center around weight issues, while boys and men may be more concerned with muscularity (Andersen, Cohn, & Holbrook, 2000; McCreary & Sasse; 2000; Smolak, Levine, & Thompson, 2001). If so, then the organization of comparison processes may differ along two dimensions: weight/non-weight and muscle/non-muscle. It is also possible that the processes may differ as a function of age—research suggests that body dissatisfaction increases from childhood through adolescence into adulthood (Smolak & Levine, 2001). Remarkably little work has investigated comparison processes as a function of age; however, Muir, Wertheim, and Paxton (1999) found no differences between 7th and 10th graders in the role of comparison as a trigger for first diets.

In the present study, a large sample of males and females from middle schools, high schools, and college completed a body comparison scale that required ratings of multiple body parts and sites. Data were analyzed with INDSCAL MDS to examine underlying cognitive comparison processes. We hypothesized, based on a wealth of previous work, that females' comparison networks would largely focus on a dimension related to weight-associated body sites, whereas males' structure would indicate a cohesive focus on muscularity (Pope, Phillips, & Olivardia, 2000; Smolak et al., 2001). Although little work has focused on the developmental nature of comparison processes, we included a broad age span because of the importance of understanding potential risk factors for eating and body image disturbances (Levine & Smolak, 2001; Shisslak &

Crago, 2001; Stice, 2001; Thompson & Stice, 2001) and because extant prevention programs often target appearance comparison as a treatment component (Piran, Levine, & Steiner-Adair, 1999). If gender differences in comparison exist, knowledge of the time of divergence may be central to assessment, treatment, and prevention efforts.

## METHOD

### PARTICIPANTS

A total of 1,760 participants were included in the study. For purposes of data analysis (described shortly) they were categorized into the following groups: 7th and 8th grade (males = 254, females = 307), 9th and 10th grades (males = 215, females = 230), 11th and 12th grades (males = 152, females = 74), college freshman and sophomores (males = 129, females = 213), college juniors and seniors (males = 67, females = 119).

### MEASURE AND PROCEDURE

All participants were tested in small classroom settings. Each individual completed the Body Comparison Scale (Thompson et al., 1999), which consists of a listing of 20 body sites (e.g., hair, waist, cheeks) and five items composed of more general ratings of somatic features (e.g., muscle tone of lower body, overall shape of upper body). Participants were asked to complete the scale based on "how often you compare these aspects of your body to those of other individuals of the same sex." A six-point Likert rating scale (never - always) was used for all item ratings.

## RESULTS

### CONFIGURATION OF A BODY COMPARISON NETWORK

As in previous work on alcohol expectancies with adults (Dunn & Earleywine, 2001; Dunn et al., 2000; Rather & Goldman, 1994) and children (Dunn & Goldman, 1996, 1998; Dunn & Yniguez, 1999), nonmetric INDSCAL (Carroll & Chang, 1970) was applied to empirically model a memory network configuration of body sites based on likelihood of comparison. Empirically derived network models are not necessarily distinct from factor models; each provides a somewhat different perspective on body site comparison. Although factors are mathematically similar to MDS dimensions, network models provide insight into the process by which the organization of body sites in memory may contribute to body site-related anxiety. Discussion of other issues related to factor versus network models and their differential utility can be found in Goldman (1994).

INDSCAL, like other MDS techniques, involves applying a mathematical algorithm to a matrix of proximities. Every item appears on one column and one row of the matrix; the elements of the matrix consist of every possible pair-wise combination of items. As in a correlation matrix, the halves separated by the diagonal are identical; the diagonal, however, is composed of zeroes (representing no difference) because each item is identical to itself. Therefore, the algorithm actually performs computations on a similarity (or dissimilarity) half matrix to locate each item on a multidimensional "map" (called a stimulus configuration). This map can be composed of any number of dimensions based on fit indices and theoretical rationale. In the present study (as in Dunn et al., 2000; Dunn & Earleywine, 2001; Dunn & Goldman, 1996, 1998; Dunn & Yniguez, 1999: Rather et al., 1992) the differences between average frequency of occurrence ratings for each item were used as indirect indicators of (dis)similarity. Although direct comparisons for every possible pair-wise combination of items (similarity ratings) would have been preferable, this procedure would have required far too many comparisons to be completed by participants. Because similarity of body sites cannot be quantified on an interval scale, nonmetric INDSCAL was used, which assumes only ordinal relations among items and not true interval scales.

An important characteristic of the INDSCAL algorithm (as compared to standard MDS) is that it simultaneously analyzes the proximity matrices of more than one participant group to compute a stimulus configuration that best represents all groups. It also highlights differences in how each group uses the distance between individual stimuli along each dimension that defines the obtained stimulus space. These differences are referred to as a "weight" ranging between 0 and 1 with higher weights indicating larger distances between stimuli on that dimension. For example, imagine a two-dimensional map of the United States produced by INDSCAL based on two groups' estimates of the distance between New York and Los Angeles, and between Chicago and Dallas. If one group estimated the east-west distance to be larger, and the other estimated the north-south difference to be larger, INDSCAL would produce the map in the correct proportion to accommodate both estimates (perhaps with equal length on both dimensions). To communicate the difference between the groups, however, INDSCAL would assign high north-south, and low east-west dimension weights to the group that estimated the north-south difference to be longer, and vice versa. The weight could then be used to change the map to make it represent the judgment of one or the other group. That is, a low weight indicates that the map should be squeezed along that dimension to make the points closer together and a high weight indicates that the map should be stretched to make the points farther apart. In the present study, INDSCAL participant weights were used to indicate differences in the configuration of a hypothetical memory network as a function of grade and gender.

For the present study, participants were grouped based on gender and grade. Pairs of grade levels were combined to increase *n* within each group and to reduce error. Proximity matrices for each group were used as input for the INDSCAL analysis to produce a stimulus configuration (network map) reflective of the entire sample (see Table 1). Because a single proximity matrix was used for each group, each group had an equal amount of influence in determining the final solution despite unequal sample sizes. Proximity matrices are considered stable when based on 25 or more participants and highly stable when based on 100 or more participants. The grouping strategy employed resulted in the smallest group containing 67 participants and only two groups composed of fewer than 100 participants. Therefore, results of this analysis should be stable and replicable. A two-dimensional solution (Figure 1), accounting for 83% of the variance (stress = .20 using Kruskal's stress formula 1), was considered optimal based on interpretability and Davison's (1992, 1983) technique for determining dimensionality by graphing $R^2$. Although stress is the customary measure of fit in MDS, Kruskal and Wish (1991) and Davison (1992, 1983) recommend using $R^2$ for INDSCAL because stress values are artificially inflated when the number of stimuli and the number of matrices increase (Young & Harris, 1992, p. 181). A three-dimensional solution offered only a small increase in variance, accounted for (5%), and was not readily interpretable. Dimension labeling was approached as follows.

## DIMENSION LABELING

MDS and INDSCAL dimensions are most often labeled by inspection of locations of stimuli. Inspection of the stimulus configuration in the present work indicated that the horizontal dimension seemed to represent the concept of weight/non-weight-related body parts. The vertical dimension appeared to represent muscle/non-muscle-related body parts. These dimension labels lead to logical quadrants of the stimulus configuration. Starting at the top left and moving clockwise, the quadrants consist of weight/non-muscle body parts; non-weight/non-muscle body parts; non-weight/muscle-related body parts; weight-related/muscle-related body parts. Almost all body parts appeared to be located in logical quadrants. In interpreting positions of individual body

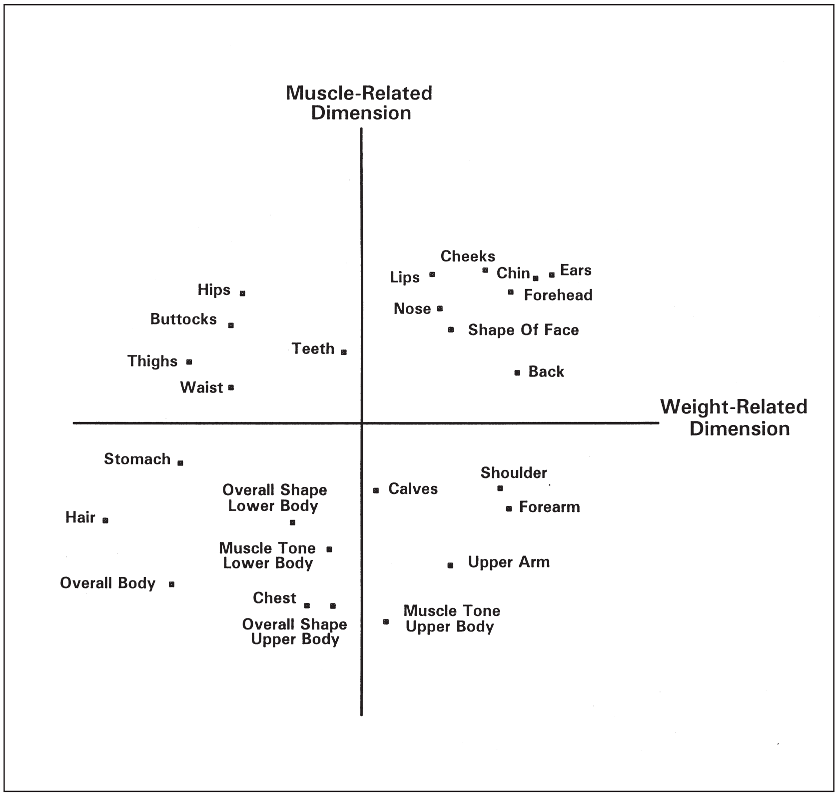


FIGURE 1. Individual Differences Scaling (INDSCAL) stimulus configuration for body comparison sites representing a hypothetical memory network. The horizontal dimension represents weight/non-weight-related body sites and the vertical dimension represents muscle/non-muscle-related body sites.

sites within the hypothetical network, it is important to remember that location is determined by the multiple associations among body sites, and not by the dimensions. This associational pattern is often the same as individual item meaning, but not always.

## DIFFERENCES IN DIMENSIONAL IMPORTANCE RELATED TO GRADE AND GENDER

Differences in organization of body sites could be addressed by examining the dimension weights of each participant group. In this application, the importance of each dimension for each group was used to determine the importance of different types of body sites to males and females of varying ages. As shown in Figure 2 (the participant weight space), fe-

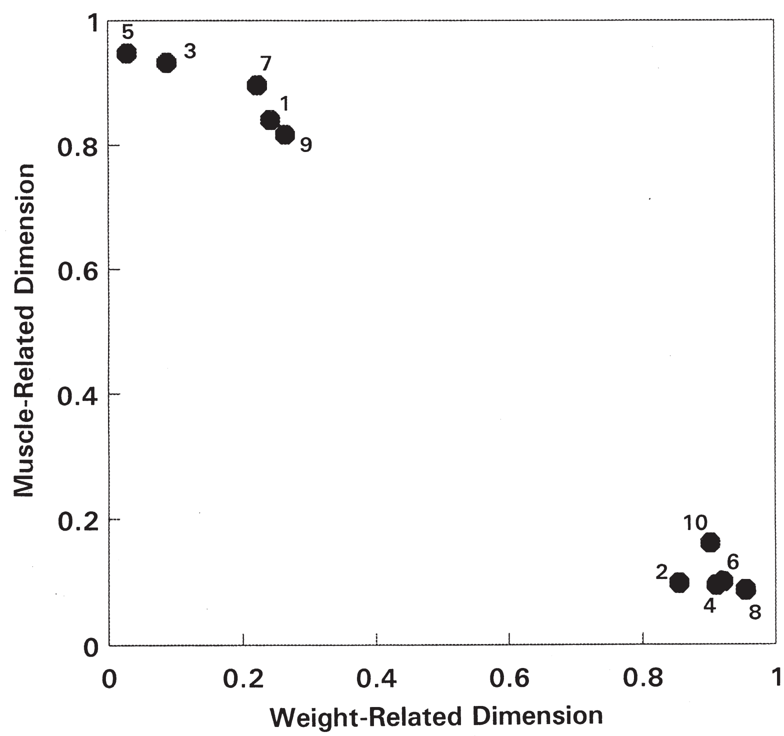


FIGURE 2. Individual Differences Scaling (INDSCAL) participant weights reflecting dimension emphasis on the weight-related dimension and the muscle-related dimension: 1 = 7th and 8th grades male, 2 = 7th and 8th grade females, 3 = 9th and 10th grade males, 4 = 9th and 10th grade females, 5 = 11th and 12 grade males, 6 = 11th and 12th grade females, 7 = freshman and sophomore males, 8 = freshman and sophomore females, 9 = junior and senior males, 10 = junior and senior females.

males of all ages had high weights on the weight/non-weight-related dimension and low weights on the muscle/non-muscle-related dimension. Males of all ages, however, had high weights on the muscle/non-muscle-related dimension and low weights on the weight/non-weight-related dimension. Therefore, females appeared to emphasize weight-related body parts and males emphasized muscle-related body parts. Weights depicted in Figure 2 corresponded to the extent to which a dimension was relevant to a participant group's responses, rather than their position on a dimension. Note that individual weights do not reflect the fit between the solution and the participant groups (e.g., the low participant weights on the weight/non-weight-related dimension for males did not indicate poor fit; rather, they indicated low relevance of the dimension to their responses). Fit is reflected, however, in the distance between a participant group's point in the weight space and the origin with greater distance corresponding to better fit. No significance tests are currently available to assess the probability of discrepancies among weights being due to chance. The large sample size on which the present analyses were based and the consistency within gender and across grades suggested that these results were stable, however.

## DISCUSSION

Cognitive body comparison processes were evaluated in males and females ranging from 7th graders to senior college students. MDS analyses indicated clearly that gender differences existed, whereas there was not an effect of age on comparison networks. Males of all ages had high dimensional weights on muscle-related sites and females of all ages had high weightings on weight-related body areas. Clearly, comparison processes differ for males and females, and these differences appear developmentally early, at least by the adolescent years.

These findings corroborate and extend various investigative areas in the field of body image. The current study is in line with previous work suggesting that elevated comparison levels are associated with body image disturbances, but only for females (Heinberg & Thompson, 1992; Thompson et al., 1999). The findings of higher dimensional weight loadings for body sites associated with excessive weight and/or unacceptably large sizes may indicate a basic cognitive organizational basis for the significant association between elevated comparison tendencies and body image disturbance. For males, whose dimensional groupings were for the muscle-related body sites, the findings indicate a similar basic cognitive explanation for the recent findings that boys and men are more invested in muscularity than thinness (Andersen et al., 2000; McCreary & Sasse, 2000; Pope et al., 2000; Smolak et al., 2001).

One limitation of the current modeling procedures was that they were at best an indirect method of measuring information stored in memory. Also, because the present findings were based on exploratory procedures, they remain tentative pending replication with different samples and longitudinal designs, and validation through experimental designs capable of testing hypotheses derived from modeled network configurations. In addition, although the findings are clear-cut in the arena of gender differences and the lack of a developmental arc regarding comparison processes, there were some confusing results for individual comparison items (for example, hair located in the weight-muscle dimension, along with stomach, whereas other facial features located in the non-weight, non-muscle dimension).

We believe these findings are stable and cast doubt on the idea that developmental trends are present in body image concerns for males and females. The participant weights on each dimension are essentially the same for each age group. The MDS solution can also be considered to be stable because of the sample size of participants used for the analyses. MDS solutions are computed from proximity matrices. Proximity matrices are quite stable if computed from at least 25 people and highly stable if computed from 100 people or more (Linkovich-Kyle & Dunn, 2001). Our smallest group was a sample of 67 participants and we only had two groups under 100 participants. Therefore, these results should be highly stable, reliable, and potentially replicable. Nonetheless, this study is cross-sectional in design and prospective work is certainly needed to further explore developmental trends in body comparison processes.

One avenue for future research might be the examination of subpopulations of males and females, such as bodybuilders and individuals with eating disorders. Perhaps extreme comparison processes, in the direction of weight or muscularity, exist in the appearance schemas of these males and females. Especially important might be prospective developmental work to determine if cognitive comparison processes coincide with the onset of specific behavioral patterns designed to enlarge muscle-relevant sites as opposed to reducing the size of weight-relevant body areas.

This study underscores the potential importance of focusing prevention efforts on elementary school-aged children (e.g., Smolak & Levine, 2001; Levine & Smolak, 2001). Children as young as those individuals in the 7th and 8th grades emphasized body sites in memory in the same way as college students. Therefore, efforts to alter the emphasis on weight- and muscle-related aspects of appearance may need to begin with younger children. Certainly, by the time children are adolescents, they have received a great deal of information regarding cultural appearance standards from peers, parents, and media (Thompson et al., 1999; Thompson & Smolak, 2001). Comparison processes may be well established in memory, and potentially resistant to modification. Extension and replication of the current findings is an important necessary step in the location of the age of gender divergence in cognitive comparison dimensionality.

## REFERENCES

Altabe, M. N., & Thompson, J. K. (1996). Body image: A cognitive self-schema? *Cognitive Therapy and Research*, *20*, 171-193.

Andersen, A. E., Cohn, L., & Holbrook, T. (2000). *Making weight: Men's conflicts with food, weight, shape, and appearance.* Carlsbad, CA: Gurze Books.

Battig, W. F., & Montague, W. E. (1969). Category norms for verbal items in 56 categories: A replication and extension of the Connecticut category norms. *Journal of Experimental Psychology Monographs, 80(3, Pt. 2).*

Caramazza, A., Hersh, H., & Torgerson, W. S. (1976). Subjective structures and operations in semantic memory. *Journal of Verbal Learning and Verbal Behavior, 15,* 103-117.

Carroll, J. D. (1972). Individual differences and multidimensional scaling. In R. N. Shepard, A. K. Romney, and S. B. Nerlove (Eds.), *Multidimensional scaling: Vol.1. Theory and applications in the behavioral sciences* (pp. 105-155). New York: Seminar Press.

Carroll, J. D., & Chang, J. (1970). Analysis of individual differences in multidimensional scaling via an N-way generalization of "Eckart-Young" decomposition. *Psychometrika, 35,* 283-319.

Cash, T. F (1996). The treatment of body image disturbances. In J. K. Thompson (Ed.), *Body image, eating disorders, and obesity: An integrative guide for assessment and treatment* (pp. 83-107). Washington, DC: American Psychological Association.

Cash, T. F. (1997). *The body image workbook: An 8-step program for learning to like your looks*. Oakland, CA: New Harbinger.

Cash, T. F., Cash, D. W., & Butters, J. W. (1983). "Mirror, mirror on the wall...?": Contrast effects and self-evaluations of physical attractiveness. *Personality and Social Psychology, 9*, 359-364.

Cash, T. F., & Labarge, A. S. (1996). Development of the Appearance Schemas Inventory: A new cognitive body-image assessment. *Cognitive Therapy and Research*, *20*, 37-50.

Cattarin, J. A., Thompson, J. K., Thomas, C., & Williams, R. (2000). Body image, mood, and televised images of attractiveness: The role of social comparison. *Journal of Social and Clinical Psychology*, *19*, 220-239.

Cooke, N. M., Durso, F. T., & Schvaneveldt, R. W. (1986). Recall and measures of memory organization. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 12,* 538-549.

Davison, M. L. (1983). *Multidimensional scaling.* New York: Wiley. Davison, M. L. (1992). *Multidimensional scaling.* Malabar, FL: Krieger.

Dunn, M. E., & Earleywine, M. (2001). Activation of alcohol expectancies in memory in relation to limb of the blood alcohol curve. *Psychology of Addictive Behaviors*, *15*, 18-24.

Dunn, M. E., & Goldman, M. S. (1996). Empirical modeling of an alcohol expectancy memory network in elementary schoolchildren as a function of grade. *Experimental and Clinical Psychopharmacology, 4,* 209-217.

Dunn, M. E., & Goldman, M. S. (1998). Age and drinking-related differences in the memory organization of alcohol expectancies in 3rd, 6th, 9th, and 12th grade children. *Journal of Consulting and Clinical Psychology, 66,* 579-585.

Dunn, M. E., & Goldman, M. S. (2000). Age and drinking-related differences in alcohol expectancies of children assessed as free-word-association responses. *Alcoholism: Clinical and Experimental Research*, *24*, 1639-1646.

Dunn, M. E., Lau, H. C., Cruz, I. Y. (2000). Changes in activation of alcohol expectancies in memory in relation to changes in alcohol use after participation in an expectancy challenge program. *Experimental and Clinical Psychopharmacology, 8*, 566-575.

Dunn, M. E., & Yniguez, R. M. (1999). An experimental demonstration of the influence of alcohol advertising on the organization of alcohol expectancies in memory among 4th and 5th grade children. *Experimental and Clinical Psychopharmacology, 7*, 473-483.

Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, *7*, 117-140.

Goldman, M. S. (1994). The alcohol expectancy concept: Applications to assessment, prevention and treatment of alcohol abuse. *Applied and Preventative Psychology, 13,* 131-144.

Heinberg, L. J., & Thompson, J. K. (1992). Social comparison: Gender, target importance ratings, and relation to body image disturbance. *Journal of Social Behavior and Personality*, *7*, 335-344.

Heinberg, L. J., & Thompson, J. K. (1995). Body image and televised images of thinness and attractiveness: A controlled laboratory study. *Journal of Social and Clinical Psychology, 7*, 335-344.

Kruskal, J. B., & Wish, M. (1991). *Multidimensional scaling.* Sage University Paper Series on Quantitative Applications in the Social Sciences, 07-001. Beverly Hills and London: Sage Publications.

Levine, M. P., & Smolak, L. (2001). Primary prevention of body image disturbances and disordered eating in childhood and early adolescence. In J. K. Thompson and L. Smolak (Eds.), *Body image, eating disorders and obesity in youth: Assessment, prevention and treatment* (pp. 237-260). Washington, DC: American Psychological Association.

Linkovich-Kyle, T. L., & Dunn, M. E. (2001). Consumption-related differences in the organization and activation of marijuana expectancies in memory. *Experimental and Clinical Psychopharmacology, 9,* 334-342.

McCreary, D. R., & Sasse, D. K. (2000). An exploration of the drive for muscularity in adolescent boys and girls. *Journal of American College Health*, *48*, 297-304.

Muir, S. L., Wertheim, E. H., & Paxton, S. J. (1999). Adolescent girls' first diets: Triggers and the role of multiple dimensions of self-concept. *Eating Disorders: The Journal of Treatment and Prevention, 7*, 259-270.

Nelson, D. L., Bennett, D. J., Gee, N. R., Schreiber, T. A., & McKinney, V. M. (1993). Implicit memory: Effects of network size and interconnectivity on cued recall. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 19,* 747-764.

Piran, N., Levine, M. P., & Steiner-Adair, C. (1999). *Preventing eating disorders: A handbook of interventions and special challenges*. Philadelphia: Brunner/Mazel.

Pope, H. G., Phillips, K. A., & Olivardia, R. (2000). *The Adonis complex: The secret crisis of male body obsession*. New York: The Free Press.

Rather, B. C., & Goldman, M. S., (1994). Drinking-related differences in the memory organization of alcohol expectancies. *Experimental and Clinical Psychopharmacology, 2,* 167-183.

Rather, B. C., Goldman, M. S., Roehrich, L., & Brannick, M. (1992). Empirical modeling of an alcohol expectancy memory network using multidimensional scaling. *Journal of Abnormal Psychology, 101,* 174-183.

Rips, L. J., Shoben, E. J., & Smith, E. E. (1973). Semantic distance and the verification of semantic relations. *Journal of Verbal Learning and Verbal Behavior, 12,* 1-20.

Shisslak, C. M., & Crago, M. (2001). Risk and protective factors in the development of eating disorders. In J. K. Thompson and L. Smolak (Eds.), *Body image, eating disorders, and obesity in youth: Assessment, prevention, and treatment* (pp. 103-125). Washington, DC: American Psychological Association.

Shoben, E. J. (1976). The verification of semantic relations in a same-different paradigm: An asymmetry in semantic memory. *Journal of Verbal Learning and Verbal Behavior, 15,* 365-379.

Smolak, L., & Levine, M. P. (2001). Body images in children. In J. K. Thompson and L.

Smolak (Eds.), *Body image, eating disorders, and obesity in youth: Assessment, prevention, and treatment* (pp. 41-66). Washington, DC: American Psychological Association

Smolak, L., Levine, M. P., & Thompson, J. K. (2001). The use of the Sociocultural Attitudes Towards Appearance Questionnaire with middle school boys and girls. *International Journal of Eating Disorders, 29*, 216-223.

Stice, E. (2001). Risk factors for eating pathology: Recent advances and future directions. In R. Striegel-Moore and L. Smolak (Eds.), *Eating disorders: Innovative directions for research and practice* (pp. 57-73). Washington, DC: American Psychological Association.

Thompson, J. K. (1996). *Body image, eating disorders, and obesity: An integrative guide for assessment and treatment* (pp. 83-107). Washington, DC: American Psychological Association.

Thompson, J. K., Heinberg, L. J., Altabe , M., & Tantleff-Dunn, S. (1999*). Exacting beauty: Theory, assessment and treatment of body image disturbance.* Washington, DC: American Psychological Association.

Thompson, J. K., & Smolak, L. (2001). Body image, eating disorders, and obesity in childhood and adolescence-The future is now. In J. K. Thompson and L. Smolak (Eds.), *Body image, eating disorders, and obesity in youth: Assessment, prevention, and treatment* (pp. 1-18) Washington, DC: American Psychological Association.

Thompson, J. K., & Stice, E. (2001). Internalization of the thin-ideal: A potent risk factor for the development of body image and eating disturbances. *Current Directions in Psychological Science, 10,* 181-183.

Vitousek, K. B., & Hollon, S. D. (1990). The investigation of schematic content and processes in eating disorders. *Cognitive Therapy and Research*, *14*, 191-214.

Young, F. W., & Harris, D. F., (1992). Multidimensional scaling. In M. J. Norvsis (Ed.), *SPSS for Windows professional statistics release 6.* Chicago: SPSS, Inc.