ABSTRACT

Title of Dissertation: ATTITUDE AND BELIEF CHANGE IN EXPLICIT AND IMPLICIT CONCEPT HIERARCHIES: A COMPARISON OF TWO MODELS OF INTER-ATTITUDINAL STRUCTURE

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Theories of inter-attitude relationships and attitude change have failed to identify the architecture of inter-attitudinal structures and then clarify its relationship to attitude and belief change. This dissertation examines two models (hierarchical and spatial) of inter-attitudinal structure that explicitly address the consequences of structure for attitude change. Ten pilot studies ($N = 271$) were conducted to examine explicit and implicit concept hierarchies and develop an appropriate instrument for the final study. The final experiment ($N = 391$) manipulated type of hierarchy (explicit vs. implicit), whether the hierarchy was primed or not, and the location in the hierarchy to which a message was directed. The hypotheses predict changes in attitudes, evaluative beliefs, and non-evaluative beliefs among hierarchically superordinate, subordinate,

and equipollent concepts after participants read persuasive messages about specific target concepts. The results show that, as both models suggest, linguistic organizational structures influence attitude and belief change. However, it is the Galileo spatial model that provides a theoretical structure which makes a correct set of predictions about how concepts affect one another. The results also support the spatial model's suggestion that such inter-attitudinal and inter-belief change is constrained less by a concept's relative position in the structure and more by the strength of the concept's association with other concepts in that structure. Furthermore, within these inter-attitudinal and inter-belief structures, concepts directly targeted by a persuasive message often exhibit less attitude change than related concepts.

Finally, regarding the concepts themselves, the well established structure of an explicit hierarchy of concepts appears to facilitate inter-attitudinal and inter-belief influence much more than the fuzzy structure of an implicit hierarchy of concepts; the key to this facilitation seems to be accessibility of the organizational structure.

ATTITUDE AND BELIEF CHANGE IN EXPLICIT AND IMPLICIT CONCEPT HIERARCHIES: A COMPARISON OF TWO MODELS OF INTER-ATTITUDINAL STRUCTURE

by

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DEDICATION

This dissertation is dedicated to my son, Jack. They say that writing a dissertation is a lot like having a baby. But having done both at the same time, I know that they couldn't be more wrong. The dissertation was never remotely as important as you are, Jack, and I hope that I didn't ask you to sacrifice too much toward its completion.

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One can never pay in gratitude; one can only pay "in kind" somewhere else in life . . .

Anne Morrow Lindbergh, 1935, *North to the Orient*

Although this dissertation bears my name, it reflects the significant contributions of many people. I know, as Ms. Lindbergh has so eloquently stated, that I will never be able to pay my debts to them. Nonetheless, I will try to articulate the depths of my gratitude.

First and foremost I must thank my husband of 15 years, Steve. Without him, the voluminous appendices (and several tables) to this dissertation would not be neatly organized on a compact disc, able to be altered and printed with just a few keystrokes. Instead, I would still be standing in front of the photocopier with a pair of scissors, a glue stick, and a case of white out. Moreover, when I stayed up all night, Steve stayed up in solidarity. When I drove to the scary Kinko's at 3:30 a.m. to copy questionnaires, he was on the phone to keep me company. Most importantly (*I* think), without Steve I would have had no food to eat, nor any clean clothes to wear. Jack Dinauer would have been left at the preschool too late for too many evenings; Social Services would surely have taken him by now. And, the wiener dogs would have been sent to a comfortable farm to live out their days. THANK YOU, Steve, for wiping my tears, rubbing my shoulders, kicking my ass, and knowing just the right moment for each. I love you.

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CHAPTER I

Introduction

For over sixty years, since Allport's (1935) assertion that "the concept of attitude is probably the most distinctive and indispensable concept in contemporary American social psychology" (p. 198), the study of attitudes has been a central endeavor for scholars from a diverse range of disciplines (Eagly & Chaiken, 1993). This interest reflects the fact that attitudes play a significant role in influencing people's everyday decisions and behavior, from buying a favorite breakfast cereal to avoiding coworkers at lunch to attending a political rally after dinner (e.g., Cialdini, 2001; Perloff, 1993).

Attitudes, and how they are formed, maintained, and changed, are particularly important for communication scholars to study. The very foundations of the field of communication are rooted in discussions of the principles of attitude change that can be traced back to the ancient Greeks. Contemporarily, attitudes are important to communication scholars because attitudes affect social behavior within a wide variety of communication contexts. Studies of organizational communication, for example, rely upon attitudes in their definition of both psychological climate (i.e., an individual's set of attitudes and beliefs that reflects perception of values, norms and expectations in the organization) and organizational climate (i.e., a collectively shared set of attitudes and beliefs relating to the organization; see Fink & Chen, 1995). Similarly, political attitude change has been examined as a subset of the general theory of attitude change (Barnett, Serota, &

Taylor, 1976). In addition, attitudes about the self and about others create social identification and self-categorization, both of which play important roles in how individuals define themselves as group members and how they interact (Hymes, 1986; Mackie, 1986). These examples illustrate the relevance and importance of attitudes and attitude change research within the communication discipline.

Often in attitude research, the term attitude typically encompasses a wide range of notions. McGuire (1989) has discussed the use of the term attitudes in a "broad sense, so that what we say . . . is generally relevant to what are also called by such terms as cognitions, values, thoughts, beliefs, and opinions" (p. 38). Moreover, attitudes and evaluative beliefs have been found to be highly correlated (Eagly & Chaiken, 1993, p. 132). The focus of the current study is on attitudes and beliefs. Chapter 2 will define these and other relevant terms.

Attitudes and beliefs are organized systematically. If there were absolutely no structure to attitudes, for example, then people would possess random assortments of unassociated thoughts and feelings; simple observation indicates that this is not the case (Eiser, 1994a). A number of attitude researchers have studied the global mental structures into which attitudes are organized and that facilitate people's ability to store, access and manage the information contained within; such research is described as inter-attitudinal.

The purpose of this dissertation is to advance inter-attitudinal theory by comparing two competing models of attitude and belief structure, each of which has specific implications for attitude and belief change. The models posit different types of inter-attitudinal and inter-belief structure; therefore, they make different predictions about how attitude and belief change occur. Determining the set of predictions (and therefore the model) that best fits the experimental data will indicate how attitudes and beliefs are mentally represented. The second chapter of this dissertation addresses the theoretical rationale for the proposed study with a review of the relevant literature, descriptions of the two models tested in the dissertation, a brief discussion of the theoretical rationale for choosing consumerism as one of the content domains of the study, and finally, a discussion of the significance of the study.

Chapter 3 of this dissertation describes the methods employed to develop the study's measurement instruments and to collect the data. This chapter explains the purpose, sample size, procedures and outcomes of the eleven different pilot studies, involving a total of 271 participants, that were necessary to create the final research instrument. The chapter also addresses the sampling issues, measurement, and data collection procedures for the final study.

The fourth chapter presents the results of the study. This chapter explains the preliminary data analysis, preparation of the data for final analysis, and manipulation checks. Additionally, the chapter summarizes the results of the primary data analyses (i.e., Galileo spatial plot analyses, analyses of variance and covariance, and structural equation modeling) and tests of the hypotheses.

Finally, Chapter 5 discusses the results of the study and their implications. The chapter also explores the limitations of the study and suggests directions for future research. Chapter 5 ends with a review of the significance of the study.

CHAPTER II

Attitude, Attitude Change, and Theories of Inter-attitudinal Structure

Attitudes

What is an Attitude?

Attitude has been defined as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (Eagly & Chaiken, 1993, p. 269), as an association in memory between an object and an evaluation (Fazio, 1989), and as the position vector from a self point to any other concept point in a space of cognitive representations (Woelfel & Fink, 1980). The diverse conceptualizations of attitudes in the research literature include: the simple evaluation of an object, an elaborate psychological organization that consists of arguments for or against a given proposition, knowledge about the attitude domain, beliefs, personal goals, and even other attitudes. However, despite this broad range of conceptualizations, the most characteristic attribute of attitude has been its evaluative aspect (Ajzen, 1993; Pratkanis, 1989).

Because of the breadth of meaning of the terms attitude and belief, it is necessary to provide some key definitions to provide clarity for the rest of the dissertation.

Definition of attitude or belief object: An attitude or belief object will be defined as the stimulus (e.g., a person, object, or idea) about which an attitudinal or belief evaluation is being made.

Definition of attitude. Consistent with Fazio (1989), attitude is defined in this dissertation as an association between an object and an affective response of like or dislike.

Definition of belief. Eagly & Chaiken, (1993) defined beliefs as associations or linkages between an object and any of its various attributes. This is the definition of belief that will be used in this dissertation.

Evaluative belief. Whereas attitudes concern like or dislike, beliefs may relate to goodness or badness (Eagly & Chaiken, 1998). An evaluative belief will be defined as an association or linkage established between an object and an evaluative attribute (e.g., "The candy is *good*").

Non-evaluative belief. Similarly, a non-evaluative belief will be defined as an association or linkage established between an object and a non-evaluative attribute (e.g., "The candy is *red*").

The Structure of Attitudes

As previously mentioned, if there were absolutely no structure to attitudes, then people would possess random assortments of unassociated thoughts and feelings; simple observation indicates that is not the case in mentally healthy individuals (Eiser, 1994a). Attitude researchers have worked in two ways to determine the underlying structures of attitudes: (1) studying the multiple mental elements that, combined, form the structure of a single attitude (intra-attitudinal structure) and (2) studying the global mental structures that encompass multiple attitudes and facilitate the ability to store, access and manage the information contained in attitudes (inter-attitudinal structure). Each reflects a unique manner in which attitudes can be formed. Therefore, each provides important information regarding how and why both attitudes and beliefs interrelate.

Intra-attitudinal structure. When an individual initially encounters an attitude object, he or she generally formulates an affective, cognitive, and/or behavioral response to it (Ajzen, 1993; Breckler, 1984; Eagly & Chaiken, 1998). An attitude object may elicit one, two or all three of the types of responses. Responses to attitude objects, therefore, may be formed solely on the basis of cognitions, whereas others may be the result of solely affective processes (Eagly & Chaiken, 1998).

Repeated encounters with an attitude object can produce a psychological tendency to respond consistently to the object. If such a tendency is established, an attitude toward the object is said to have formed (Eagly & Chaiken, 1993; Jamieson & Zanna, 1989). Additionally, individuals with specific attitudinal tendencies toward particular objects are assumed to have associations in their minds that link the attitude object with some or all of the thoughts, affective evaluations and behaviors experienced by the individuals in prior encounters with the object (Eagly & Chaiken, 1998). These associations produce regularities that entail intra-attitudinal structure (e.g., see Figure 1).

The basic building blocks of intra-attitudinal structure are thought to be beliefs because attitudes are assumed to reflect, in large part, the beliefs that people

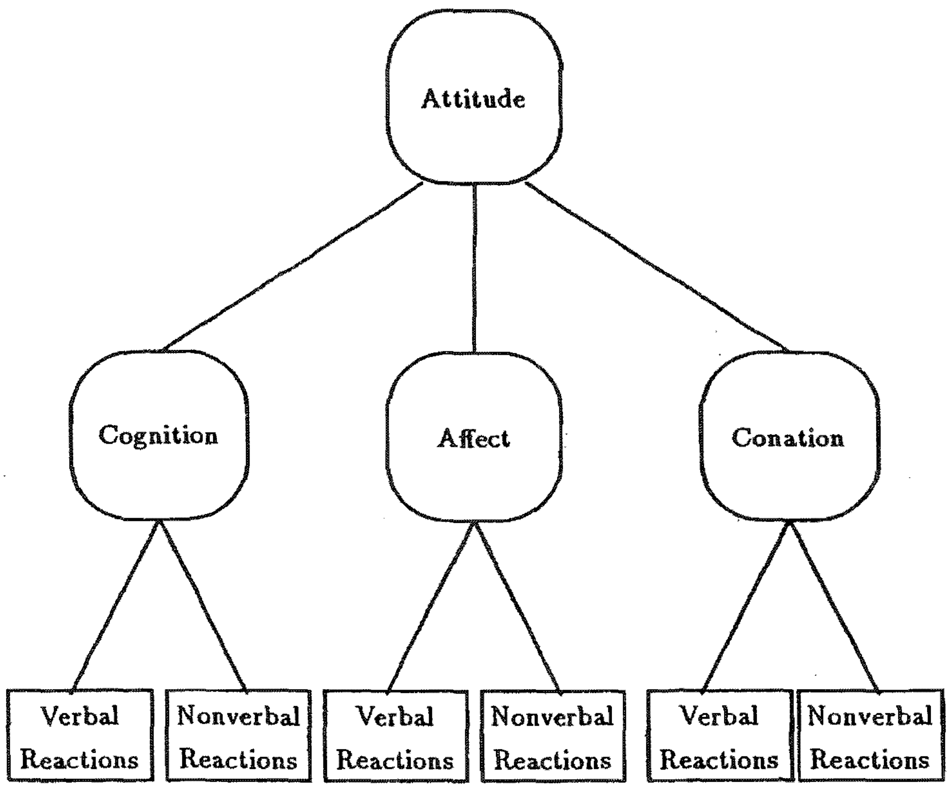


Figure 1. A model of intra-attitudinal structure (Ajzen, 1993, p.43).

hold about attitude objects (Ajzen, 1993). Furthermore, attitudes are generally highly correlated with the evaluative implications of their associated beliefs (Eagly & Chaiken, 1998; Rosenberg, 1956). For example, an individual might construct the attitude "I like the beach as a vacation spot" from a variety of available and accessible beliefs, such as "The beach is exciting," "The beach is warm," and "The beach is full of friendly people," all of which appear evaluatively consistent. An individual could also construct the attitude evaluation "I dislike the beach as a vacation spot" from those same beliefs if they were linked, for example to other beliefs, such as "Exciting places are overwhelming," "Warm places are uncomfortable," and "Places full of friendly people are annoying." In this instance, the beliefs would be evaluatively consistent with the attitude "I dislike the beach as a vacation spot."

Inter-attitudinal structure. By definition, the building blocks of inter-attitudinal structure are attitudes. A person may hold related attitudes about different objects (e.g., "I like the beach *and* I like the mountains for vacationing") or may hold different attitudes about a single object (e.g., "I am not in favor of legalized abortion. I am in favor of abortion for my teenage daughter"). Thus, a formidable part of attitude research over the years has been the attempt to determine the structure of associated attitudes in order to better understand how individual attitudes interact, and how such interaction might affect how attitudes are maintained and changed (e.g., Eagly & Chaiken, 1993; Petty & Krosnick, 1995; Pratkanis & Greenwald, 1989).

Theories of inter-attitudinal structure are closely related to, and often subsumed by, theories of attitude change. This relationship reflects the idea that changes in attitude are thought to occur when some part of an inter-attitudinal structure is disturbed. Thus, attitude dynamics suggest some movement within an inter-attitudinal structure. Unfortunately, most theories of attitude change attempt to explain attitude change without specifying the type of organization that attitudes might have in what Rosenberg (1956) called people's "attitudinal cognitorium" (i.e., a theoretical space of cognitions; p. 369).

Because they specifically describe relationships between attitudes, consistency theories of attitude change (e.g., the theory of cognitive dissonance, Festinger, 1957, and balance theory, Heider, 1946) are thought of as theories of inter-attitudinal structure (Eagly & Chaiken, 1993). Few consistency theories, however, provide a well-developed picture of both the structure and dynamics of attitude change. In Festinger's (1957) theory of cognitive dissonance, for example, two elements stand in a dissonant relation to each other when, in an individual's mind, one implies the converse of the other. According to the theory, in order to resolve the dissonance (the theory assumes where there is dissonance, there is an internal pressure to reduce it), the individual changes either the content, the importance, or the relevance of one or more of the dissonant elements. Aside from implying that consonant attitudes might be grouped together or linked in some way, Festinger makes very few claims as to how the attitudes themselves might be cognitively organized so as to create the dynamics he suggests.

In contrast, Heider's (1946, 1958) balance theory explicitly suggests the existence of attitudinal structures that consist of dyads and triads of cognitive elements, and provides a description of the dynamics of attitude change. Moreover, the structure and the dynamics are symbiotic. According to Heider, people prefer to maintain balanced (i.e., not conflicting) elements in these dyads and triads. Changes in structure—conflicting attitudes or beliefs—are resolved by changes in one or more attitudes to restore the balance of the system. Although his description of structure is relatively rudimentary, it provides a necessary organizational framework on which Heider can place his explanation of attitude dynamics.

Other cognitive theories of attitude change (e.g., information processing theories, cognitive elaboration theories, attribution theories) also hint at an underlying structure of attitudes in their implicit assumptions that attitudes are linked, or at least related, but these theories fail to provide explicit models. Cognitive elaboration theories, for example, focus on attitude dynamics, suggesting that attitude change is affected by the number, type, or quality of the thoughts (i.e., cognitive responses) that people generate in response to persuasive messages. Messages that evoke favorable thoughts should be persuasive and messages that evoke unfavorable thoughts should not be (Eagly & Chaiken, 1993). Petty and Cacioppo's (1986) Elaboration Likelihood Model proposes an algorithm to determine if an individual is likely to think about a persuasive message and to predict the effect of that thought (see Figure 2). According to the theory, when an individual receives a personally relevant message about an attitude object under non-distracting

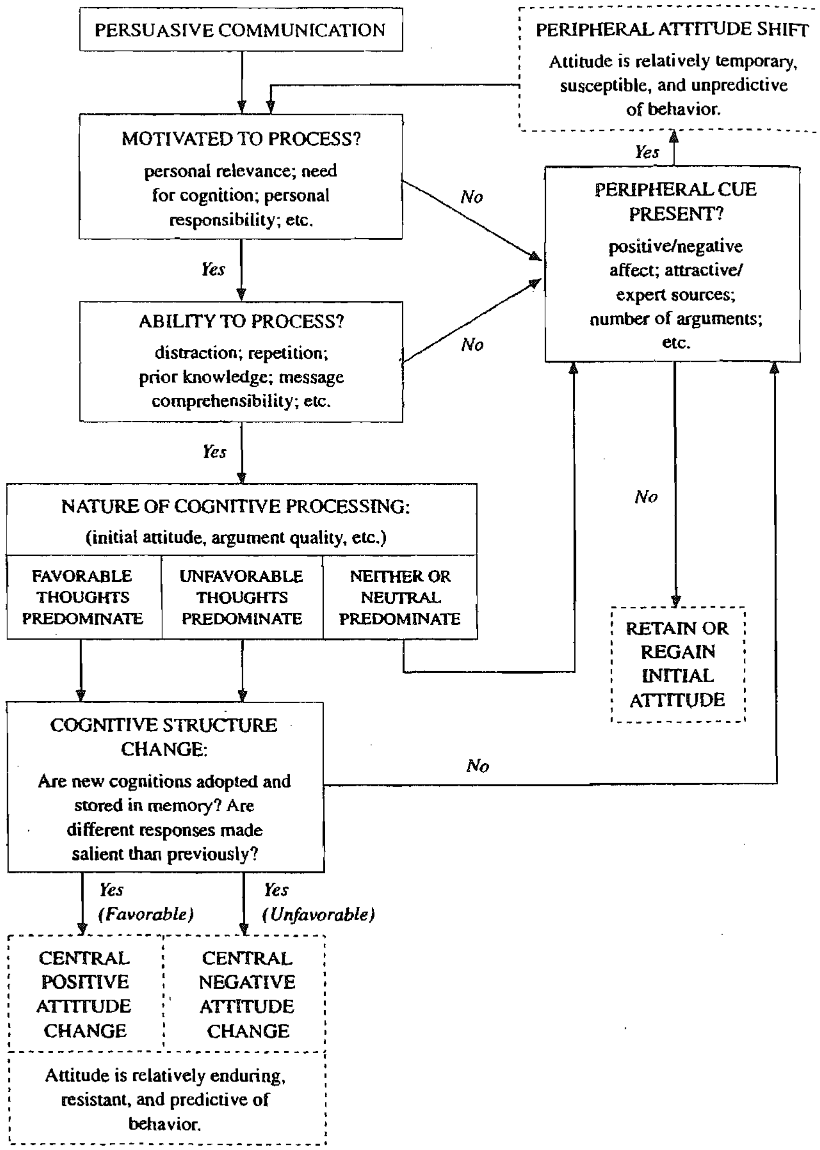


Figure 2. A guide to the Elaboration Likelihood Model (Petty & Cacioppo, 1986, Figure 1, p. 126).

conditions, he or she will probably think about the message arguments. And if the message arguments are strong, one or more of his or her attitudes will change. The model refers specifically to changes in cognitive structure, but does not specify what form the structure might actually take or the organization of attitudes preceding and following the message argument.

Another category of attitude change theories treats attitudes as entities that are deduced from an individual's existing ideologies, or broad classes of general attitudes that have already been formed. These theories implicitly suggest a hierarchical structure of attitudes by arguing that specific attitudes are components of larger, broader ideological structures (Kinder & Sears, 1985). For example, Eagly and Chaiken (1998) describe a study in which some participants deduced their attitude toward a news item concerning sex discrimination from their existing beliefs about equal rights for women (p. 284). Ideological theories like this, however, tend to eschew discussion about the formal organization of attitudes in favor of discussing dynamics. Furthermore, a major limitation of ideological approaches to inter-attitudinal theory is that they tend to focus primarily upon the interaction of political attitudes and beliefs, which may not be representative of the interactions of attitudes in a variety of other domains (Judd & Krosnick, 1989; Tetlock, 1989).

Overall, inter-attitudinal theories and theories of attitude change have not specified any inter-attitudinal structure or clarified the relationship between attitude structure and dynamics. However, inter-attitudinal theories probably emphasize dynamics because dynamics lead to measurable changes, which lead to testable hypotheses. Hence, structure is given much less thought and, in the end, is often simply implied.

Examples of the Relationship Between Inter-attitudinal Structure and Measurement

One example of an attitude structure tacitly implied by measurement rather than explicitly stated by theory is the representation of an individual's attitude on a unidimensional, bipolar continuum, like a Likert scale (Judd & Kulik, 1980; Likert, 1932; see Figure 3). When an attitude is measured with a Likert scale, the researcher makes implicit assumptions about attitudes and attitude change, including the following: that attitude is a discrete entity (i.e., an attitude can be measured and understood relative to nothing else except the measurement tool); that attitude change is a process with only five (or seven or nine, etc.) degrees of psychological differentiation that individuals are capable of identifying; that each attitude is located between two extremes, and indifference or neutrality has the same psychological distance from each extreme; and that the language used to describe each extreme is isomorphic to the numerical value assigned to each extreme and adequately describes it (see Eiser, 1994b). The difficulty that arises from acceptance of the scale's implicit assumptions is these assumptions place too many restrictions upon attitude change (e.g., an individual who says "But I really, REALLY strongly agree . . . like 10!" cannot have his or her attitude adequately measured). These assumptions impede researchers' abilities to generate a well-developed functional form to represent attitude change and structure.

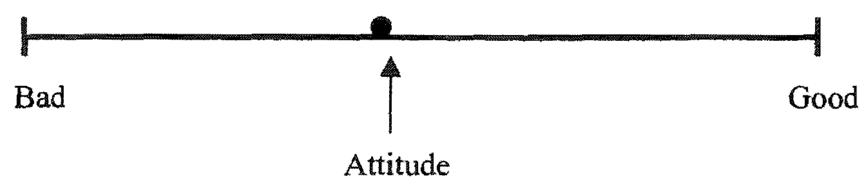


Figure 3. A unidimensional, bipolar representation of an attitude.

In another example of an attitude structure tacitly implied by measurement rather than explicit stated by theory, Kerlinger (1984) has argued for a two dimensional, unipolar model of political attitudes. Although Likert scales were used to measure individual attitudes, Kerlinger performed a factor analysis of teachers' and graduate students' positive and negative feelings toward each of 50 concepts (e.g., religion, civil rights, social security) and found responses grouped together as mostly conservative and mostly liberal which suggested a "dualistic and orthogonal structure" of social attitudes, as modeled in Figure 4 (Kerlinger, 1984, p. 45). So, according to Kerlinger's (1984) model, individuals do not form attitudes on a single continuum on which liberal and conservative are polar opposites. Instead, people endorse liberal beliefs, for example, but are indifferent to conservative beliefs or found these beliefs to be irrelevant. Despite loosening the one-dimensional constraint of the Likert structure, Kerlinger's model is problematic in that it still adheres to the other assumptions necessitated by the Likert scale (e.g., in Kerlinger's study, there were only three levels of differentiation for positive feelings about a concept [+3, +2, +1] and three levels of differentiation for negative feelings [-3, -2, -1]).

Structure preceding measurement. In contrast to models in which structure has been assumed as a function of measurement, Lavine and Latané (1996) have argued for a "cusp catastrophe" model of attitudes that specifies both the structure and dynamics of many of the relationships between attitudes. They argue that "the impact of a given cognitive unit [e.g., attitude] on another unit is given by the

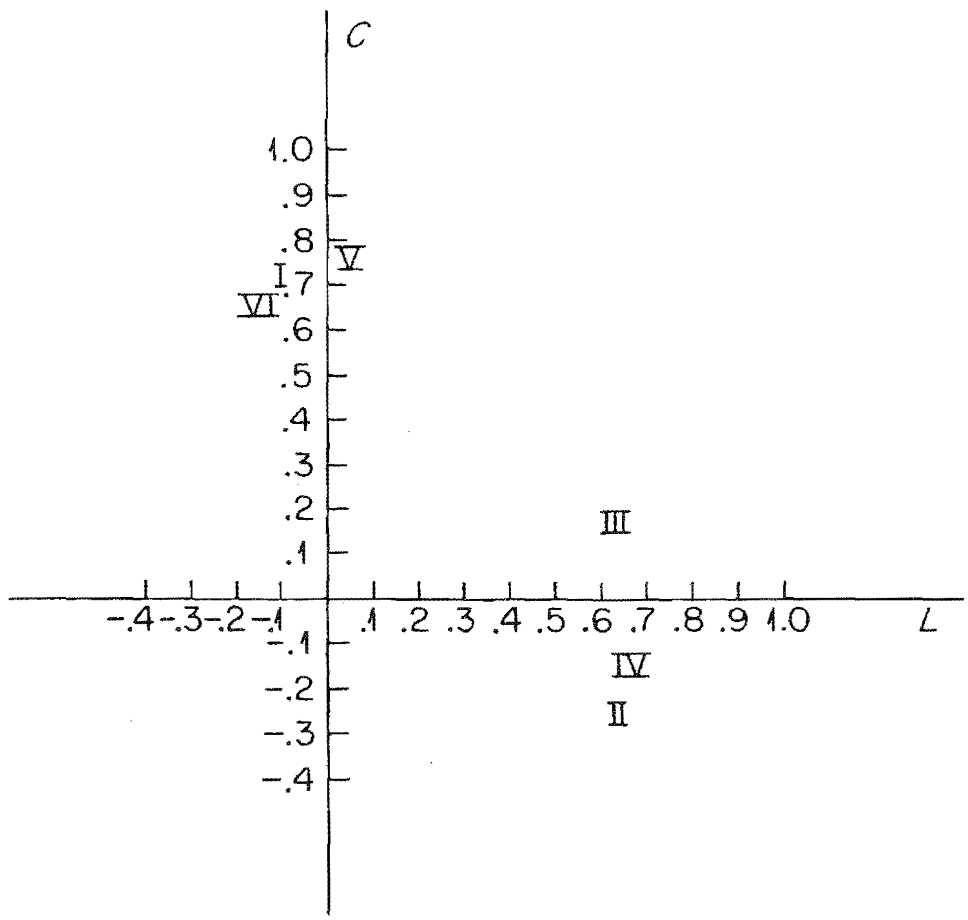


Figure 4. Kerlinger's (1984) bidimensional, unipolar representation of liberal (*L*) and conservative (*C*) attitudes (p. 46).

product of the extremity, strength, or activation value of the impinging unit and the implicational relation, immediacy, or connection-strength linking the units to one another" (Lavine & Latané, 1996, p. 51). This model results in a nonlinear attitude change. For example, the model presented in Figure 5 shows that unimportant attitudes tend not to exhibit a wide dispersion on the dimension of favorability (the intersection of low importance and favorability slopes moderately upward); that is, most unimportant attitudes are neither very highly favorable nor very highly unfavorable, but rather of neutral favorability. Most important attitudes, however, have either low or high favorability, compared to unimportant attitudes (the intersection of high importance and favorability starts relatively low and slopes, quite nonlinearly, relatively high). Furthermore, there is a catastrophic point at which incoming messages cause important attitudes to abruptly change from favorable to unfavorable (the bend in the plane). Lavine and Latané (1996) suggest that

> unlike traditional linear dynamics where people react to discrepancies by making small adjustments, nonlinear change is nonincremental or catastrophic, like the camel's response to the last straw. To the extent that people become committed to a position, they may exhibit little change in response to social pressure until the force to change outweighs the force to stay. (p. 22)

Huguet and Latané (1996) have described this model as making robust predictions, "theoretical variations [that] can be tested, and consequences that can be measured in

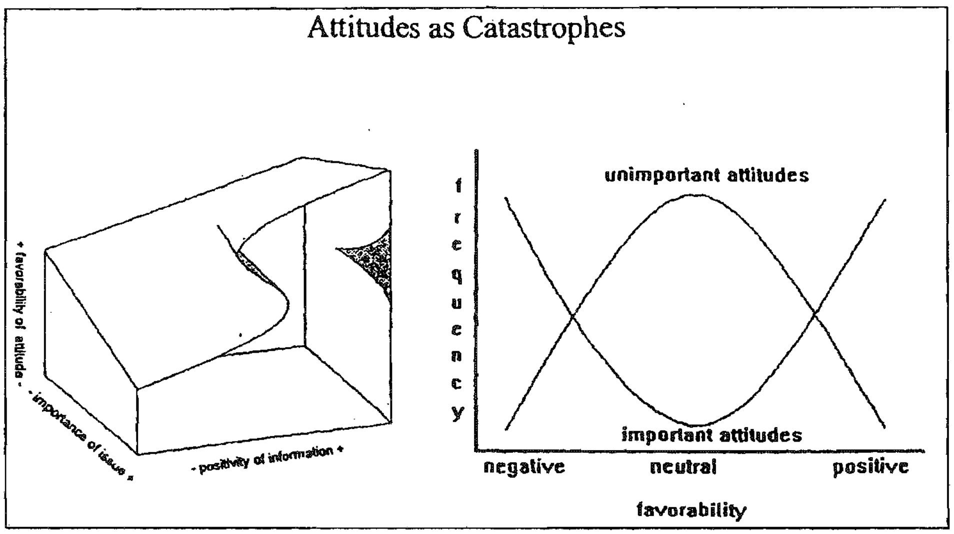


Figure 5. The cusp catastrophe model of attitudes as suggested by Latané (1996, p. 22).

terms of well developed, global order parameters" (p. 59). Such a high degree of specificity allows the model's structure and dynamics to be simulated and evaluated by a computer program, which is extremely unusual in attitude research.

As is evidenced by the range of models depicted by Figures 2 to 5, there are diverse opinions about the structure and dynamics of attitudes. Even Eagly and Chaiken's (1993) comprehensive synthesis of attitude research does not indicate a dominant model for the cognitive structure of attitudes, nor does it "announce [a] general theory of attitudes" even though it "deals with the entire domain of the psychology of attitudes" (p. 692). Eagly and Chaiken's unwillingness to proclaim a dominant model after such a thorough review may reflect a general reluctance of attitude researchers to suggest that one model of attitudes is superior to others (Pratkanis & Greenwald, 1989). Such a laissez-faire attitude among attitude researchers has created a model of inquiry in which researchers conduct variable analytic studies with their favorite model. Such studies almost never reject that favorite model. Consequently, there have been few attempts and little consensus to determine which model of the structure of attitudes might generate the best fitting predictions about attitude change.

Discovering a model that well describes the structure and dynamics of attitudes is the first step in developing an adequate theory regarding inter-attitudinal structure. Such a model is necessary because models, in general, facilitate our understanding of complex phenomena (Bailer-Jones, 2002). They provide the necessary basic framework from which a field's researchers can generate and test hypotheses such that one researcher's findings are relevant to and significant for another's. Thus, a robust model that can instantiate the specifications of several of the prevailing attitude change theories of the day could be a powerful tool for unifying the body of attitude change research.

Any model under consideration to unify theories of inter-attitude change should be, of course, explanatory, parsimonious, heuristic, falsifiable, and practical. If the model does not satisfactorily explain why attitudes can be conceptualized in the specified way, for example, then it has little usefulness to researchers. Or, if the model does not generate additional research and contribute to the development of additional theory, then it's a dead end for the field. Lave and March (1975) expand the usual criteria for a "good" model, suggesting that, in addition to being a vessel for discovering truth, a good model should be artful, and produce aesthetic pleasure (p. 61). Furthermore, according to Lave and March, "A beautiful model is fertile [the model yields many predictions] . . . unpredictable [the model generates predictions that would not have otherwise come to fruition] . . .and just [the model contributes to a better world]" (pp. 64-73).

With the aforementioned criteria in mind, two models of attitude change were chosen for the current study.

Two Models of Attitude Change

For models of attitude change to be compared, they must make predictions that can be tested. The implied unidimensional, bipolar structure that emerges from using a Likert scale does not provide, for example, any information about how or why any single attitude might fit into a structure, how any two attitudes might be related, what force might be required to change an attitude, or how an attitude rated "2" might affect a different attitude rated "7." Kerlinger's (1984) two-dimensional structure is less a theoretical model of the underlying structure of attitudes than the *post hoc* result of a factor analysis of one particular attitudinal domain that yielded two orthogonal factors.

In an effort to refine inter-attitudinal and inter-belief structure, this dissertation will examine two models of attitude and belief structure that make testable predictions of attitude and belief change: the hierarchical model and the Galileo model.

The Hierarchical Model

Definition. A hierarchy is any system of concepts ranked one above another (*Random House Webster's Unabridged Dictionary*, 1997); typically, as one moves down a hierarchy, there are an increasing number of objects per level (see Figure 6). The attribute used for ranking objects in a hierarchy is arbitrary; objects can be ranked by geographic size (e.g., state-county-neighborhood), for example, or by number of members (e.g., battalion-platoon-squad). As these examples suggest, usually as one moves down a hierarchy, categories increase in their specificity (i.e., the category units become smaller); more global or general concepts are located at the top of the hierarchy.

Hierarchies provide logical structure to, and imply relationships between, concepts. Thus, a hierarchy seems to be a good candidate to represent attitude concepts, because it is generally known that conceptually-related attitudes are correlated and that change in one attitude will usually induce change in a conceptually-related attitude (see, e.g., Eagly & Chaiken, 1993; Greenwald, Brock, & Ostrom, 1968; Triandis, 1971). Figure 7 (Hunter, Levine, & Sayers, 1984, p. 232) shows what the hierarchical structure for the concept *war* might look like.

The hierarchical model: Inter-attitude and inter-belief change. If attitude objects are organized hierarchically, then the hierarchy should have a dynamic influence on the relationships between those objects. That is, the hierarchy should have an effect on attitude stability and change with respect to the included objects. Poole and Hunter (1979) and Hunter, Levine, and Sayers (1976, 1984) have proposed

that at least some attitude objects can be organized hierarchically. They have further proposed the dynamics of such a structure, claiming that the hierarchy influences attitude change. According to Hunter et al. (1984), attitudes organized hierarchically have attitude objects, or concepts, that could themselves be organized into "logical classes or subclasses that form superordinate-subordinate relationship with each other" (p. 231). These concepts, and consequently attitudes towards these concepts, are arranged on different, connected levels from the most general to the most specific, and these concepts are not completely independent of each other (see, for example, Figure 7). Note that Hunter et al. imply an isomorphism between a hierarchy of attitude concepts and a hierarchy of attitudes towards those concepts.

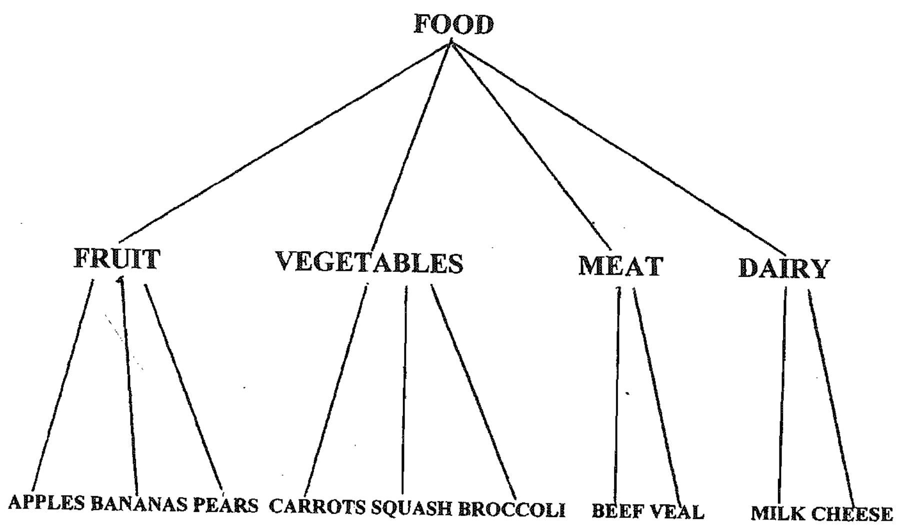


Figure 6. Example of a hierarchy. Moving down from the top concept, specificity increases and there is an increasing number of objects at each level.

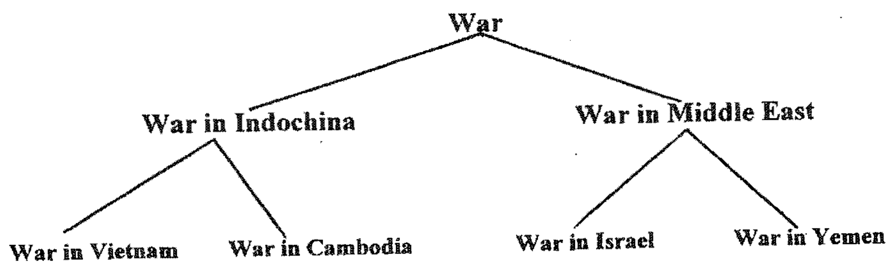


Figure 7. Hunter, Levine, and Sayers' (1984) example of the hierarchical structure of concepts associated with war in general (p. 232).

They do not distinguish between attitude and concept hierarchies, which results in the kind of attitude-belief ambiguity discussed earlier in this chapter (page 4) and as well by McGuire (1989).

For any particular conceptual hierarchy, Hunter et al. assert that messages directed toward the top of the hierarchy can affect attitudes towards concepts at lower levels of the hierarchy (i.e., "top-down" influence):

> An attitude toward a logically superordinate concept (such as "war in general") acts as a source of messages about the given concept (such as "war in the Middle East"). Thus the attitude toward the superordinate concept influences the attitude toward the subordinate concept. (p. 231)

This prediction leads to the first study hypothesis:

> H1: When an individual receives a persuasive message directed toward a superordinate concept in a particular concept hierarchy, (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change will occur with respect to concepts subordinate in the hierarchy.

Furthermore, although Hunter et al. (1984) claim that attitudes toward general concepts at the top of a given hierarchy (e.g., the concept War in Figure 7) will bring about change in attitudes toward concepts lower down in the hierarchy (e.g., the concept *War in Vietnam* in Figure 7), they use Aristotelian logic to deduce that the reverse effect will be significantly weaker. That is, given the syllogism "If *A* then *B*. *A*. Therefore *B*," then if the probability of *A* increases, then the probability of *B* increases but the reverse is not true (see Hunter et al., 1984, pp. 232-234). They write:

> Consider the relationship between the person's attitude toward war in general and consider the person's attitude toward the war in Indochina. Logically, if all wars are bad, then the war in Indochina is bad. Thus, logic predicts a strong downward influence. On the other hand, if the war in Vietnam is bad, then logically one could only conclude that *some* wars in Indochina are bad, that is, there is no logical reason that the war in Cambodia might not be good. Thus, logically, upward influence is much weaker than downward influence. (p. 232)

Finding very little empirical evidence or theoretical logic available regarding upward influences, Hunter et al. (1976) concluded that "the model assumes that downward influences are so much stronger than upward influences that the upward influences can be ignored" (p. 6). Poole and Hunter's (1979) test of the Hunter et al. (1976) model found that messages directed toward concepts at the bottom of a hierarchy (i.e., the subordinate concepts) have no upward effect. Specifically, a message about the Interstate Commerce Commission did not affect individuals' attitudes toward the superordinate concept, the Federal Government bureaucracy More recently, Hunter (personal communication, March 25, 1999) asserted that evidence for bottom-up influence among attitudes *organized in a hierarchy* had not been found in his research. Thus, the second hypothesis:

> H2 (Hierarchical): When an individual receives a persuasive message directed toward a subordinate concept in a particular concept hierarchy, (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change will occur for the targeted concept, but not for any superordinate concept.

In addition to predicting the absence of upward influence among attitudes or beliefs, Hunter et al. (1984) posit that "concepts that are located side-by-side in a concept hierarchy represent mutually exclusive sets. Thus, from a purely logical point of view, there is no sideways influence" (p. 233). This statement comprises the third and final hypothesis generated by the hierarchical model of attitude and belief change:

> H3 (Hierarchical): When an individual receives a persuasive message directed toward a subordinate concept in a particular concept hierarchy, (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change will occur for the targeted concept, but not for any equipollent concept.

The question of explicitness. In addition to the ambiguity of the terms attitude and belief, there seems to be some ambiguity about what kinds of relationships would satisfy Hunter et al.'s (1984) definition that a hierarchy contains "an attitude toward a *logically* [italics added] superordinate concept . . . [which] acts as a source of message about the given concept" (p. 231). Hunter et al.'s elaboration of the definition simply suggests that "concepts can be frequently organized into *logical* [italics added] classes or subclasses that form superordinate-subordinate relationships with each other" (p. 275). These definitions imply that the hierarchical theory applies to concepts that people consistently conceptualize as being hierarchical without much thought. That is, there are some sets of concepts that, when presented as a set, directly suggest a hierarchical organization; the hierarchy is available and easily accessible when an individual is presented the set of concepts. This type of hierarchical relationship will henceforth be referred to as *explicit*. Concepts with explicit hierarchal relationships are super- and subordinate (or equipollent) to each other as a result of their denotative meanings, and there is general consensus about the location of these concepts in the hierarchy. An example of an explicit hierarchy would be the food hierarchy shown in Figure 6 (page 23), or the taxonomic scale for the classification of animals (i.e., kingdom, phylum, class, order, family, genus, species).

People can and do organize all kinds of concepts into hierarchies, often based upon *context-dependent* meanings. People create these kinds of hierarchies because hierarchical organization seems to be an easy way for people to manage all of the concepts that they know. Jackendoff (1992) explains that people (1) encode all of the things that they think there are and then (2) develop a repertoire of categories in which to place these things, and finally, (3) construct a list of situations in which these things might be encountered and within which the meaning of these things can be understood (Jackendoff, 1992, p. 8). Such categorizations can give rise to *implicit* hierarchies, or hierarchies of concepts for which there are super- and subordinate relationships between more abstract and more specific concepts, but these relationships are not embedded in their semantic meanings in the same way as for explicit hierarchies. An example of an implicit hierarchy that an individual might construct would be *relationships* (superordinate) → *friendship* and *love* (mid-level) → *co-workers* and *gym buddies* (subordinate to friends) and *parents* and *spouse* (subordinate to love). For the individual, the concepts in these hierarchies are—at least temporarily—logically related. However, this particular hierarchical organization of this particular set of concepts is subject to change as different meanings for the concepts develop or are invoked. If the individual falls in love with a co-worker or gym buddy, the entire hierarchical structure may be subject to collapse.

Can the hierarchical theory apply to both explicit and implicit types of hierarchies? This question leads to the two research questions of the study. The first question arises directly from a need to compare explicit and implicit hierarchies:

RQ1: How does attitude change in explicit hierarchies differ from attitude change in implicit hierarchies?

The second research question attempts to determine more precisely the differences, if any, between explicit and implicit hierarchies. Because explicit hierarchies are more readily apparent to individuals, and their emergence does not depend upon the context of the concepts, it is hypothesized that explicit hierarchies are more accessible than implicit hierarchies. If accessibility can be defined as the activation potential of available knowledge (Higgins, 1996, p. 134), then an explicit hierarchy should be readily available and accessible as a function of the presence of several members of the hierarchy. The fuzziness of an implicit hierarchy, however, and the dependence of its emergence upon situational or contextual factors, suggest that implicit hierarchies, although stored in memory and available, are less accessible than explicit hierarchies. If these differences in accessibility between explicit and implicit hierarchies exist, then it follows that increasing the accessibility of an explicit hierarchy (e.g., by priming) should have little or no effect upon attitude change dynamics within the hierarchy because it is, by definition, already accessible. However, increasing the accessibility of an implicit hierarchy should result in some effect upon its attitude change dynamics. Thus, the second research question:

> RQ2: How does accessibility of a hierarchy affect that hierarchy's influence on attitude change?

Support for the hierarchical model. There is a great deal of consensus around the notion that attitude and beliefs are hierarchically related, and that the hierarchical organization affects attitude change. Eagly and Chaiken (1998), for example, in describing inter-attitudinal structure, lend strong support to the top-down only restrictions of the hierarchical model:

> [A]ttitudes that are linked to more abstract attitudes (i.e., values) in a hierarchical structure may be particularly strong. If a lower-level attitude (e.g., recycling) is an implication of a more general attitude (e.g., environmental preservation), direct attack on the lower-level attitude . . .

> would be ineffective because support of this lower-level attitude would derive from its relation to the higher-level attitude. (p. 289)

In addition, studies by McGuire (1960) and Wyer (1970, 1976) support Hunter et al.'s (1984) use of syllogistic inference as a determinant of top-down influence. In their probabilogical models of belief interactions, McGuire (1960) and Wyer (1970) each hypothesized that relationships among beliefs followed the tenets of logical deduction. McGuire's model took the form of logical syllogisms, whereas Wyer's model took the form of conditional inferences, but in both models, beliefs are formed or modified as propositions that are *conclusions* to a logical argument. Although neither McGuire nor Wyer specifically address the effect that a conclusion might have on a premise, the laws of logic dictate that syllogistic arguments do not work in the reverse direction. That is, there is no logical reason for a conclusion to affect a premise; furthermore, in a syllogism, the assertion of a reverse effect (i.e., from the conclusion to the premise) would commit the logical fallacy of affirming the consequent (Hamblin, 1970).

Theorizing that cognitions such as attitudes or beliefs might be hierarchically organized is not without precedent. Jolly and Kramer (1994) attempted to apply a hierarchical model of affect to cognition, using a model suggested by Watson and Clark (1992). Watson and Clark had proposed a model of affect in which lower order affects (e.g., fear, sadness) are influenced by a superordinate factor (e.g., Negative Affect). That is, Watson and Clark argued for a structure of discrete affects that were organized under and accessed by two larger, superordinate affects. Jolly and Kramer (1994) hypothesized that "If data which are primarily cognitive in nature performed in a manner similar to Watson and Clark's (1992) affect . . . data, a hierarchical model of internalizing cognition would exist" (p. 3). Jolly and Kramer tested a hierarchical model on primarily cognitive data and did find support for a hierarchical theory of cognitions in which a "broad-band cognition factor . . . comprises several discrete factors" (p. 11). Specifically, Jolly and Kramer found that specific types of cognitions (e.g., depressive cognitions, anxious cognitions) were influenced by, and could be subordinated under, a more general concept of cognition (e.g., negative cognitions). So, general negative cognitions could, in turn, create specifically depressed or anxious cognitions. Thus, Jolly and Kramer's study supports the notions of both a hierarchical structure of cognitions and patterns of influence based on the hierarchy. Jolly and Kramer further suggested that their finding would "hold promise for understanding the relationship between specific and general components of cognitions" (p. 3).

Also providing support for the hierarchical structure of attitudes is Marsh, Byrne, and Shavelson (1992). They presented a review of the hierarchical model of the self-concept (i.e., cognitions or attitudes about the self). Their model posits general self-conceptions at the top as more global and more stable than the discrete perceptions of personal behavior in specific circumstances, which are at the bottom. In describing the model, Marsh et al. explain that "the hierarchical general self-concept—the apex of the model—is stable, but as one descends the hierarchy, self-concept become increasingly situation specific and, as a consequence, less stable" (p.

50). That is, for example, one's subordinate self-concept about ability in a particular math class might vary as he or she scores an A on one math test and an F on another math test. The Marsh et al. model does not make claims regarding dynamic influences within the hierarchy. Still, evidence of hierarchically organized cognitions does lend support to Hunter et al.'s proposed structure.

From a theoretical standpoint, Simon (1969) argues that hierarchies are natural structures that construct many of the systems in our world. The stability of hierarchical structures, he contends, allows them to bring order to complex structures. He provides many examples of hierarchical systems at work in the world: The basic structure of matter is hierarchical, in that molecules are made of atoms, which are themselves made of putatively more elementary particles (p. 87). Books are divided into chapters, and then into sections, paragraphs, clauses, phrases, and words (p. 90). Music may be analyzed similarly (p. 90). The segmentary structures of societies – individuals within families within tribes within nations -- are likewise hierarchical (p. 88). And problems can be solved more easily when they can be decomposed into subproblems whose solutions can be combined into a solution to the problem as a whole (pp. 95-96). Thus, the notion of a hierarchical organization of attitudes seems reasonable, and perhaps even expected.

Finally, in the area of neuropsychology, Cartling (1996) has demonstrated a neurological basis for people storing particular cognitions—semantic associations—hierarchically. (Semantic associations are facts and information, as opposed to episodic associations, which refer to spatiotemporal relations of an autobiographical character.) According to Cartling, the hierarchical organization of semantic information (e.g., cognitions or attitudes) can be attributed to a particular firing of neurons within a neural network in the brain. The brain is theorized to store information in hierarchies in order to maximize its storage capacity. Cartling's work provides important support for the structural component of Hunter et al.'s (1984) hierarchical model because attitudes, which are understood by most researchers to be enduring structures (McGuire, 1969), are assumed to be both stored in and organized in the same way as other material in long-term memory (Pratkanis & Greenwald, 1989; Tourangeau, Rasinski, & D'Andrade, 1991).

Arguments counter to the hierarchical model. Some lines of argument, however, seem to call into question the assumptions of a hierarchical model. First, and very importantly, the model does not account for inductive processes. Holland, Holyoak, Nisbett and Thagard (1986) discuss how individuals make generalizations in a "bottom-up" manner where specific instances (e.g., attitudes toward subordinate concepts) affect general conclusions (e.g., attitudes toward superordinate concepts). Moreover, simple observation suggests that induction indeed occurs in individuals. Although induction represents a severe weakness to the hierarchical model, it could constitute a limiting condition rather than a falsification of the hierarchical model, if it were found that the hierarchical model makes accurate predictions about the conditions under which *certain* attitudes change.

Second, Judd, Drake, Downing and Krosnick (1991) have demonstrated that providing an attitude response on one issue (e.g., capital punishment) tended to increase the extremity of responses to a second attitude issue to which it was assumed to be cognitively linked (e.g., gun control). Their conclusion that the first attitude influenced the second was based on the assumption that both repeated attitude responses and thinking about an issue tend to polarize subsequent responses to the same issue or object (see Tesser, 1978; Zajonc, 1968). That is, because study participants received messages only about capital punishment, only attitudes about capital punishment would be expected to increase in extremity. However, because attitudes about gun control also increased in extremity, Judd et al. concluded that attitudes about capital punishment and attitudes about gun control—what Hunter et al. would call sideways attitudes that should not affect each other—must be linked.

Finally, a strong philosophical objection to the notion that hierarchically organized concepts necessarily produce attitudes that are influenced by the hierarchy comes from Rosch's (1978) research on the psychological principles of categorization and prototypes. Rosch suggests that dynamics do not necessarily follow from structure and warns against the "failure to distinguish the structure of categories from the theories concerning the use of the structure in processing" (p. 36). So, although individuals will categorize stimuli (perhaps hierarchically) for reasons of cognitive economy, the act of categorization (structure) should not be confused with cognitive processing strategies.

The Galileo Spatial Model

Definition of a spatial model. A general spatial model of attitudes uses scaling methods to represent psychological distances between concepts or attitude objects as in a spatial coordinate system; the more similar or closely related two objects are, the less the psychological distance between them (Abelson, 1967; Kruskal & Wish, 1978; Torgerson, 1958). The spatial coordinate system becomes a representative model of the cognitive space of the individual (or aggregate) that generated it. Attitude change is represented by movement of the objects in the space, and the space is isotropic.

Figure 8 is an example of a spatial model that was constructed using multidimensional scaling methods (Saltiel, 1988). Although the space generated by participant data is more than two dimensional, the figure shows the first two dimensions of a space created by the perceptions of high school students regarding a number of occupations. The space clearly identifies the location of similarly perceived occupations grouped along two particular attributes that appear to represent prestige (or socioeconomic status) and gender. Thus, the two-dimensional map of the space provides important information regarding how these occupations are conceived of by the sample of respondents.

One particular spatial model is the Galileo model, described in detail by Woelfel and Saltiel (1988; see also Kaplowitz & Fink, 1988; Woelfel & Fink, 1980). The discriminative characteristics of the Galileo model, with respect to other spatial models, are its descriptions and predictions of the movements of concepts in the space. These predictions are discussed below.

The Galileo spatial model: Inter-attitude and inter-belief change. An important implication of the occupational map described above, according to

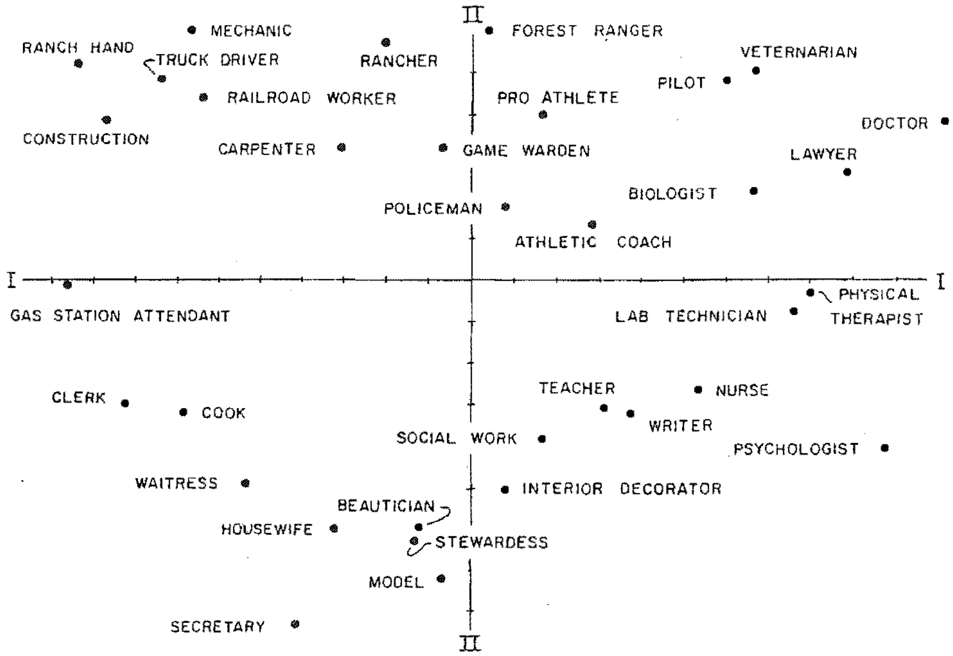


Figure 8. A two-dimensional configuration of thirty-four occupations (Saltiel, 1988, p. 306).

Saltiel (1988), is "the possibilit[y] it holds for measurement of change over time. With the use of such a metric technique it would be possible to . . . measure the motion in the system" (p. 309). In this example, such motion would reflect changes in the conception of the various occupations.

According to Woelfel and Fink, the Galileo model

> defines cognitive . . . processes as changes in relations among sets of cultural "objects" or concepts. The interrelationships among these objects are themselves measured by magnitude estimation pair comparisons, and the resulting dissimilarities matrices are entered into metric multidimensional scaling programs. The result of this work is that each of the cultural objects is represented as a point in multidimensional Riemann space. Cognitive . . . processes may be defined within the framework as motions of these objects relative to the other objects within the space. (p. x)

According to the Galileo model, once a space has been defined, the laws of motion of concepts within the space can be addressed. Generally, the motions have been conceptualized as conforming to the laws of Newtonian physics. Kaplowitz, Fink, and Bauer (1983) provide five assumptions about the attributes of the cognitive space that aid in understanding both the space and the objects within it:

> A1: A cognitive system is a set of concepts; a given concept has both a location and a mass in cognitive space.
>
> A2: Change in a belief or attitude regarding a particular concept is equivalent to motion of that concept in the cognitive space. (Woelfel & Fink, 1980)

A3: Following McGuire (1969, p. 257), we regard a message as an impulse which disturbs the existing state.

A4: As in Newtonian mechanics, we assume that the amount of acceleration of a concept in the cognitive space will be equal to the amount of force acting upon the concept divided by the mass of that concept.

A5: Moreover, the inertial mass of the concept is assumed to be a monotonically increasing function of the information the actor possesses about that concept (see Saltiel & Woelfel, 1975 and Danes, Hunter, & Woelfel, 1978, for evidence supporting this assumption). (pp. 289-290)

The Galileo spatial model of attitude change starts with a multidimensional space. In this space are attitude objects (concepts) that have mass and motion. The more information an individual possesses about an object, the more mass it possesses and the harder it is to accelerate. A message directed toward an attitude object can be seen as imparting a force upon that object; the amount of movement (attitude or belief change) is a function of the force, which equals the acceleration due to the forces time the mass of the object so impacted (Force = mass x acceleration, according to Newton's second law of motion). Finally, associated attitude objects can be linked as if by a spring (Kaplowitz et al., 1983); thus, the motion of any one attitude object will affect any concept linked to the focal concept.

So, the Galileo spatial model, in contrast to the hierarchical model, predicts attitude and belief change to some degree for all linked concepts when there is change in a focal concept. This model leads to the following hypothesis, generated relative to the predictions of the hierarchical model:

> H1: When an individual receives a persuasive message directed toward a superordinate concept in a particular concept hierarchy, (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change will occur with respect to concepts subordinate in the hierarchy.

Note that the prediction of downward influence is the same for both the hierarchical and the Galileo spatial models. Hypothesis 1 will be considered a "convergent" hypothesis, support for which indicates support for both models. The predictions of the models diverge for Hypotheses 2 and 3, which will therefore provide the basis for inferring from the results of the study which of the models is appropriate. The Galileo spatial model's predictions with respect to upward and sideways influence are:

> $H2_{ALT}$ (Galileo): When an individual receives a persuasive message directed toward a subordinate concept in a particular concept hierarchy, the force of that message will cause (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change that will be reflected by motion in linked superordinate concepts in that space.
>
> $H3_{ALT}$ (Galileo): When an individual receives a persuasive message directed toward a subordinate concept in a particular concept hierarchy, the force of that message will cause (a) attitude change, (b) belief change with respect to

an evaluative component, and/or (c) non-evaluative belief change that will be reflected by motion in linked equipollent concepts in that space.

Support for the Galileo spatial model. There is evidence that supports the Galileo model. Barnett (1988) discusses the development of the Galileo system and its multidimensional scaling methods—based on the principles of thermodynamics and information theory—as bringing communication research methodology closer to the tradition of "Kuhn's (1962) paradigmatic perspective of normal science" (p. 1). This "normalization" occurs because the Galileo system uses the same equations that physicists do to describe mathematically the changes in the location of the concepts in the multidimensional space over time. Similarly, Woelfel and Fink (1980) explain at length how a model of individual cognition similar to the physicists' multidimensional space-time continuum can be created by measuring changes in people's perceptions of concepts.

Galileo models have been used successfully to study many diverse communication phenomena, including group communication (Rice & Barnett, 1985), organizational climate (Fink & Chen, 1995), and managerial communication and work perception (Albrecht, 1984). Additional support for the notion of a Galileo spatial model comes from Danes, Hunter and Woelfel's (1978) demonstration of an accumulated information model of belief change. Danes et al. show that the amount of information an individual possesses about a belief is inversely related to the amount of belief change (i.e., the more information one has about a concept, the less change new information will have on the concept). That individuals who possess a great deal of information regarding a belief are less likely to change that belief can be (and has been) interpreted as consistent with the Galileo model, which suggests that (a) the mass of a concept increases as the amount of information regarding that attitude increases and (b) as mass increases, the concept becomes harder to move.

Furthermore, the Galileo model's conceptualization of attitudes as masses that are linked together in space is consistent with recent research in the area of network analysis, the analysis of people or objects connected to each other in some way. The study of networks

> is part of the general area of science known as complexity theory. . . . [A]ny collection of interacting parts—from atoms and molecules to bacteria, pedestrians, traders on a stock market floor, and even nations—represents a kind of substance. Regardless of what it is made of, that substance satisfies certain laws of form, the discovery of which is the aim of complexity theory. (Buchanan, 2002, p. 18)

Using network analysis, researchers can look at macro-patterns among a group of connected objects (or people or attitudes) and, even without knowing what every single object is doing at the micro-level, it is possible to know something about how the network as a whole works. Recent advances in network analysis have demonstrated that in both massive and complex systems (e.g., the communication patterns of 50,000 fireflies or the connections within the neural network of the worm *C. elegans*; Buchanan, 2002, p. 59), linked elements become organized in systematic ways, even in the absence of a deliberate organizing force. Each of a worm's 282 neurons, for example, are linked directly to about 14 others in a complex pattern, which results in four times as many between-neuron connections as would be expected if the links were random. According to Watts (1999), network analysis holds promise for explaining "the spread of everything from computer viruses to infectious or sexually transmitted diseases" as well as "the processing of information in spatially extended and irregularly connected networks such as the human brain" (p. 7). Because the spread of attitude change through linked masses (analogous to nodes) in the Galileo spatial model is similar to the concepts of linked nodes in network analysis, advances in the latter appear promising for providing support as well as insight to the former.

Arguments against the Galileo spatial model. Craig (1983) has argued directly against the claims of Galileo spatial model by suggesting that the model's epistemological basis is flawed. According to Craig, "There seems little reason to expect that a theory of human communication derived from physics would be successful, or more generally, that the first principles of physical science would generate an exact social science" (1983, p. 405). Moreover, Craig takes issue with the more basic assumption of the Galileo spatial model that the social sciences should strive to develop a more scientific paradigm, referring to the "numerous philosophical refutations of the very notion that knowledge does or can rest upon any rational foundation" (1983, p. 406).

Tversky and Gati (1978, 1982) have criticized spatial models of cognition in general, on the grounds that empirical perceived similarity data among concepts sometimes fail to satisfy the axioms of a Euclidean space, which are satisfied by ordinary physical space. The three Euclidean axioms are (1) the axiom of positivity, which requires that the distance between any two points is greater than zero or equal to zero if the points are the same (see Tversky & Gati, 1978, p. 95) (2) the axiom of symmetry, which requires that the distance between any two points is the same, regardless of which is the starting point and which is the end point (Tversky & Gati, 1978, p. 84); and (3) the triangle inequality, which requires that the sum of any two sides of a triangle be greater than or equal to the third side (Tversky & Gati, 1982). In a spatial model of cognition, for example, the concept *big business* could be located near the concept *rich*, if it was believed that big businesses are money makers. The concept *big business* also could be located near the concept *myself*, if one works for a big business. However, even though *big business* might be located near both *rich* and *myself*, one could still find the distance between *rich* and *myself* to be quite large. This example of a violation of the axiom of triangle inequality represents what Tversky and Gati see as a fatal flaw in spatial models of cognition.

Additionally, Tversky and Smith (as cited in Smith & Medin, 1981) find that spatial representation of related superordinate and subordinate concepts in the same space confounds any ability to determine meaningful distances between such concepts; that is, members of a class cannot be adequately separated from the class itself in a space of cognitive representations (e.g., *cherries* and *fruit* cannot be well separated from each other). Thus, Tversky and Smith reject the validity of a spatial model of cognitions that includes groups of hierarchically related concepts.

Proponents of spatial models, however, suggest that these criticisms do not invalidate the results of all multidimensional models of cognition; these criticisms can be brought against only particular sets of data or types of concepts that are not similar to the kinds of concepts used in this dissertation (see discussions in Sandhaus, 1987; Woelfel & Fink, 1980). I argue that each of Tversky and Gati's objections can be addressed and overcome by the use of carefully selected concepts that form cognitive spaces which are (1) highly reliable; (2) of low dimensionality; and, (3) have few violations of the triangle inequality. Furthermore, valid cognitive spaces can be generated by the use of distances created from "symmetric" questions (i.e., "How different are *A* and *B*?" rather than "How different is *A* from *B*?"). With close adherence to these conditions, the issues raised by Tversky and Gati should not significantly affect the models to be tested in this dissertation.

Significance of the Study

It is clear that attitude researchers would be well served by refinement of the theories of inter-attitudinal structure. This dissertation will contribute toward this end as it compares two models of inter-attitude structure that make very different predictions regarding attitude dynamics. The hierarchical model offers a well defined, logically consistent structure that predicts the movements of attitudes towards the concepts in it: top-down change *only*. The Galileo spatial model offers a flexible structure that uses a physics analogy for the dynamics of the objects in the structure in extremely precise quantitative terms. The hierarchical model's utility is limited, tautologically, to attitudes and beliefs toward concepts that can be organized hierarchically. The Galileo spatial model can accommodate attitudes toward any set of concepts, limited only by individuals' abilities to provide information about the concepts. The hierarchical model specifies that attitude(s) toward a subordinate concept cannot affect attitude(s) toward any superordinate or equipollent (i.e., sideways-related) concept. The Galileo spatial model specifies that attitudes toward concepts that are linked will necessarily affect each other, regardless of any hierarchical (or other) relationship. Understanding which cognitive representation of attitudes is supported experimentally, or at least discovering the conditions under which one makes better predictions than the other, will assist attitude researchers in refining a general theory of attitude structure.

CHAPTER III

Method

This chapter describes the methods employed to develop the study's measurement instrument and to collect the data. The first half of the chapter explains the purpose, sample size, procedures, and outcomes of the pilot studies that were necessary to develop the final instrument. The second half addresses the sampling issues, measurements, and data collection procedures for the final study.

Pilot Studies

A total of ten pilot studies were necessary to develop the final study instrument. This section describes the purpose, sample, procedures, and outcome of each of the pilot studies that were conducted. An overall description of all of the pilot studies is given first, followed by descriptions of each of the pilot studies.

The pilot studies were conducted between November 30, 2001 and April 24, 2002. Their purpose was to create the instrument that would be used to collect data in the final study. Each of the pilot samples consisted of students enrolled at a large eastern university. With the exception of Pilot Study 5, students were approached in their classrooms, with prior consent of their instructors, and asked if they would be willing to participate in research conducted by a doctoral student in the University of Maryland Department of Communication (i.e., the author). Consistent with the researcher's arrangements with each classroom instructor, students in each pilot study were offered a small amount of extra credit in exchange for their participation. Individuals who were interested in receiving extra credit but who chose not to participate in the research or who had participated in any other pilot study for the same project were given an alternative extra credit assignment that required comparable effort. For each pilot study, students were informed that they could not participate if they had participated in any other portion of the study, and names on the informed consent forms were cross-checked to ensure that no student participated in more than one part of this research. No demographic information was collected during the pilot studies. Copies of each of the instruments used in the pilot studies can be found in Appendices A through K.

Pilot Study 1: Concept Domains

Purpose. The purpose of Pilot Study 1 (PS1) was to generate a domain of concepts on the topic of consumerism that would be relevant to the proposed final study sample.[1] The concepts generated in PS1 were to be used in the development of the final instrument's implicit hierarchy.

Sample size. There were 23 participants in this pilot study.

Procedures. PS1 was conducted on November 30, 2001. The pilot topic was consumerism. Participants received a five-question questionnaire. The questionnaire asked participants to list everything that came to their mind when they thought about the concepts *buying, spending, shopping, money,* and *debt*. (See Appendix A.)

Outcome. The pilot study generated 78 terms related to buying, spending, shopping, money and debt. Many of the words were conceptually similar and could be grouped together. For example, the concept of *gifts* was articulated in a number of different ways in response to the spending question (e.g., birthday presents, Christmas presents, gifts for others). Similarly, the idea of *badness* permeated the responses to the debt question (e.g., remorse, guilt, irresponsible, jail). A list of all of the words generated by the pilot study can be found in Appendix B. The criteria for choosing possible concepts for the hierarchy in the final study were as follows:

(1) Possible concepts must appear to be frequently thought of by participants (i.e., the concepts must be generated by multiple participants).

(2) Possible concepts must not appear to evoke a particularly intense emotion (e.g., most of the concepts generated in response to the debt question conveyed a noticeably large negative component when compared to the concepts generated in response to the other terms).

(3) Possible concepts must appear to have the potential for hierarchical organization (e.g., money might divide into the subordinate concepts of buying and spending; spending might divide into the subordinate concepts of money and credit cards; luxuries might divide into the subordinate concepts of gifts and wants, or gifts and clothes).

Twelve concepts that appeared to meet the above criteria were chosen for further study: *clothes, gifts, money, needs, buying, spending, credit cards, luxuries, shopping, bills, wants,* and *food.*

Pilot Study 2: Creating the Hierarchies

The purpose of the four individual sub-studies that comprise Pilot Study 2 (PS2) was to create the explicit and implicit concept hierarchies that would be used in the final study. It was extremely important for the experiment's hierarchies to emerge from participants who were similar to the proposed final sample, which would consist of college students. Emergence of the hierarchy from the participants was critical because concepts that appeared to be hierarchical linguistically could not be assumed to be necessarily hierarchical to the sample. Conversely, concepts that the sample found to be hierarchical might not have been necessarily the same as those generated from obvious linguistic hierarchies.

Each of the final hierarchies would consist of one superordinate concept, two mid-level subordinate concepts and four bottom-level subordinate concepts (each mid-level concept being superordinate to two concepts). A seven-concept hierarchy was chosen because this was the size of the hierarchy used by Hunter et al. (1976, p. 5) and Poole and Hunter (1979, p.158).

Pilot Study 2A: The Explicit Hierarchy Topic Area

Purpose. The purpose of Pilot Study 2A (PS2A) was to identify the topic area for an explicit hierarchy that could be used in the main study.

Sample size. There were 16 participants in this pilot study.

Procedures. PS2A was conducted on February 12, 2002. PS2A defined the term "hierarchy" and then asked participants to draw on a blank piece of paper any three hierarchies that came to mind. No frame of reference or suggestion of topic area was given in the instructions. (See Appendix C.)

Outcome. The participants drew a total of 36 hierarchies on a variety of subjects such as school or university organizational structure (drawn by 5 [31%] participants), typical business organizational structure (drawn by 4 [24%]

participants), and food groups, animals, and royalty (each drawn by 3 [19%] participants). School or university organizational structure was eliminated as a possible hierarchy because it was believed that, for the set of possible study participants, attitudes toward these concepts would be extremely difficult to manipulate in an experimental setting. Business-type organizational structure was also eliminated because it appeared that when participants thought of such structures, they thought of their own workplaces, and not an abstract workplace; thus, such a hierarchy might not be consistent across participants. Furthermore, it was unlikely that all participants in the final study would be employed. So, the concept of animals was finally chosen as the topic area for the explicit hierarchy. The hierarchies of animals that were drawn by participants in PS2A satisfied the criteria for choosing hierarchical concepts listed above.

Pilot Study 2B: The Implicit Hierarchy Concepts

Purpose. The purpose of Pilot Study 2B (PS2B) was to identify an implicit hierarchy that could be used in the main study.

Sample size. There were 17 participants in this pilot study.

Procedures. PS2B was conducted on February 15, 2002. In PS2B participants were given a list of the 12 concepts chosen from the domain of implicit concepts that had been generated in PS1. Participants were then asked to draw one or two hierarchies using the provided concepts. (See Appendix D.)

Outcome. The participants drew a total of 31 hierarchies. These hierarchies consistently showed concepts organized in the way that became the experimental implicit hierarchy. For example, 14 participants (82%) drew a superordinate concept of either shopping (5 [29%] participants), money (6 [35%] participants) or spending (3 [18%] participants) that subsequently divided into the concepts needs and wants. In each of those 14 hierarchies, needs consistently divided into food (14 [100%] hierarchies) and clothes (11 [79%] hierarchies). Similarly, wants consistently divided into gifts (10 [71%] hierarchies) and luxuries (13 [93%] hierarchies). Thus, the superordinate concept in the final implicit hierarchy would be either shopping, spending, or money; this decision would require another pilot study (PS2C). The mid-level concepts in the final implicit hierarchy would be needs and wants; needs would divide into food and clothes, and wants would divide into gifts and luxuries.

Pilot Study 2C: The Implicit Hierarchy Superordinate Concept

Purpose. The purpose of Pilot Study 2C (PS2C) was to determine whether shopping, spending, or money should be the superordinate concept of the implicit hierarchy to be used in the main study.

Sample size. There were 29 participants in this pilot study.

Procedures. PS2C was conducted on February 22, 2002. Participants were given four seven-item hierarchies, each of which was missing a superordinate concept. Participants were also given a word list of twelve concepts from which they were to choose the words that they believed best completed each hierarchy. Words could be used once, more than once, or not at all. (See Appendix E.)

Outcome. Pilot PS2B had suggested that the concepts shopping, money, and spending were very similar with respect to the rest of an implicit consumerism hierarchy that divides into needs and wants. PS2C showed similar results for the concepts shopping and spending. Eleven respondents (38%) chose shopping as the superordinate concept, 10 respondents (34%) chose spending, 7 (24%) chose money and 1 (3%) chose product selection.

Shopping was chosen as the superordinate concept for the study. The choice of shopping as the superordinate concept was supported for three reasons. First, shopping was selected most often by participants in this pilot study as the most superordinate concept for the set of concepts provided. Second, after careful consideration of the definition of hierarchy that had been used in the pilot studies, and would be used in the final study (i.e., "Underneath the overall, or most abstract word are two or more words into which the overall word can be logically divided based on some criterion"), there was a question as to whether either shopping or spending most logically divided into needs and wants. Informal discussion with peers led the researcher to conclude that the idea of dividing shopping into types of shopping (i.e., shopping for needs and shopping for wants) was more consistent with the normal, everyday language of consumerism when compared to the idea of dividing spending into types of spending (i.e., spending for needs and spending for wants). Pragmatically, shopping is the label of an activity during which spending occurs, but not all people consider the activity "I'm going out to do some shopping" as equivalent to "I'm going out to do some spending."[2] Finally, with respect to the lists of terms generated in PS1, the concept of shopping seemed to generate terms that invoked fewer negative connotations than the concept of spending did.

The final implicit hierarchy can be seen in Figure 9.

Pilot Study 2D: The Explicit Hierarchy Concepts

Purpose. The purpose of Pilot Study 2D (PS2D) was to identify the concepts for an explicit hierarchy of animals that could be used in the main study.

Sample size. There were 20 participants in this pilot study.

Procedures. PS2D was conducted on March 18, 2002. In PS2D participants were given a list of 12 concepts relevant to an explicit hierarchy of animals, consistent with the results of PS2A. Participants were then asked to draw one or two hierarchies using the provided concepts. (See Appendix F.)

Outcome. The participants drew a total of 35 hierarchies. These hierarchies consistently yielded concepts organized in the way that became the experimental hierarchy. For example, 16 participants (80%) used animals as a superordinate concept that subsequently divided into the concepts *mammals* and *reptiles*. In each of those 16 hierarchies, mammals consistently divided into *dogs* (16 [100%] hierarchies) and *monkeys* (16 [100%] hierarchies). Similarly, reptiles consistently divided into *snakes* (15 [94%] hierarchies) and *lizards* (15 [94%] hierarchies). Thus, the intended final explicit hierarchy included the concepts animals, mammals, reptiles, dogs, monkeys, snakes, and lizards.

It must be noted here, however, that the concept of monkeys does not appear in the final animals hierarchy. In PS4A and PS4B, below, it became evident that participants' initial liking of monkeys was substantially less than the initial liking of the other six

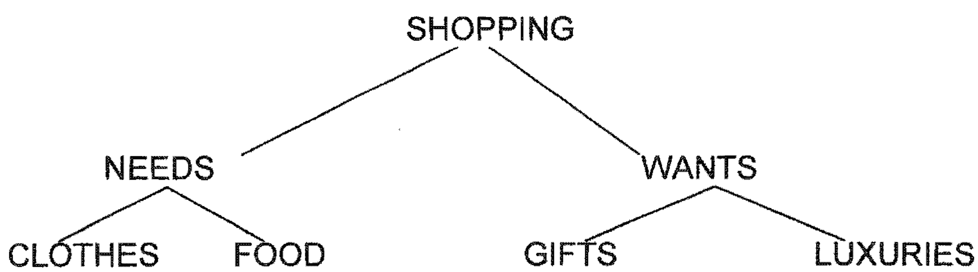


Figure 9. The implicit hierarchy to be used in the final study.

concepts. Additionally, participants found persuasive messages about monkeys to be relatively less believable than persuasive messages about the other concepts to be manipulated. Although comparative degrees of liking and message believability were not original criteria for choosing the hierarchical concepts, it was decided at this time that the relative equivalence of the concepts within each hierarchy should a factor. In the end, monkeys was replaced with *cats*, a concept that the pilots showed was more consistent with the relative likeability of other concepts in the hierarchy, and for whom the persuasive messages were more believable.

The final explicit hierarchy can be seen in Figure 10.

Pilot Study 3: Yardsticks

Purpose. The purpose of Pilot Study 3 (PS3) was to create two reference standards ("yardsticks," one for each hierarchy) for estimating the distances between each pair of concepts in the final study. A yardstick is a concept pair between which most participants will find a moderate distance and with which participants can make their paired-comparison judgments. Thus, the yardstick should help participants complete their magnitude estimations with relatively similar metrics and generate consistency in participant responses.

Yardsticks aid participants in completing their magnitude estimations. Consider, for example, a yardstick that states "The distance between ham and breakfast is 100." Given that yardstick, a participant may be asked, "What is the distance between eggs and breakfast?" Because she finds that the concept of eggs is

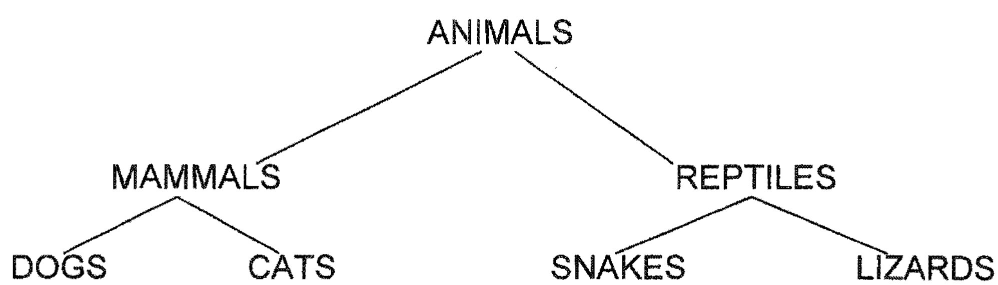


Figure 10. The explicit hierarchy to be used in the final study.

much more similar to the concept of breakfast than is ham--perhaps about 10 times more similar--she can easily answer 10 for the distance between eggs and breakfast. Gordon (1988) has found that individuals' abilities to use a yardstick criterion pair are "very impressive" (p. 199), that individuals using a yardstick are able to use it consistently, and that the procedure, in general, is "exceptionally robust" (p. 199).

Sample size. There were 56 participants in the study. Thirty participants were randomly assigned to complete the pilot questionnaire that determined the explicit hierarchy yardstick. Twenty-six participants were randomly assigned to complete the pilot questionnaire that determined the implicit hierarchy yardstick.

Procedures. PS3 was conducted on March 18, 2002. In one classroom, participants were randomly assigned to complete the yardstick questionnaire for either the explicit or implicit hierarchy. In each questionnaire, following the guidance of Woelfel and Fink (1980), participants were asked, "If Red and White are 100 units apart, how far apart are [Concept 1] and [Concept 2]?" to generate distances for all of the 36 pairs of concepts related to their hierarchical condition. (See Appendix G.)

Outcome. The pilot data were analyzed in accordance with the guidelines of Neuendorf, Kaplowitz, Fink, and Armstrong (1987), who suggested that a yardstick for paired comparison judgments should meet the following criteria: (1) it should consist of a pair of concepts that are judged to be a moderate distance apart, and (2) it should consist of a pair of concepts that are judged consistently across subjects (that is, it should have small interindividual variability).

In order to apply the Neuendorf et al. (1987) criteria, the response set for each hierarchy condition (i.e., explicit and implicit) was transformed to normality via a base e logarithmic transformation, and the mean was calculated for each variable (i.e., for each paired-comparison judgment). In each set of hierarchy data, the mean of all the means was determined to be the benchmark of "moderate distance apart," and was the value against which any potential yardstick would be compared. The mean of the means for each hierarchy's response set was determined (explicit hierarchy: M = 3.98, SD = .88; implicit hierarchy: M = 3.54, SD = .91), and the criteria for choosing the yardstick was further operationalized such that any yardstick should be ± .5 from the mean of the means, and have a variance < 1. In addition to the Neuendorf et al. criteria, it was decided that the yardsticks for this experiment could not include any concept that would be manipulated because that would affect the stability of the yardstick.

Therefore, for the explicit hierarchy, the distance between snakes and lizards (M = 3.64, SD = 0.76) was chosen as the representative yardstick. For the implicit hierarchy, the distance between gifts and wants (M = 3.59, SD = 0.94) was chosen.

Pilot Study 4: Persuasive Messages

The purpose of the three sub-studies that comprise Pilot Study 4 (PS4) was to create and test messages suitable for use in the final experiment.

The simple persuasive messages used in the experiment would be belief statements intended to move concepts in individuals' cognitive spaces closer to the evaluative concept point of *good*. In this regard, the messages would be consistent with the types of messages considered to be effective by Galileo model proponents (e.g., Woelfel & Fink, 1980). Messages of this type have been shown by Woelfel, Holmes, Newton and Kincaid (1988), for example, to induce attitude change successfully. According to Woelfel et al., simple messages about occupational groups (e.g., "Did you know that the occupations hairdresser and journalist are highly similar?") induced significant attitude change regarding the occupations relative to each other, in two different studies. Woelfel et al. tested simple messages in two distinct but redundant studies designed to support the overall generalizability of the conclusions. The first study examined two different samples of the same population one year apart. The second study examined two samples of different populations at the same time. In both studies (i.e., all four samples), simple messages had a significant effect upon participants' evaluations of the occupations targeted by the message.

Pilot Study 4A: Initial Goodness of Concepts

Purpose. The purpose of Pilot Study 4A (PS4A) was to determine the initial goodness of the concepts that would be used in the messages. This determination was necessary for two related reasons. First, the messages will be simple, stating that "X is good" (where X would be substituted with either animals, dogs, monkeys, shopping, food, or clothes). Such messages are expected to move the concept X towards the concept good in a spatial model. Therefore, X should be neither so good that it can move no closer to good, nor so bad that the likelihood of movement toward good is very small. Second, the hierarchical model is based upon a discrepancy model such that "(1) the subject compares how he feels about a specific object with whatever message is coming in, and (2) he also compares his feeling about the object with his attitudes towards concepts or objects immediate higher up the tree" (Hunter et al., 1976, p. 8). Thus, the messages should be such that the discrepancy between X and good should be about the same as the discrepancy between "objects higher up the tree" and good. Using concepts with similar discrepancies from good reduces the probability that any single concept's attitude change (or lack thereof) was disproportionately affected by its initial discrepancy from good.

Sample size. There were 14 participants in this pilot study.

Procedures. PS4A was conducted on April 19, 2002. In part one of the study, seven randomly assigned participants were asked to list all the reasons why shopping is good, clothes are good, and food is good, and seven randomly assigned participants were asked to list all the reasons why animals are good, monkeys are good, and dogs are good. (See Appendix H.) Participants were given five minutes to write their responses, and asked to continue to try to think of responses for the entire five minutes, even if they thought they had run out of answers.

The choice of five minutes as the time allotted for participants to write their responses was not arbitrary. The effect of time on experimental persuasion efforts is an important and unresolved issue. Some studies have shown decay of manipulated persuasion effects over time (see, e.g., Hovland, Janis & Kelley, 1953), whereas others have noted increases of such effects over time (e.g., the sleeper effect: Cook & Flay, 1978; Hovland, Lumsdaine, & Sheffield, 1949). Most attitude researchers agree that attitudes do not change instantaneously upon receipt of a message and then remain completely fixed until the receipt of another external message; rather, as McGuire (1960) describes, "the impact of the message on the remote issue occurs only gradually, the opinion . . . continuing to change for some time after the receipt of the persuasive message" (pp. 345-346).

Kaplowitz et al. (1983) assessed change in students' attitudes toward health service fees in 30 second increments across ten minutes in a between- subjects design. Using a differential equation model of oscillation, the researchers developed a dynamic model of attitude change as it proceeds in the absence of continuous external messages. Kaplowitz et al. found that "it takes about 135 seconds [for attitude change induced by a discrepant message] to be 90% completed, and 271 seconds to be 99% completed" (p. 247). These findings guided the decision to use a period of five minutes (i.e., approximately 271 seconds) for participants to consider the experimental message.

In part two of the study, participants were given the yardstick generated in PS3 (i.e., participants were instructed that "Gifts and wants are 100 units apart, which is a moderate distance"), and asked to generate distances between each of 20 shopping-related (i.e., *getting something new*), clothes-related (i.e., *looking nice*) and food-related (i.e., *tasty*) phrases and the concept good. All of the participants answered the same 20 questions, regardless of the questions they answered in part one.

Outcome. Most of the messages that participants generated in part 1 of PS4A regarding the goodness of the concepts (e.g., "Animals are good because they provide eco-diversity" or, "Clothes are good because it's good to look nice") were anticipated by the researcher, which indicated that participants' thinking about the concepts that would be manipulated was predictable. Furthermore, because many of these messages that participants generated had been anticipated, most of them had been included in part 2 of the pilot study; the ability to test the relative goodness of some freehand responses that participants gave in part 1 was quite useful.

Part 2 of pilot study PS4A yielded data that allowed the calculation of mean distance from each phrase to the concept good for many of the qualitative goodness reasons generated in part 1. The goodness means showed that reasons commonly generated about clothes (*Feeling positive about yourself* [Median = 50, Range = 300]), and food (*Nutritional nourishment* [Median = 100, Range = 200]; *Tasty food* [Median = 70, Range = 150]) were closest to good, followed by a reason shopping was good (*Getting something new* [Median = 50, Range = 300]), and additional reasons why clothes are good (e.g., *Looking nice* [Median = 60, Range = 200]; *A unique identity* [Median = 100, Range = 300]). Of the common goodness reasons about animals, monkeys, and dogs that were listed in part two of PS4A, *Cute animals* was the closest to good (Median = 100, Range = 200), followed by a *Vibrant ecosystem* (Median = 110, Range = 200), *Animal companionship* (Median = 150, Range = 400), and *Dogs are loyal* (M = 110, Range = 400).

It must be noted here that even though participants could consistently generate reasons why monkeys were good (e.g., several participants indicated that monkeys were good because they were funny, or fun to watch), the actual relative goodness of monkeys was not very good. The median distance between *Monkeys are fun to watch* and good was 300 units (Range = 490). This reason ranked 19th out of 20 goodness medians, and was three times the yardstick, or moderate distance, of 100 units. Thus, the distance between monkeys and good was judged to be highly discrepant with respect to the considerations discussed above.

Pilot Study 4B: Message Believability and Concept Resistance to Change

Purpose. There were two purposes to Pilot Study 4B (PS4B). First, each of two possible messages designed for the final study was tested for believability. The two criteria for acceptance of a persuasive message to be used in the study were (1) the message had to be believable, and (2) the message content had to accommodate the wide range of concepts that would be targeted for manipulation (i.e., shopping, food, clothes, animals, dogs, and monkeys [monkeys had not yet been replaced in the hierarchy]).

The second purpose of PS4B was to obtain estimates of both the average number of links that the hierarchy concepts had to other words, and the average amount of information that participants held about the hierarchy concepts. This information was necessary for two reasons. First, the links that concepts have to other words form the basis for both the hierarchical and Galileo spatial model's predictions regarding attitude change. Second, the amount of information that people hold about concepts has been shown to affect attitude change such that the more information a person holds about a concept, the more difficult it is to change attitudes about that concept (Danes et al., 1978; McGuire, 1960; Saltiel & Woelfel, 1975). Thus, the concepts that were to be used in the final study were examined to determine if they were relatively equivalent in number of links and amount of information because such equivalence would suggest equivalence in the concepts' resistance (or susceptibility) to attitude change.

Sample size. There were 75 participants in this pilot study. Thirty-six participants were randomly assigned to complete the pilot questionnaire that examined the six possible permutations of Message A. (See Appendix I.) Message A suggested that each of the six target concepts was good because it had been shown by researchers to positively affect college students' self-esteem. Thirty-nine participants were randomly assigned to complete the pilot questionnaire that examined the six possible permutations of Message B. (See Appendix J.) Message B suggested that each of the six target concepts was good because it had been shown by researchers to provide either personal pleasure, social benefit, or both and thus was important to the culture.

Procedures. PS4B was conducted on April 16, 2002 in two sections of an undergraduate Communication class. In each class, participants were randomly assigned to one of 12 message conditions:

Message A conditions: Shopping is good ($n = 6$), Clothes are good ($n = 5$), Food is good ($n = 7$), Animals are good ($n = 6$), Dogs are good ($n = 5$), and Monkeys are good ($n = 7$).

Message B conditions: Shopping is good ($n = 6$), Clothes are good ($n = 7$), Food is good ($n = 5$), Animals are good ($n = 8$), Dogs are good ($n = 7$), and Monkeys are good ($n = 6$).

In part one of the study, participants were asked to read a paragraph that concluded with the message statement "X (i.e., shopping, clothes, food, etc.) is good." They then were asked to complete 15 Likert-type questions (on a scale of 1 – 7 where 1 indicated "I don't agree at all," and 7 indicated "I agree very much") that included four questions about the believability about the passage:

3. I found the statements to be believable.
7. I questioned the accuracy of the Zimmer et al. study results.
10. I thought the information in the passage could be true.
14. I believe the finding that X [shopping, clothes, food, animals, dogs or monkeys was inserted here] can be related to self-esteem.

In part two of the study, participants were asked to think about the target concept of their respective messages (e.g., to think for a moment about shopping or animals or food) and then answer four questions regarding how often in the last month they recalled talking about the concept, reading about it, seeing a television program about it or engaging with it directly. These tasks were intended to make participants' stored knowledge about target concept X easily accessible. Then, the amount of information participants had about their assigned target concept X was measured by asking participants to rate the amount of knowledge they thought they had, compared to the average undergraduate student at their university (who was defined as possessing 100 units of knowledge about target concept X):

2. Compared to the average University of Maryland undergraduate student, I rate the amount of knowledge I have about X [shopping, clothes, food, animals, dogs or monkeys was inserted here] to be _____.

Finally, in part three of the study, participants were asked to list as many words as they could think of that were closely linked with their target concept X; this task was intended to make the linkages accessible to participants so that they could then make an estimate about the total number of links to target concept X that they possessed. The estimated number of a target concept's linkages were measured by the question:

4. Estimate the total number of words that you think you probably know which are associated with X [shopping, clothes, food, animals, dogs or monkeys was inserted here] _____.

Outcome. Tables 1 and 2 summarize the results of the believability data from part one for messages A and B, respectively. For message A, the believability of messages for all concepts except monkeys ranged from 4.40 (SD = 1.67) to 6.10 (SD = .95); the believability of message A with respect to monkeys ranged from 2.57 (SD = 1.50) to 3.71 (SD = 1.55). For message B, the believability of messages for all concepts except monkeys ranged from 4.42 (SD = 1.16) to 6.00 (SD = 1.13); the

Table 1

Mean and Standard Deviation Believability of Concepts for Proposed Explicit Hierarchy, Pilot Study 4B (N = 36), Message A ("X positively affects self-esteem")

Message Target	Belief Measure Q3 (Believability)		Belief Measure Q7[a] (Accuracy)		Belief Measure Q10 (True)		Belief Measure Q14 (Generally Believable)		Overall Mean of Means[b]	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Animals	5.83	1.47	3.00	2.00	5.67	1.51	4.83	1.47	5.44	1.48
Dogs	5.20	1.48	5.00	2.35	5.40	.89	4.40	1.67	5.00	1.35
Monkeys	3.71	1.55	5.57	2.02	3.43	1.61	2.57	1.50	3.24	1.55
Shopping	5.55	1.39	2.98	1.44	6.10	.95	6.02	1.61	5.88	1.58
Clothes	5.96	1.70	3.43	1.29	5.87	1.28	5.59	1.26	5.81	1.41
Food	5.13	1.45	4.97	1.86	5.27	1.72	5.02	1.88	5.14	1.75

[a] For this variable, higher numbers reflect higher questioning of the accuracy of the passage and, therefore, less belief.
[b] Calculated without Belief Measure Q7, because of its reverse-coding with respect to the other measures.

Table 2

Mean and Standard Deviation Believability of Concepts for Proposed Explicit Hierarchy, Pilot Study 4B (N = 39), Message B ("X is important to the culture")

Message Target	Belief Measure Q3		Belief Measure Q7[a]		Belief Measure Q10		Belief Measure Q14		Overall Mean of Means[b]	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Animals	5.50	.98	5.38	1.05	5.50	.75	5.12	1.28	5.33	1.00
Dogs	4.86	.90	3.71	2.07	4.43	1.04	5.14	.97	4.81	.97
Monkeys	3.45	1.30	4.80	2.21	3.24	1.56	4.00	1.11	3.56	1.54
Shopping	5.71	1.69	3.00	2.07	5.00	.74	4.42	1.16	5.04	1.20
Clothes	4.57	.89	3.71	1.10	4.71	1.14	4.57	1.26	4.62	1.10
Food	4.60	1.27	3.60	1.95	6.00	1.13	5.80	1.58	5.47	1.33

[a] For this variable, higher numbers reflect higher questioning of the accuracy of the passage and, therefore, less belief.
[b] Calculated without Belief Measure Q7, because of its reverse-coding with respect to the other measures.

believability of message B with respect to monkeys ranged from 3.24 ($SD = 1.56$) to 3.45 ($SD = 1.30$). Because message A was believable and could accommodate the wide range of concepts that would be targeted for manipulation, and because message A with the study concepts appeared overall to be more believable than message B with the study concepts, it was chosen for use in the final study.

The believability of message A with respect to monkeys was not significantly different than the believability of the message with respect to the other concepts in a one-way ANOVA of message target (animals vs. dogs vs. monkeys [observed power = .33]). However, because the believability of message A with respect to monkeys fell below the midpoint of the Likert-type scale used to measure believability, and because monkeys had been determined to be highly discrepant from good in PS4A, monkeys was removed from the explicit hierarchy that would be used in the final study. Cats was considered as a possible replacement for monkeys because (1) it had been generated by participants in some of the animal hierarchies drawn in PS2A and (2) it met the three criteria listed above (under PS1). It was believed that cats would be similar in believability to dogs, because of cats' similarity to dogs in general and with respect to their relationships with people (e.g., they are domesticated, they are housepets, and many people own and love them). An additional pilot (PS4C) would be needed to examine the believability of message A with respect to cats as compared to monkeys, to determine if message A about cats was more believable.

The second purpose of PS4B was to obtain estimates of both the average number of links that the concepts had to other words, and the average amount of information that participants reported holding for the concepts. Table 3 summarizes the links and information data from part two of PS4B. Although not a factor in choosing message A over message B, participants who received message A generally reported having more links to the message target concepts than participants who received message B, particularly for the explicit concepts. Because links are theorized to facilitate the spreading of attitude and belief change, the presence of the additional links reinforced the decision to choose message A.

With the exception of the message A participants' low ratings of their knowledge of monkeys (t [6] = -1.58, $p < .01$, $\eta^2 = .51$), all participants generally indicated that they had about the same information for the concepts as the average University of Maryland student; none of the other information values was significantly different from 100. This result suggests that participants do not possess so much information about the concepts that will be used in the persuasive messages of the final study so that persuasion could not occur.

Pilot Study 4C: Believability of Message A—Monkeys Versus Cats

Purpose. The purpose of Pilot Study 4C (PS4C) was to examine the believability of message A with respect to cats, relative to the believability of message A with respect to the other explicit hierarchy concepts, in order to determine the concept of cats' suitability for inclusion in the hierarchy.

Sample size. There were 16 participants in this pilot study.

Procedures. PS4C was conducted on April 18, 2002. Because message A had already been selected as the persuasive message that would be used in the final

Table 3

Mean and Standard Deviation of Linkages and Accumulated Information, Pilot Study 4B (N = 75)

	Message A ("X positively affects self-esteem")				Message B ("X is important to the culture")			
Message	Links		Information		Links		Information	
Target	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Animals	72.40	107.70	79.00	30.90	14.75	7.54	90.00	22.36
Dogs	52.20	68.79	81.00	40.37	12.60	10.74	80.00	27.39
Monkeys	28.00	41.90	57.00	29.07	10.20	9.34	110.00	54.77
Shopping	42.60	52.41	115.00	105.48	22.00	18.57	120.00	44.72
Clothes	29.80	42.43	115.00	74.16	34.25	20.47	95.00	37.08
Food	41.40	26.20	130.00	44.72	34.20	41.52	144.00	41.74

study, only the message A questionnaire described in the Procedures section of PS4B above was used in this pilot study, and all questionnaires contained the message "Cats are good."

Outcome. The cats message was more believable overall ($M = 4.90$ [$SD = 1.78$]) than the monkeys message ($M = 3.24$ [$SD = 1.55$]), and hence more similar to the other animals messages even though the difference was not significant in a *t*-test (t [4] $= -3.31$, $p < .05$, $\eta^2 = .51$, observed power = .22). Therefore, monkeys was replaced by cats in the explicit hierarchy to be used in the final study.

Pilot Study 5: Piloting the Final Study

Purpose. The purpose of Pilot Study Five (PS5) was to pilot the final instrument.

Sample size. There were 5 participants in this pilot study.

Procedures. PS5 was conducted on April 24, 2002. The researcher conducted in-depth interviews with five Communication undergraduate students who were participating in the university's undergraduate research day. Each participant was asked to complete the questionnaire that would be used in the final study (see Appendix K), and to read it thoroughly while completing it. It was suggested that participants make notes as they read, particularly if they found any directions vague or unclear. After completing the questionnaire, the researcher first asked each participant for his or her comments, and asked probing questions when necessary about potential problems with the instrument. Then the researcher went through the questionnaire systematically and asked each participant the same set of questions regarding possible areas of difficulty (e.g., "Do you find these directions complicated?").

Outcome. The participants' responses were very helpful in making the final questionnaire more readable, and in increasing the probability that final study participants would be able to follow the directions. Some of the language of the directions was simplified, and emphasis by bolding, underlining, and italics was added. For example, the PS5 paired-comparison judgments contained a reminder of the yardstick at the top of each page of paired-comparison judgment questions; the reminder yardstick appeared in 12-point font and bolded. However, the participants in this pilot indicated that they did not see the reminder yardstick at the top of those pages. As a result, the reminder yardstick was changed to appear in 16-point font and bolded, with additional underlining and arrows.

Furthermore, PS5 participants seemed to attend to the questionnaire's directions somewhat arbitrarily, which demonstrated a clear need for all directions to be read out loud by the researcher during the administration of the final questionnaire, and a need for all participants to be working on the same section of the questionnaire at the same time. Thus, PS5 made a significant contribution to the construction of the final questionnaire.

Final Study

The administration of the final study was conducted on May 6 and May 7, 2002. This section describes the selection and description of the sample, the variables of interest, the creation of manipulation checks, the experimental design, the data collection procedures and, finally, the data analysis strategies for the final study.

Sample

Sample size. The necessary size of the final sample was estimated prior to sampling. A target sample size of 336 was calculated as the minimal sample necessary to afford the final study a .05 level of significance (one-tailed) and .80 power for the proposed 2 (Hierarchy: explicit vs. implicitness) x 2 (Priming: primed vs. unprimed) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2) ANOVA. That is, the estimated necessary sample size was chosen such that if a null hypothesis was true, the chance that it would be wrongly rejected (*alpha* or Type I error) would be 5%; if an alternative hypothesis was true, the chance that the null hypothesis would not be rejected (*beta* or Type II error) would be 20%.

The target sample size was calculated following the guidelines of Kraemer and Thiemann (1987). First, participants completed what would become the experimental paired-comparison judgments during PS3. To determine a critical effect size to be used in the sample size calculation, the evaluative belief (i.e., the distance between good and a concept) of the superordinate concept in each hierarchy (i.e., animals or shopping) was examined. Consideration of the explicit and implicit hierarchies that emerged from the pilot studies suggested that participants in the explicit hierarchy condition would locate animals significantly farther from good than participants in the implicit hierarchy condition would locate shopping because, in general, people are much more intimately involved with shopping than with animals.

It was theorized that this intimacy would result in implicit concepts being rated as better (i.e., closer to good) than explicit concepts. Furthermore, this reasoning seemed adequate to satisfy Kraemer and Thiemann's liberal criterion guideline that critical effect size is based primarily upon researchers' "understanding and knowledge of their field" (p. 24). The results of PS3 yielded a transformed superordinate-good mean of 3.45 (SD = .85) for participants (n = 29) in the explicit condition.[2] The corresponding mean for participants (n = 26) in the implicit condition was 3.26 (SD = .72).

The usual values of *alpha* and *beta* range from .01 - .05 and .10 - .30, respectively (Kraemer & Thiemann, 1987). Having chosen a desired power (i.e., 1 - *beta*) level of .80, and an *alpha* of .05, the following equations were calculated:

$$\delta = |(\bar{x}_E - \bar{x}_I)| / s$$

$$= |(3.26 - 3.45)|/.93$$

$$= .19/.93$$

$$= .20 \ .$$

This value is the calculated Glass's effect size (Kraemer & Thiemann, 1987, p. 42), in which $\bar{x}_E$ is mean length of the transformed distance between the superordinate concept and good in the explicit sample, $\bar{x}_I$ is the corresponding mean length in the implicit sample, and s is the standard deviation of the pooled samples). To obtain the critical effect size, Glass's effect size must be adjusted:

$$\Delta = \delta / [\delta^2 + 4]^{1/2}$$

$= .20/[4.04]^{1/2}$

$= .10$.

This value is the critical effect size that must be input into Kraemer and Thiemann's (1987) Master Table (pp. 105-112) at the 5% significance level for a one-tailed test to get the value of ν, an indicator of sample size that does not consider the type of statistical test being conducted (Kraemer & Thiemann provide a formula for adjusting the value of ν depending upon the test being conducted). A critical effect size of .10, with a 5% significance level and 80% power, requires a sample size of $n = \nu + 2$, or $n = 616+2 = 618$ participants per cell of the 2 x 2 x 3 ANOVA. Thus, under the desired conditions, with a critical effect size of .10, the necessary sample would be 618 x 12 = 7,416.

At this point, the critical effect size was reevaluated because using a critical effect size of .10 would require a prohibitively large sample. According to Cohen (1988), a value of .20 represents the smallest worthwhile effect size; a value of .50 is moderate, and .80 is large. Considering Cohen's guidance, and Kraemer and Thiemann's own application of a liberal guideline for critical effect size that is based primarily upon researchers' "understanding and knowledge of their field" (p. 24), a moderate effect size of .50 was chosen to represent significant effects in the data, with the understanding that very small effects probably would not be found to be significant.

When $\Delta = .50$ is entered into the Master Table at the 5% significance level and 80% power level for a one-tailed test, the sample size indicator value $\nu = 22$. The sample size is then adjusted to $n = \nu + 2$, or $n = 22 + 2 = 24$ participants per cell of the 2 x 2 x 3 ANOVA, or $n = 24 \times 12 = 288$.

In addition to the sample required for the ANOVAs, the study design also called for two control groups, one each to measure the implicit and explicit hierarchy concept distances. Thus, the final sample size required by the study would be 288 + 24 + 24 = 336.

Sample selection. Participants in the final study were 391 students (119 men, 271 women, and 1 gender unidentified) enrolled in Communication classes at a large eastern university. Consistent with the sampling procedures of the pilot studies, students were approached in their classrooms with the prior consent of their instructors and asked if they would like to participate in research being conducted by members of the University of Maryland Department of Communication. Students were offered a small amount of extra credit in exchange for their participation. Individuals who were interested in receiving extra credit but who chose not to participate in the research or who had participated in any pilot study for the same project were given an alternative extra credit assignment that required comparable effort. Students were informed that they could not participate if they had participated in any other portion of the study, and names on the informed consent forms were cross-checked to ensure that no students participated in the final study if they had participated in any pilot study for this research. Students then completed the study in class, under the direction of the researcher.

Variables

A complete list of the variables measured and their corresponding conceptual labels, source, transformations (if any), and descriptive statistics of the transformations (if any) can be found in Appendix L.

Explicitness and implicitness of hierarchy. An explicit hierarchy consists of concepts that are super- and subordinate to each other as a result of their denotative meanings. The concepts in the explicit hierarchy were: animals, mammals, reptiles, cats, dogs, snakes, and lizards (see Figure 10). An implicit hierarchy consists of concepts that are not obviously super- and subordinate to each other as a result of their denotative meanings. The concepts in the implicit hierarchy were: shopping, needs, wants, food, clothes, gifts and luxuries (see Figure 9). Recall that these hierarchies emerged from several pilot studies.

Consistent with the definitions of attitude and evaluative belief that were provided in Chapter 2, attitudes will be measured as distances between the hierarchical concepts and *things I like*, and evaluative beliefs will be measured as distances between the hierarchical concepts and *good*. Therefore, in addition to the seven concepts per hierarchy, there are two other concepts necessary to the study that will be included in the paired-comparison judgments that participants complete: things I like and good. When these two concepts are combined with the seven others in each hierarchical condition, for a total of nine, the number of paired-comparison judgments that must be completed by both the explicit and implicit condition participants is $9 \times 8 / 2 = 36$.

Priming of hierarchy. To determine the effect of hierarchy accessibility upon attitude change, each hierarchy had a primed, unprimed, and control condition. In the primed condition, participants were asked to study a diagram of one of the hierarchies at the beginning of the final study questionnaire, prior to reading the experimental message and answering the paired-comparison judgments. Primed participants completed paired-comparison judgments for the concepts in the hierarchy that they were shown.

In the unprimed condition, participants were also asked to study a diagram of an experimental hierarchy at the beginning of the final study questionnaire. However, unprimed participants received an experimental message and completed paired-comparison judgments for concepts in the experimental hierarchy that they were not shown.

In the control condition, participants were asked to study a diagram of a hierarchy of plant types that was neither the explicit nor implicit hierarchy of the study, and they did not receive an experimental message prior to completing a set of paired-comparison judgments regarding either the implicit or explicit set of concepts.

Message targets. There were six variations of the message "X is good" that were used to induce attitude change. Each message target (e.g., superordinate, subordinate 1, subordinate 2) had two messages, one for the explicit condition and one for the implicit condition. The messages directed toward the superordinate target were "Animals are good" (explicit) and "Shopping is good" (implicit). The messages directed toward the first subordinate target were "Dogs are good" (explicit) and

"Clothes are good" (implicit). The messages directed toward the second subordinate target were "Cats are good" (explicit) and "Food is good" (implicit).

Other variables. Gender was added to hierarchy, priming, and message target as an independent variable because a preliminary examination of the data seemed to indicate that it might be a significant factor.

In addition, several variables were created for the structural equation model analyses that would be used to test the hypotheses. First, message target was recoded into two trichotomous dummy variables. The first of these two variables, supervsub, created polar opposition between participants who received a message directed toward the superordinate concept and participants who received any message directed toward a subordinate concept. Participants who received a message directed toward the superordinate concept were assigned a value of 1 for supervsub, and participants who received a message directed toward either subordinate concept were assigned a value of -0.5. The second of these two variables, subvsub, created polar opposition between participants who received a message directed toward subordinate concept 1 and participants who received a message directed toward subordinate concept 2. Participants who received a message directed toward the superordinate concept were assigned a value of 0 on this variable, participants who received a message directed toward subordinate concept 1 received a value of 1, and participants who received a message directed toward subordinate concept 2 received a value of -1.

Second, to determine the effect of the target message on concepts other than the target concept, it was also necessary to create new variables that captured the movement of the non-manipulated concepts in the study. The non-manipulated concepts were collectively designated as the *non-targeted space*, and consisted of: mid1 (i.e., needs or mammals), mid2 (wants or reptiles), sub3 (gifts or snakes) and sub4 (luxuries or lizards). The new variable *midgood* was a measure of the relation of goodness to these non-targeted concepts, and was the sum of the transformed distances between each of the four non-targeted concepts and the concept good. Similarly, the new variable *midlike* was a measure of the relation of the concept things-I-like to these non-targeted concepts, and was the sum of the transformed distances between each of the four non-targeted concepts and the concept things-I-like. And, the new variable *midsize* was a measure of the distances between all of the non-targeted concepts, and was the sum of the six ([4 x 3] / 2 = 6) transformed distances among the four non-targeted concepts.

Finally, in order to control the fact that some participants may, in general, report larger values for distances in their spaces than do others (which could, in turn, affect covariance among participants' distances estimates), a correction variable—*avspan*—was created. To create avspan, the 36 ([9 x 8] / 2) transformed paired-comparison judgments were reduced to a set of 21 by omitting distances from each of the seven hierarchy concepts to the concept good and also to the concept like, as well as the distance between the concept good and the concept like. The mean of these 21 transformed distances is avspan. In anticipation of constructing a structural equation model (discussed below) in which all of the dependent variables were adjusted to account for the fact that some participants may use bigger numbers in their spaces than do others, some new variables were created using avspan. First, avspan was subtracted from midlike, midgood, and midsize. Second, avspan was subtracted from the nine transformed dependent variables that represent the attitudes, evaluative beliefs, and non-evaluative beliefs of the message target concepts that would be used in the structural equation models. (See Appendix L.)

Manipulation Checks

Explicitness and implicitness of hierarchy. As previously discussed, explicit hierarchies should be more accessible than implicit hierarchies, and therefore easier for participants to draw correctly. To measure the correctness of the hierarchies drawn by participants, a hierarchy score was created. The hierarchy score was a 0-7 point rating of the correctness of a drawn hierarchy when compared to an ideal hierarchy as defined by the study. Participants received one point for each element of the hierarchy that appeared in its proper place in the hierarchy, relative to other elements of the hierarchy. (Coders' guidelines for determining hierarchy score can be found in Appendix M.)

Priming. If priming is successful in making a hierarchy more accessible, participants who are primed with a picture of the hierarchy they are asked to draw should be more likely to draw the hierarchy correctly than participants who are not primed. Therefore, the hierarchy score was also used as a manipulation check for priming.

Message targets. To determine if participants received the persuasive message employed at the beginning of the questionnaire, two questions on the final page of the questionnaire addressed participants' recall of the message. The first question asked participants, given a list of twenty words, to circle every word that was mentioned in the passage (i.e., the message) that they had read. If the target concept that the participant had actually encountered was circled, the question was coded as a correct recall for the participant. The second question asked participants to recall the three main points of the research passage they had read, and rank them in order of importance. If "X is good" or "X increases self-esteem" (where X is the message target the participant received) was written, it was coded as a correct recall for the participant and assigned an ordinal value commensurate with the participant's ranking (i.e., If "X is good" was written as the most important point, it was coded 3; if "X is good" was written as the second most important point, it was coded 2).

Experimental Design

The experiment employed a 2 (Hierarchy: explicit vs. implicit) x 2 (Priming: primed vs. unprimed) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2) between-subjects design. The between-subjects design allowed for comparison of the aggregate cognitive spaces in each manipulation to determine if, for example, the manipulated target concepts moved closer to each other, away from each other, or not at all.

Data Collection

Participants were randomly assigned to one of 28 questionnaire conditions: 2 (Hierarchy: explicit vs. implicit) x 2 (Priming: primed vs. unprimed) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2) x 2 (Question Order: A vs.

B), plus four control groups – 2 (Hierarchy: explicit vs. implicit) x 2 (Question Order: A vs. B). Question order refers to the order of the 36 paired comparison judgments that appear in part three of the questionnaire. In all questionnaires, paired comparison judgments 1 – 3 concern concepts in the targeted space, and are the same. Questions 4 – 36 in questionnaires with order A, however, are in reverse order of questions 4-36 in questionnaires with order B (i.e., order A, question 4 is the same as order B, question 36; order A, question 5 is the same as order B, question 35). Question order was manipulated in order to control for any maturation effects that might occur, and the data analysis will include a check of the effect of question order upon the dependent variables of interest. However, question order is not a part of the experimental design and the primary data analysis will consider both question order groups as one. Thus, the final experimental design will be 2 (Hierarchy: explicit vs. implicit) x 2 (Priming: primed vs. unprimed) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2), plus two control groups. Representative examples of a final explicit, implicit, and control (explicit concepts) questionnaire can be found in Appendix N.

Upon receiving their questionnaires, participants read a welcome statement thanking them for their participation, asking them not to look at their previous responses as they completed the questionnaire, and asking them to refrain from looking at their classmates' questionnaires to determine the "right" answers during the questionnaire administration. Participants were asked to indicate the course during which they were completing the questionnaire, the starting time, and their gender. All participants were instructed to turn the page to begin the questionnaire at the same time.

Questionnaire prologue: Examining a hierarchy. The prologue to the questionnaire gave participants a definition of the term *hierarchy* and a picture of a hierarchy; the specific hierarchy that each participant saw was determined by the condition to which he or she was randomly assigned. The directions asked participants to study the hierarchy until they felt confident that they knew it well. The researcher read both the definition and the directions aloud, instructing participants to study the hierarchy until time was called. Participants had 1½ minutes to study the hierarchy.

Participants who were randomly assigned to the explicit-primed and implicit-primed conditions saw a picture of the animals or shopping hierarchy, respectively. Participants who were randomly assigned to the explicit-unprimed or implicit-unprimed conditions saw a picture of the shopping or animals hierarchy (i.e., they saw the hierarchy that belonged to the opposite condition), respectively. Participants who were randomly assigned to the control conditions saw a picture of a hierarchy of plants.

Questionnaire part one: Processing the message. The first part of the questionnaire asked participants to read a fictional research passage regarding college students' self-esteem. The main point of the passage was that researchers had found that target concept X (animals, dogs, cats, shopping, clothes, or food) was good, and could be used to help students improve their self-esteem. In order to guide participants to spend time thinking about the goodness of target concept X (and consequently increase their evaluation of the goodness of X [see, e.g., Tesser, 1978]), participants were asked to underline the main points of the passage, circle the most important point, and finally formulate an argument in favor of the message "X is good." Participants had five minutes to write their argument, and were instructed to keep trying to generate reasons why "X is good" (or, for the control, what types of issues affect college students' self-esteem) even if they thought they had run out of things to write. Participants in the control condition read the same passage as participants in the experimental condition to the point of the manipulation (e.g., "X is good . . . "), at which time their passage ended.

All participants turned to part two of the questionnaire together at the direction of the researcher.

Questionnaire part two: Estimating linkages. The second part of the questionnaire asked participants to think about how many of the words they regularly use are associated with shopping, animals, college, self-esteem and goodness. As discussed with respect to PS4B, establishing estimates of linkages was important because the links that concepts have to other words form the basis for both the hierarchical and Galileo spatial model's predictions regarding attitude change. If participants differed significantly on the number of linkages that they had for the superordinate concept, for example, those linkages (or lack thereof) might affect the ability of a persuasive message to influence concepts elsewhere in the hierarchy.

All participants turned to part three of the questionnaire together at the direction of the researcher.

Questionnaire part three: Paired-comparison judgments. The third part of the questionnaire asked participants to make 36 paired-comparison judgments for either the explicit or implicit hierarchy concepts, depending upon the participants' assigned condition. One of the control groups completed the explicit set of paired-comparison judgments, and the other control group completed the implicit set of paired-comparison judgments.

The directions for the explicit and implicit conditions were the same. The researcher read the directions aloud slowly, and solicited questions often. The researcher led the participants in completing an example to ensure that participants appeared to understand and exhibit confidence about how to complete the paired-comparison judgments. Participants were instructed to move on to part four of the questionnaire at their own pace.

Questionnaire part four: Manipulation checks. The fourth part of the questionnaire first asked participants to draw one hierarchy using any or all of 13 words provided. Participants in the explicit condition (both experimental and control) were given a set of concepts that included the seven concepts of the explicit experimental hierarchy. Participants in the implicit condition were given a set of concepts that included the seven concepts of the implicit experimental hierarchy. Participants were instructed very clearly not to look back at any previous pages of the questionnaire, and the definition of a hierarchy was reprinted from the first page.

Part four then asked participants to study a list of 20 terms and circle every word that was used in the original research passage of the questionnaire.

Finally, participants were asked to recall the original research passage and list the passage author's three main points in rank order from most important to third most important.

Primary Data Analyses

The hypotheses will be examined in three ways: analysis of variance, structural equation modeling, and Galileo plot analysis.

Analyses of covariance. The primary analyses of interest will be a 2 (Hierarchy: explicit vs. implicit) x 2 (Priming: primed vs. unprimed) x 2 (Gender: male vs. female) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2) ANCOVA design, on both individual and combined dependent transformed attitude variables, evaluative belief variables, and non-evaluative belief variables. In order to control linearly for the effect of systematic individual differences in the size of distance estimates, avspan will be a covariate in all of the ANCOVAs.

Structural equation modeling. Structural equation modeling will be employed to determine the significant causal relationships that may exist between the variables of interest. There were three major issues to be resolved, however, before an analytical strategy for the structural equation models could be constructed; those issues will be discussed below.

The first issue is that some participants may use bigger numbers in their distance estimates than might others. This individual difference could, in turn, affect covariances among participants' distances estimates, and result in effects that are, in actuality, significant only because of the systematic differences in distance estimates. One strategy for addressing this potential problem is to adjust participants' distance estimates to be consistent with a yardstick of 100 units. This was done, as will be discussed in detail in Chapter 4.

Another strategy for addressing the problem was to correct all of the dependent variables of any potential model by subtracting from each dependent variable. Although this strategy eliminates the effect of individual space size upon the dependent variables, it adds the possibility that significant covariance among participants' estimates could occur as an artifact of the subtraction. That is, the variables (X – Y) and (Z – Y) will covary because Y is common to both. Still, however, if Y reflects a real potential problem with the data, then the possibility of this artifactual covariance is not enough to reject subtraction as a feasible solution to the possible individual difference problem.

A third strategy for the problem is to construct a model with avspan as an additional variable.

It was decided that both the avspan-subtraction and avspan-variable strategies would be used and the results compared in order to determine whether the avspan-subtraction or avspan-variable strategy appears to produce the best fitting, acceptable models for the data. The criteria for choosing one strategy over the other, in order of importance, will be: (1) preference for models that converge and have admissible values: the squared multiple correlations of the structural equations (i.e., R^2) must be positive; (2) preference for models that consistently produce lower chi-square and higher associated p values: the minimum fit function chi-square must have a value $p > .05$; and (3) preference for models that produce higher normed fit index (NFI) values: the NFI values must be greater than .90 (Jöreskog & Sörbom, 1993).

A second important issue to consider is the use of automatic modification of the structural equation models. Although the hierarchical and Galileo spatial models make predictions about the beginning and end states of attitude and belief change, the intermediate processes that may generate these end states is unknown. That is, a basic model can be drawn to represent relationships between attitudes and beliefs that are specifically suggested by the theories, but there are additional possible paths between variables whose causal order is not known in advance. It was decided, therefore, that automatic modification would be used to adjust the basic model to its best fitting form. Automatic modification sequentially modifies a model by specifying paths one at a time, whose release would significantly improve the overall goodness of fit of the model being tested.

It is well documented that automatic modification should be used with caution (e.g., MacCallum, 1986; MacCallum, Roznowski, & Necowitz, 1992; Silvia & MacCallum, 1988). However, the likelihood of specifying a model correctly when using automatic modification increases as the initial model corresponds closely to the true model, when the model begins with valid restrictions, and when a large sample is used (MacCallum, 1986, p. 107). The original model of this dissertation study conforms to the predictions of the theories and therefore is considered to be very close a "true" approximation of the theories, with the exception of the unknowns discussed in the paragraph above. The original model also begins with restrictions among a number of paths, most notably from the exogenous variables to the set non-targeted concepts. Finally, the sample sizes for the models are moderately large; the sample size for the explicit hierarchy models is 154 and for the implicit hierarchy models it is 177. Thus, the likelihood of specifying the current study's models correctly using automatic modification is considered moderately high.

Moreover, the current study represents the first of a series of planned investigations in which the models generated by the study can be validated through replication. As such, the basic models are ripe for exploration and discovery that could lead to a "serendipity found" that results only from looking at them in the new or unique ways that automatic modification might afford (see Barber & Fox, 1958 for the use of the term "serendipity found").

A third critical issue concerned whether the explicit and implicit conditions should be represented by a dichotomous variable in a single model, or by two separate models. The research questions of the study seek to determine if and how the relationships of concepts associated by an explicit hierarchy differ from the relationships of concepts associated by an implicit hierarchy. From this perspective, separating these two conditions and examining their respective models separately would appear to provide a much clearer portrait of the data than combining the conditions into one.

Additionally, as was discussed above with respect to the manipulation checks, explicitness and priming are both manipulations of accessibility. Analyzing separate models for the explicit and implicit hierarchies will increase the meaning of the priming variable in the implicit model because priming will be the *only* manipulation of accessibility in the model. Hence, there can exist no interaction of the effects of the explicit hierarchy and priming to confound the main effects of priming in the implicit model. For these two reasons, to clarify explicit and implicit relationships and to remove any confounding effect of explicitness from priming, it was decided that explicit hierarchy and implicit hierarchy data would be analyzed separated.

As was discussed above, during the execution of the LISREL computer program to test the structural equation models, there will be three primary and one secondary criteria for determining the acceptability of a model (Jöreskog & Sörbom, 1993).

The primary criteria are: (1) the squared multiple correlations of the structural equations (i.e., R^2) must be positive; (2) the minimum fit function chi-square must have a value $p > .05$; and (3) the normed fit index must be greater than .90. If all three of the primary criteria are met, the modification indices will be examined. The secondary criterion will be that there must be no modification indices greater than 3.84. If there is a modification index greater than 3.84, the appropriate path will be freed and the model run again. The new run will be judged against the primary and then the secondary criteria. This iterative process will continue until there exists no modification fit indices greater than 3.84, the model fails to converge with the addition of the released path, or the model becomes underidentified. In the case of the first, the final model run will be deemed acceptable. In the latter two cases, the last acceptable model (according to the primary criteria) prior to convergence failure will be accepted. If no acceptable models exist prior to convergence failure, the values of the model after the first run will be reported, but the model will be deemed unacceptable and not further considered.

In sum, there will be 12 structural equation models that will be examined and compared. There will be four attitude models (i.e., hierarchy: explicit vs. implicit and strategy: avspan-subtraction vs. avspan-variable), four evaluative belief models, and four non-evaluative belief models (see Table 4). After all 12 of the models are run, the avspan-subtraction models will be compared to the avspan-variable models

Table 4

Summary of the Conditions of the 12 Structural Equation Models to be Tested in the Study

	Explicit Condition		Implicit Condition	
	Avspan Variable	Avspan Subtraction	Avspan Variable	Avspan Subtraction
Attitude Models	1	2	3	4
Evaluative Belief Models	5	6	7	8
Non-Evaluative Belief Models	9	10	11	12

according to the three strategy-selection criteria listed above and one strategy will be chosen. The models of the chosen strategy will become the final six models (three explicit and three implicit) of the study. All models will be based on covariance matrix input and therefore will use the unstandardized parameter estimates.

Galileo plot analyses. The Galileo computer program V56 (Woelfel, 1993) will calculate the adjusted geometric mean distances among the nine experimental concepts, which will result in 14 sets of distances, one for each of 2 (Hierarchy) x 2 (Priming) x 3 (Message Target) experimental conditions, plus the two controls (explicit and implicit). The program will then rotate each space to the same orientation (i.e., the explicit, primed, message directed toward subordinate 1 orientation, which was chosen arbitrarily) and transform it to a least-squares best fit so that the spaces will be similarly aligned and visual comparison can be made between them to detect the changes across experimental conditions.

CHAPTER IV

Results

This chapter presents the results of the main study. First, preliminary data analysis, preparation of the data for final analysis, and manipulation checks are addressed. The second section of the chapter summarizes the results of the primary data analyses and tests of the hypotheses.

Preliminary Data Analysis

Data Transformations

The data needed to be transformed in three different ways in order to meet the assumptions of the analyses that would be performed on them. First, the data had to be standardized with respect to the yardstick. Comparisons of Galileo MDS data assume that individuals respond to the paired-comparison judgment questions by basing their responses on a common unit of measure, the yardstick criterion pair (see Chapter 3 for more detailed information). The value of the yardstick criterion pair (i.e., snakes and lizards for participants asked to draw the explicit hierarchy and gifts and wants for participants asked to draw the implicit hierarchy) was set at 100. Participants who, in their responses, did not rate the distance between the concepts in the yardstick criterion pair at 100 consequently did not adopt the unit standard required by the questionnaire.

A total of 264 (67.52%) respondents were found to commit this error. Gordon (1988) found that the relationships of concept points relative to one another within the multidimensional distances are not influenced by individual variation from a predetermined yardstick value; however, the overall size of an individual's cognitive space increases (or decreases) as an individual uses a reference value larger (or smaller) than the predetermined yardstick value. Therefore, the data were transformed to adjust each participant's responses to be consistent with a yardstick value of 100, following the corrective procedure suggested by Neuendorf et al. (1987). For each participant, 100 was divided by the participant's yardstick value as indicated on the questionnaire and the resulting ratio was used to transform all of the participant's paired-comparison judgments by multiplying each response by that ratio. The transformation equation is:

$$x' = x\,(100/y),$$

where x is the untransformed response value, x' is the transformed response value, and y is the response to the yardstick criterion pair given by the participant.

Second, extreme values had to be evaluated and, if necessary, adjusted. Frequency charts were generated for the paired-comparison judgment data after the yardstick transformation. A review of the charts showed that some of the paired-comparison judgment variables had very large outliers. Based on the examination of the data, all values exceeding 1,000 were considered extreme and set to 1,000. The cut-off value of 1,000 was chosen for three reasons. First, for each paired-comparison judgment, almost all values above 1,000 were 5,000 or greater (up to 1,000,000), and each of these extreme values was given by fewer than five people (1.28% of participants). Second, the extreme values over 1,000 exerted undue influence on the means of their respective variables (e.g., the extreme responses of two or three participants [.77% of participants] often doubled or tripled the mean), and 1,000 was the largest value that did not seem to exert such undue influence on the mean. Third, 1,000 was the largest value that could be included in the data such that all of the subsequently mathematically transformed distance measures would achieve acceptable skewness (see discussion below).

Finally, statistical tests such as ANOVA assume homoscedastic and normal population residuals. Paired-comparison judgments such as those used in this study generally result in the data being positively skewed. Descriptive statistics of the transformed data showed that they were, indeed, positively skewed (100% of the variables exhibited |skewness| > 1.00). Furthermore, a one-way ANOVA performed on each paired-comparison judgment variable across the independent variable that represented the message target (i.e., for each participant, this variable coded the target concept of the persuasive message "X is good," [e.g., cats or shopping], including a no-message code for the control groups) generated a Levene's test of homoscedasticity for each variable. A review of the Levene's tests showed 33 of the 36 paired-comparison judgment variables to appear heteroscedastic (i.e., at $p < .05$). Various transformations were performed in an attempt to correct the positive skewness of the data while simultaneously achieving homogeneity of variance. Ultimately, the logarithm of each variable was determined to be the best transformation. (Note that because some of the untransformed data included responses equal to zero—and the logarithm of zero is undefined—a constant was added to the original data and then the logarithm was taken. The constant, 25, was chosen to minimize the skewness for the variables. The same constant was used for all transformations.)

Both the skewness and the heteroscedasticity of the untransformed data were greatly improved by logarithmically transforming the data. Thirty-five of 36 (97%) transformed variables exhibited $|\text{skewness}| < 1$ and 34 of 36 (94%) transformed variables appeared homoscedastic (i.e., Levene's test $p > .05$). A list of the skewness and Levene's significance values for each transformed variable can be found in Appendix L.

Reliability of the Paired-Comparison Judgments

Miller (1988) has proposed procedures to check the reliability of the paired-comparison judgments by computing fixed and random effects dependability coefficients. These procedures are essentially repeated-measures analyses of variance that seek to detect systematic variance among the pairs of concepts within an aggregate of individuals. That is, when generated using the log-transformed data, these coefficients indicate the extent that individuals are reporting distances that create geometrically similar spaces. The fixed (D_F) and random (D_R) effects dependability coefficients of one set of paired–comparison distance data (i.e., the reliability for one specific set of 36 paired-comparison judgments, such as for participants in the explicit, primed and message directed toward the superordinate concept condition) are obtained by the following equations:

$$D_F = (BMS - EMS) / BMS$$

$$D_R = (BMS - EMS) / (BMS + [RMS - EMS] / N),$$

where *BMS* is the mean squares of the (transformed) pair-wise distances, *EMS* is the residual (error) mean squares, *RMS* is the mean squares within respondents, and *N* is the number of respondents (O'Brien as cited in Miller, 1988, p. 210).

All of the fixed effects dependability coefficients and the random effects dependability coefficients of the paired-comparison distance data were found to be greater than .92. Table 5 provides a complete list of the dependability coefficients for the 14 spaces that were constructed with the paired-comparison judgments.

Reliability of Hierarchy Scores

As discussed in Chapter 3, a hierarchy score was created to measure the correctness (with respect to the experimental hierarchies) of hierarchies drawn by the participants. It was predicted that explicit hierarchies should be more accessible than implicit hierarchies, and therefore easier for participants to draw correctly. It was also predicted that participants who were primed with a picture of a hierarchy, regardless of its explicitness or implicitness, should draw the hierarchy more correctly than participants who were not primed.

To determine the ability of participants to draw the specific experimental hierarchies when shown a list of words that included but was not limited to the experimental hierarchy concepts, a hierarchy score was developed. The hierarchy score is a 0-7 point rating of the degree of correctness of a drawn hierarchy when compared to an ideal hierarchy as defined by the study. Participants receive one point for each element of the hierarchy that appeared in its proper place in the hierarchy, relative to other elements of the hierarchy (see Appendix M). A measure of the

Table 5

Fixed and Random Effects Dependability Coefficients for 2 (Hierarchy: explicit vs. implicit) x 2 (Primed: primed vs. unprimed) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2) + 2 (Control: explicit vs. implicit) = 14 Galileo Aggregate Spaces Created by Paired-Comparison Judgments (N = 362)

Condition	BMS	RMS	EMS	*n*	D_F[a]
ExpPriSup	18.82	.85	.45	29	.98
ExpPriSub1	20.07	.80	.52	28	.97
ExpPriSub2	22.37	.80	.42	30	.98
ExpUnpSup	19.14	.66	.38	21	.98
ExpUnpSub1	13.99	.60	.33	22	.98
ExpUnpSub2	22.01	.61	.36	22	.96
ImpPriSup	12.62	.58	.41	30	.96
ImpPriSub1	11.90	.60	.42	30	.96
ImpPriSub2	6.58	.51	.35	28	.95
ImpUnpSup	7.17	.38	.28	17	.96
ImpUnpSub1	5.62	.53	.41	30	.93
ImpUnpSub2	5.95	.40	.30	15	.95
ExpControl	21.52	.86	.48	31	.98
ImpConrol	10.10	.47	.66	29	.96

Note. Exp = Explicit hierarchy; Imp = Implicit hierarchy. Pri = Primed; Unp = Unprimed. Sup = Message target superordinate; Sub1 = Message target subordinate 1; Sub2 = Message target subordinate 2. BMS = Mean squares of the transformed pair-wise distances. RMS = Mean squares within respondents. EMS = Residual (error) mean square. D_F = Fixed effects dependability coefficients. D_R = Random effects dependability coefficients.
[a] The values of D_F and D_R are equal to two decimals for all table conditions.

reliability of the hierarchy score was obtained by correlating the hierarchy scores of two coders across a random sample ($n = 50$) of hierarchies. The inter-coder correlation of hierarchy score was $r = .92$ (Cronbach's $\alpha = .96$).

Manipulation Check: Explicitness

As predicted, the explicit hierarchy was more likely to be drawn correctly than the implicit hierarchy. This prediction was supported by two findings. First, within the control group, in which participants were not exposed to either the explicit or implicit hierarchy, participants asked to draw the explicit hierarchy had significantly higher hierarchy scores ($M = 6.19$, $SD = 1.25$) than participants asked to draw the implicit hierarchy ($M = 4.24$, $SD = 2.23$), $F\ (1, 60) = 12.47$, $p < .05$, $\eta^2 = .18$.

Second, an analysis of variance of the hierarchy scores was conducted on those participants who received an experimental message (i.e., all of the participants except those in the control groups). In a 2 (Hierarchy: explicit vs. implicit hierarchy) x 2 (Priming: primed vs. unprimed) x 2 (Gender: male vs. female) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2 concept) factorial design, experimental participants who were asked to draw the explicit hierarchy had significantly higher scores ($M = 5.82$, $SD = 1.94$) than experimental participants who were asked to draw the implicit hierarchy ($M = 4.59$, $SD = 2.25$), $F\ (1, 330) = 24.88$, $p < .001$, $\eta^2 = .08$.

Manipulation Check: Priming

The prediction that primed participants should be more likely to draw a hierarchy correctly was supported by the 2 x 2 x 3 analysis of variance of hierarchy score described above. As predicted, participants who were primed had higher hierarchy scores ($M = 5.76$, $SD = 1.98$) than participants who were unprimed ($M = 4.48$, $SD = 2.24$), $F(1, 330) = 22.78$, $p < .001$, $\eta^2 = .07$. The interaction of explicitness and priming together on hierarchy score was not significant (observed power = .37). However, participants in the explicit, primed condition were most likely (81%) to have a hierarchy score of 6 or 7 out of a possible 7 points, followed by participants in the implicit, primed condition (67%), explicit unprimed condition (62%) and implicit unprimed condition (25%) ($\chi^2_{explicit}$ [1, 154] = 5.65, $p < .02$; $\chi^2_{implicit}$ [1, 177] = 30.33, $p < .001$). It is interesting to note that priming has a bigger effect on participants exposed to the implicit hierarchy than on those exposed to the explicit hierarchy ($\phi_{explicit} = .21$, $\phi_{implicit} = .43$). This finding is consistent with the notion that the initial accessibility of the implicit hierarchy is lower than that of the explicit hierarchy; therefore, priming that succeeds in increasing accessibility can bring about relatively more change in the hierarchy scores for the implicit hierarchy than for the explicit hierarchy.

Manipulation Check: Message Targets

In order to check recall of the persuasive message, participants were asked to recollect the original research passage and list the three main points in rank order from most important to third most important. Eighty percent ($n = 267$) of non-control participants wrote either "X is good" or "X increases self-esteem" (where X indicates the target concept that the participant received) or both as the main points of the research passage (t [330] = 37.104, $p < .001$).[4]

Tests of the Hypotheses

The hypotheses were addressed in three ways: Galileo aggregate space plot analyses, analyses of variance, and structural equation modeling.

Galileo Aggregate Space Plot Analyses

The adjusted geometric mean distances among the nine experimental concepts were input into the Galileo computer program V56 (Woelfel, 1993) which generated 14 sets of distances, one for each of 2 (Hierarchy: explicit vs. implicit) x 2 (Priming: primed vs. unprimed) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2) experimental conditions, plus the two control conditions (the explicit and implicit control groups). The program rotated each space to the same orientation (i.e., the explicit, primed, message directed toward subordinate 1 orientation, chosen arbitrarily) and transformed it to a least-squares best fit so that the spaces could be similarly aligned and visually compared.

Appendix O contains scattergram overlays of the 12 spaces on top of the control spaces (e.g., the explicit, primed, message to superordinate space laid over the explicit control space). Each overlay facilitates comparison of its two respective spaces. Note that the first two dimensions in each space account for at least 79% of the variance of the real space involved (see Table 6, p. 104). Thus, the true spaces are very close to two-dimensional and the scattergrams are relatively accurate representations of the arrangements of their respective concepts. This two dimensionality increases the validity of conclusions drawn from examinations of the graphs.

Table 6

Percentage of Variance Explained in the 2 (Hierarchy: explicit vs. implicit) x 2 (Priming: primed vs. unprimed) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2) + Control (Hierarchy: explicit vs. implicit) Real Spaces

Description of the Space	Dimension 1	Dimension 2	Total: First Two Real Dimensions
ExpPriSup	74.97	12.85	87.82
ExpPriSub1	71.59	13.10	84.69
ExpPriSub2	71.45	11.51	82.96
ExpUnpSup	72.03	15.02	87.05
ExpUnpSub1	63.20	24.21	87.41
ExpUnpSub2	66.75	20.57	87.32
ImpPriSup	62.98	19.42	82.40
ImpPriSub1	74.89	11.94	86.83
ImpPriSub2	74.37	11.15	85.52
ImpUnpSup	51.89	27.98	79.87
ImpUnpSub1	55.85	25.72	81.57
ImpUnpSub2	55.53	26.32	81.85
ExpControl	63.80	25.17	88.97
ImpControl	63.20	16.97	80.17

Note. Percentages are based on spaces before rotation. Exp = Explicit hierarchy; Imp = Implicit hierarchy. Pri = Primed; Unp = Unprimed. Sup = Message target superordinate; Sub1 = Message target subordinate 1; Sub2 = Message target subordinate 2.

Figure 11, the space of the distances generated by implicit, primed participants who received the message "Shopping is good," as compared to the implicit control participants (who were not primed and received no message), yields one set of interesting conclusions. One expected result of the "Shopping is good" message is that Shopping moves toward good, relative to the positions of shopping and good in the control space. But these two groups of participants place the concepts shopping, clothes, like, and good at virtually identical locations in their cognitive spaces. It appears that instead of locating shopping closer to good, the message recipients "pushed away" the other concepts— needs, food, wants, gifts, and luxuries—from shopping and good. In other words, the persuasive message about shopping affects concepts subordinate to shopping; this finding supports Hypothesis 1. Interestingly, Fink, Monahan and Kaplowitz (1989) have found similar instances of non-targeted concepts moving out of the way of other concepts in motion (i.e., as a result of attitudes changing) in individuals' cognitive spaces. Fink et al.'s findings suggest that this demonstrated movement of secondary attitudes and beliefs in response to a persuasive message may not be a phenomenon unique to the current study.

More evident from examination of the Galileo plots, however, are the concerns of the research questions, particularly RQ1: How does attitude change in explicit hierarchies differ from attitude change in implicit hierarchies? Figure 12 illustrates the control spaces for the explicit and implicit concepts. The explicit concepts span a much larger space than the implicit concepts. However, as expected

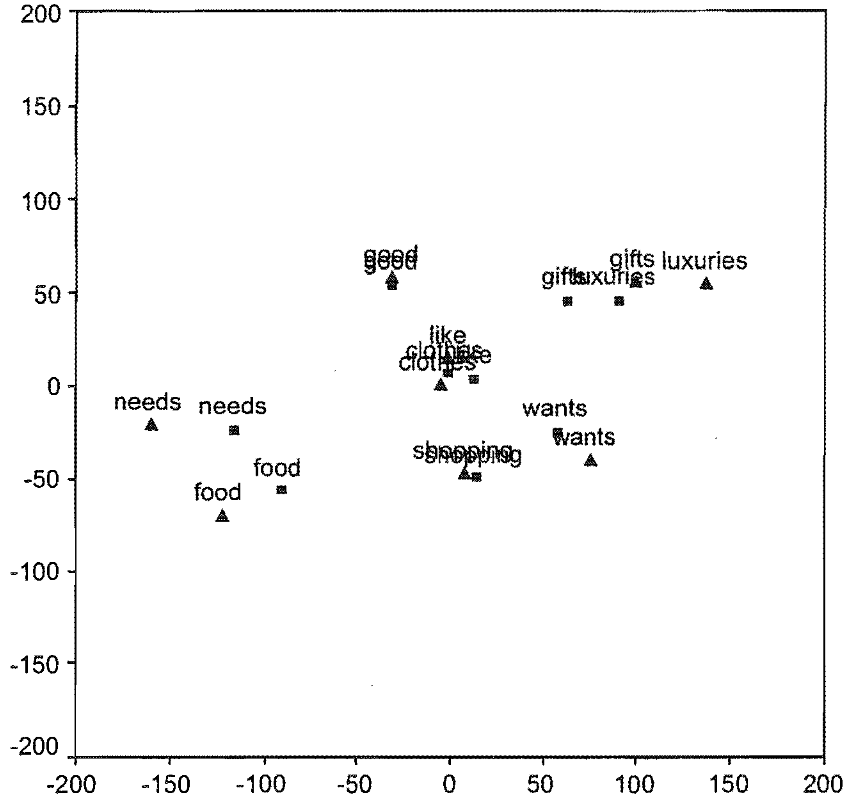


Figure 11. A scattergram overlay of the first two real dimensions of two Galileo aggregate space plots: Implicit, primed, message directed toward the superordinate concept (▲) and Implicit control (■).

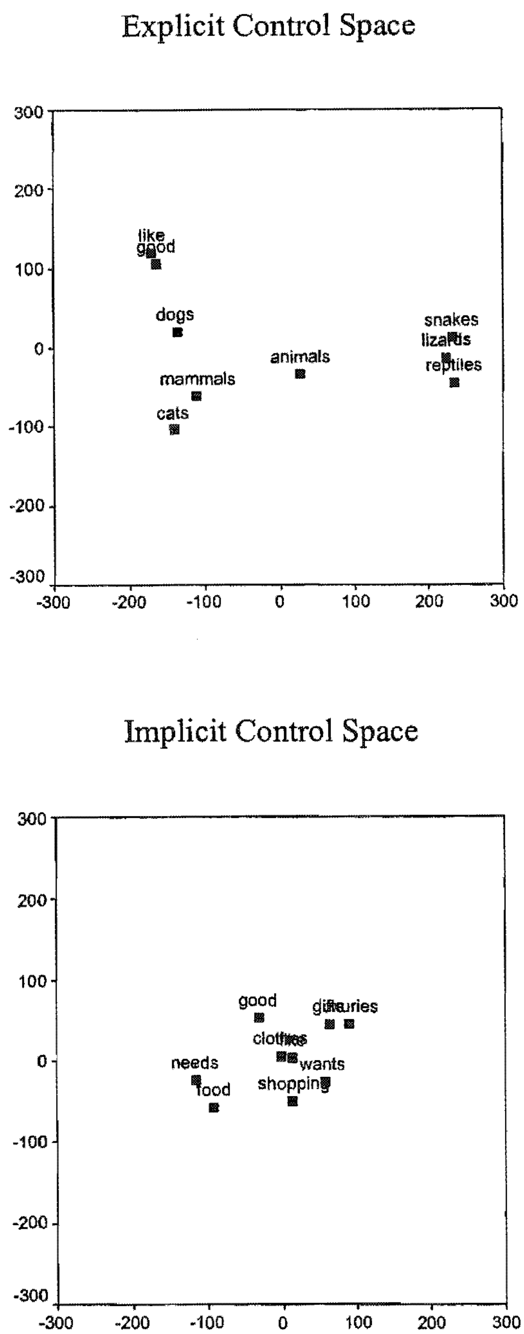


Figure 12. Galileo aggregate space plots of the first two real dimensions of the explicit hierarchy concept control space (top; $n = 31$) and the implicit hierarchy concept control space (bottom; $n = 29$).

by definition of their explicitness, the explicit concepts appear to fall into a much neater organizational pattern than the implicit concepts. Animals is near the origin of the space; mammals and reptiles, the next two sub-level organizational concepts of the space, move out in almost polar opposite direction from animals. Dogs and cats cluster around mammals as lizards and snakes cluster around reptiles. The self, represented by things I like (which appears as like on the plot) is relatively removed from the organization of concepts as if to say, "I am not an animal." Furthermore, goodness is also far from the central cluster of concepts and is located close to the self.

In contrast, the tight group of implicit concepts signifies the fuzzy borders of the concepts' meanings. Shopping lies between needs and wants, but not as distinctly as animals lies between mammals and reptiles. Furthermore, although food is clustered near needs, clothes—not surprisingly— falls between needs and wants. Gifts and luxuries cluster together, but relatively distantly from wants. The self is not an observer off to the side but instead almost at the origin of the space, right next to clothes, and wants, and shopping. Good is also much closer to the concept set, indicating participants' overall positive evaluation of the hierarchy.

Analyses of Variance and Covariance

Analyses of individual attitudes and beliefs. The first nine ANCOVAs to be reported are 2 (Hierarchy: explicit vs. implicit hierarchy) x 2 (Priming: primed vs. unprimed) x 2 (Gender: male vs. female) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2 concept) factorial designs. Additionally, a control for the fact that some participants may, in general, report larger values for distances in their spaces than do others (i.e., the variable avspan) is used as a covariate. Differences between hierarchy conditions and also between priming conditions inform the two research questions of the study:

RQ1: How does attitude change in explicit hierarchies differ from attitude change in implicit hierarchies?

RQ2: How does accessibility of a hierarchy affect that hierarchy's influence on attitude change

As was discussed in Chapter 3, gender is included in the ANCOVAs because preliminary analyses of the data indicated that gender might be a significant factor. For example, women like the concepts of the implicit (shopping) hierarchy significantly more ($M = 4.55$, $SD = .06$) than do men ($M = 4.79$, $SD = .09$), $F(1, 318) = 4.78$, $p < .05$, $\eta^2 = .02$.[5]

Differences across message target conditions represent direct tests of the hypotheses; the study hypotheses predict changes in attitudes, evaluative beliefs, and non-evaluative beliefs among hierarchically superordinate, subordinate, and equipollent concepts after participants read persuasive messages about specific target concepts. For example, if participants who receive the message "Animals are good" evaluate dogs as significantly better than do participants who receive the message "Cats are good," then we can infer that the message "Animals are good" affects participants' evaluative beliefs about the goodness of dogs (a concept subordinate to animals), whereas the message "Cats are good" does not affect evaluations about the goodness of dogs (a concept equipollent to cats).[6] Such an inference would provide support to both Hypothesis 1 and Hypothesis 3. The study hypotheses are summarized in Table 7. To address each of the components for all of the hypotheses, ANOVAS or ANCOVAS were conducted on three attitude measures (i.e., attitudes

Table 7

Summary of the Predictions of the Study Hypotheses

	Predicted Attitude, Evaluative Belief, and Non-Evaluative Belief Change	
Persuasive Message Directed Toward	Hierarchical Model	Galileo Spatial Model
Superordinate (H1)	Superordinate and all subordinate concepts	Superordinate and all linked concepts
Subordinate 1 (H2, $H2_{ALT}$)	Subordinate 1 only	Subordinate 1 and all linked concepts
Subordinate 2 (H3, $H3_{ALT}$)	Subordinate 2 only	Subordinate 2 and all linked concepts

toward the superordinate, subordinate 1 and subordinate 2 concepts), three evaluative belief measures (i.e., the evaluation or goodness of the superordinate, subordinate 1 and subordinate 2 concepts), and three non-evaluative belief measures (i.e., the distances between the superordinate and subordinate 1 concepts, between the superordinate and subordinate 2 concepts, and between the subordinate 1 and subordinate 2 concepts).

As you may recall from Chapter 2, attitude was defined as an association between an object and an affective response of like or dislike. To facilitate the use of multidimensional scaling methods, this definition of attitude is further operationalized to be the distance from a self point to any other concept point in a set of cognitive representations. In this experiment, the self point is located at the point for things I like. Therefore, attitudes toward the superordinate concept animals, for example, are represented by the distance between things I like and animals. And, for any participant, as the distance between things I like and animals increases, the liking of animals decreases.

Similarly, an evaluative belief was defined as an association or linkage established between an object and an evaluative attribute. Evaluative belief is operationalized to be the distance from any concept point (except the self point) to an evaluative attribute in the set of cognitive representations. In this experiment, the evaluation of interest is the term "good." Therefore, evaluative beliefs about animals are represented by the distance between animals and good in the set of concept distances; as the distance between animals and good increases, the perceived goodness of animals decreases.

Finally, a non-evaluative belief was defined as an association or linkage established between an object and a non-evaluative attribute. Non-evaluative belief is operationalized to be the distance between any two concepts points (not including things I like and good) in the set of cognitive representations. Non-evaluative beliefs about animals, for example, are represented by the distance between animals and other concepts, such as dogs or reptiles. To the degree that a participant believes that two concepts are similar, the distance between those concepts will be smaller than for a pair of concepts that a participant believes are less similar. For example, a participant might believe animals and dogs to be more similar than animals and reptiles; for this participant, the distance between animals and dogs will be less than the distance between animals and reptiles.

The covariate, avspan, is significant ($p < .05$) in all nine of the 2 x 2 x 2 x 3 ANCOVAs. (The comprehensive results for all nine of these ANCOVAs on individual attitudes and beliefs can be found in Appendix P.) Additionally, there is a significant effect of hierarchy in seven of the nine ANCOVAs. (The exceptions are for attitude toward subordinate concept 1: dogs/clothes [observed power = .41] and non-evaluative belief between the superordinate concept: animals/shopping and subordinate concept 1 [observed power = .19].) The distances generated by the explicit paired-comparison judgments are significantly larger than those generated by the implicit paired-comparison judgments in every case except for the non-evaluative belief between subordinate concepts 1 and 2 (cats and food). For that non-evaluative belief, the logarithmically transformed distance for the implicit hierarchy paired-comparison judgments is significantly larger ($M = 5.31$, $SD = .92$) than that for the explicit hierarchy ($M = 5.15$, $SD = .83$), $F(1, 319) = 38.50$, $p < .001$, $\eta^2 = .12$.

To summarize, the aggregate distances generated by paired-comparison judgments about animal concepts are larger than the aggregate distances generated by the paired-comparison judgments about shopping concepts. That is, overall, participants used larger distances (i.e., report more general dissimilarity) when considering the animal concepts and smaller distances (i.e., report more general similarity) when considering the shopping concepts. Figure 12, a pair of Galileo paired-comparison plots for the explicit and implicit control distances, graphically demonstrates the difference between the distances. Because the axes on the two plots are identical (i.e., they employ the same size grid), it is easy to see how the explicit hierarchy concepts occupy a larger span of space than the implicit hierarchy concepts.

Priming shows a significant main effect in only one of the nine ANCOVAs, for the evaluative belief of S2 (cats/food). In this ANCOVA, participants who are primed with a picture of the appropriate experimental hierarchy evaluate the S2 concepts (i.e., cats or food) as significantly better ($M = 4.92$, $SD = 1.07$) than unprimed participants ($M = 4.98$, $SD = 1.08$), $F(1, 319) = 4.48$, $p < .05$, $\eta^2 = .02$.

Gender shows a significant main effect in two of the nine ANCOVAs, for attitudes toward the superordinate concepts (animals/shopping) and toward subordinate concept 1 (dogs/clothes). In each case, women like the concepts more than men do. For attitude toward the superordinate concept, women's mean liking (i.e., the distance between things I like and animals/shopping) is 4.71 ($SD = .96$) as compared to men's mean liking of 4.99 ($SD = .98$), $F(1, 319) = 5.29$, $p < .05$, $\eta^2 = .02$. For attitude toward subordinate concept 1 (i.e., the distance between things I like and dogs/clothes), women's mean liking is 4.49 ($SD = .94$) as compared to men's mean liking of 4.83 ($SD = .86$), $F(1, 314) = 10.91$, $p < .001$, $\eta^2 = .04$.

Significant interactions between variables are considered to be noteworthy to this study if any one of the following conditions were met: (1) the same significant interaction occurs in more than three of the nine ANCOVAs, or (2) the significant interaction is disordinal *and* the partial eta-squared value of the significant interaction is greater than .05. By these criteria, there are no noteworthy interactions.

Analyses of aggregate attitudes and beliefs. The next ANOVAs and ANCOVAs are of dependent variables that represent sets of non-targeted concepts. As you may recall from Chapter 3, it was necessary to create new variables that captured the positions of the non-manipulated concepts in the study. The non-targeted concepts consist of: mid1 (i.e., needs or mammals), mid2 (wants or reptiles), sub3 (gifts or snakes) and sub4 (luxuries or lizards). The new variable midgood is the sum of the transformed distances between goodness and each of these four non-targeted concepts; it is a measure of evaluative beliefs. Similarly, midlike is the sum of the transformed distances between things I like and the four non-targeted concepts; it is a measure of attitudes. Finally, midsize is the sum of the six ([4 x 3] / 2 = 6) transformed distances among the four non-targeted concepts; it is a measure of non-evaluative beliefs.

Additionally, in order to create measurements of the non-targeted distances that account for the fact that some participants may, in general, report systematically larger or smaller values for distances than do others, newmdgd (evaluative belief distances), newmdlk (attitude distances), and newmdsz (non-evaluative belief distances) were created by subtracting the variable avspan from midgood, midlike, and midsize, respectively. You may recall that avspan is the mean of 21 transformed paired-comparison judgment distances; omitted from the calculation of avspan are the distances from each of the seven hierarchy concepts to the concept good and also to the concept like, as well as the distance between the concept good and the concept like.

The design of the ANOVAs on the non-targeted distances is the same as the previous ANOVAs: 2 (Hierarchy: explicit vs. implicit hierarchy) x 2 (Priming: primed vs. unprimed) x 2 (Gender: male vs. female) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2 concept). Avspan is included as a covariate in the midlike, midgood, midsize ANCOVAs; it is not included in the newmdlk, newmdgd, and newmdsz ANOVAs.

The sets of non-targeted attitude distances (midlike) and evaluative belief distances (midgood) are very highly positively correlated ($r = .94, p < .001$); the set of non-evaluative belief distances (midsize) is also highly positively correlated with the sets of evaluative belief distances ($r = .83, p < .001$) and attitude distances ($r = .79, p < .001$). Because of these strong correlations, the analyses of covariance on these three variables are nearly identical; therefore, the analysis of the set of non-targeted attitude distances (midlike) will be discussed in detail as the exemplar of the three. The comprehensive results for all of these six ANCOVAs on aggregate attitudes and beliefs are presented in Appendix Q.

The results of the analysis of covariance for the attitude distances (midlike) show significant main effects of hierarchy. Consistent with previous analyses, distances for the explicit hierarchy (*M* = 22.23, *SD* = .28) are greater than distances for the implicit hierarchy (*M* = 18.08, *SD* = .26), even though a covariate is controlling for general size of the distances. Thus, relatively, participants like the set {needs, wants, gifts, and luxuries} more than they like the set {mammals, reptiles, snakes, and lizards}. Because hierarchy was found to be significant in a similar way in an ANCOVA for the evaluative belief distances, the set {needs, wants, gifts, and luxuries} is also better (i.e., closer to good) than the set {mammals, reptiles, snakes, and lizards}.

The analysis of the attitude distances also reveals that priming participants with the relevant experimental hierarchy (e.g., primed participants were shown the explicit hierarchy and then completed explicit paired-comparison judgments) results in participants liking the set of non-targeted concepts less (primed: *M* = 20.86, *SD* = .24) than participants who are not primed (unprimed: *M* = 19.44, *SD* = .27). This result is repeated for both the evaluative and non-evaluative belief distances; primed participants evaluate the set of non-targeted concepts as both worse and less related to each other than do unprimed participants.

Furthermore, there is a main effect of message target in all three ANCOVAs. Participants who receive the message "Dogs [or clothes; subordinate concept 1] are good" like the set of non-targeted concepts (either {mammals, reptiles, snakes and lizards} or {needs, wants, gifts, and luxuries}) less (*M* = 20.82, *SD* = .32) than participants who receive other messages ("Animals/shopping [superordinate concept] is good": *M* = 19.99, *SD* = .31; "Cats/food [subordinate concept 2] is good": *M* =

19.64, $SD = .31$). That is, the distances from the subordinate concept 1 to things I like, to good, and to the set of non-targeted distances are greater than those distances for the superordinate concept, which are greater, in turn, than those distances for subordinate concept 2.

There are three significant two-way interaction effects that are common to all the analyses of covariance of the sets of non-targeted distances for attitudes, evaluative beliefs and non-evaluative beliefs: hierarchy by priming, hierarchy by message target, and priming by message target. None of these interactions effects, however, meets the criteria of noteworthiness described above.[7]

After the above analyses of the sets of non-targeted distances, which used variables (midlike, midgood, and midsize) that require a covariate (avspan) to account for the fact that some participants may systematically use larger or smaller values for their distances than others, analyses of the non-targeted distances can be performed using variables from which avspan has been subtracted (i.e., midlike – avspan = newmdlk; midgood – avspan = newmdgd; and midsize – avspan = newmdsz). Recall that avspan-subtraction is an alternate strategy to address the issue of individual variation in distance reporting. Compared to the analyses of the non-targeted distance variables that used avspan as a covariate, these analyses reveal nothing new.[8]

Analyses of explicit and implicit conditions separately. Because hierarchy has been found to be so significant across all of the ANOVAs and ANCOVAs, and because the structural equation models will be run separately for the explicit and implicit conditions, additional ANCOVAs were performed again separately for participants in the explicit and implicit hierarchy conditions. These separate ANCOVAs would aid in determining is there were any significant and noteworthy interactions that should be represented in the structural equation models. The design for the explicit and implicit separate ANCOVAs is 2 (Priming: primed vs. unprimed) x 2 (Gender: male vs. female) x 3 (Message target: superordinate vs. subordinate 1 vs. subordinate 2 concept), with avspan as a covariate for midlike, midgood, and midsize. These analyses, however, provide little additional information. For the three dependent variables attitude distances (midlike), evaluative belief distances (midgood), and non-evaluative belief distances (midsize), the analyses of covariance are nearly identical. In the explicit condition the only significant effect, found in every ANCOVA, is the effect of avspan as a covariate. Note that although it is possible that avspan could be involved in significant interactions if those interactions had been requested during the ANCOVA run, such interactions were not of interest and not requested.

In the implicit condition, there are significant main effects of avspan, priming and target, and a significant but non-noteworthy (according to the criteria established earlier in this chapter) interaction of priming by target, for all three ANCOVAs (i.e., all three sets of distances: attitude, evaluative belief, and non-evaluative belief). Consistent with the previous results, primed participants liked the set {needs, wants, gifts, and luxuries} less than unprimed participants, and evaluated the set to be worse than the unprimed participants did. Also consistent with the previous results, participants who received the message "Clothes are good" liked the set of non-targeted concepts the least, and evaluated it as worse than participants who received the messages "Shopping is good" or "Food is good."

Finally, the 2 x 2 x 3 ANOVAs were performed on the avspan-corrected attitude (newmdlk), evaluative belief (newmdgd), and non-evaluative belief (newmdsz) sets of distances. In both the explicit and implicit conditions, there are no significant main or interaction effects.

Structural Equation Modeling

Constructing the models. Two recursive structural equation models, with zeta covariances fixed at zero, are illustrated in Figures 13 and 14. There are two generic models because, as was discussed at length above, it was necessary in the analyses of variance and covariance to either use a covariate (avspan) or avspan-corrected variables to account for the fact that some participants may systematically report larger or smaller values for their distances than do others. Consequently, as will be explained below, each of these strategies (i.e., avspan as an independent variable [model A] and avspan as a correction [model B]) is reflected in a set of structural equation models. Results of the two different types of models will be compared to determine the best model to represent the data.

Furthermore, as previously discussed, the explicit and implicit hierarchies are analyzed separately in order to further assess the overall differences, if any, between the two types of hierarchies (see Research Questions 1 and 2). This decision is consistent with the results of the ANOVAs, in which hierarchy has a significant main

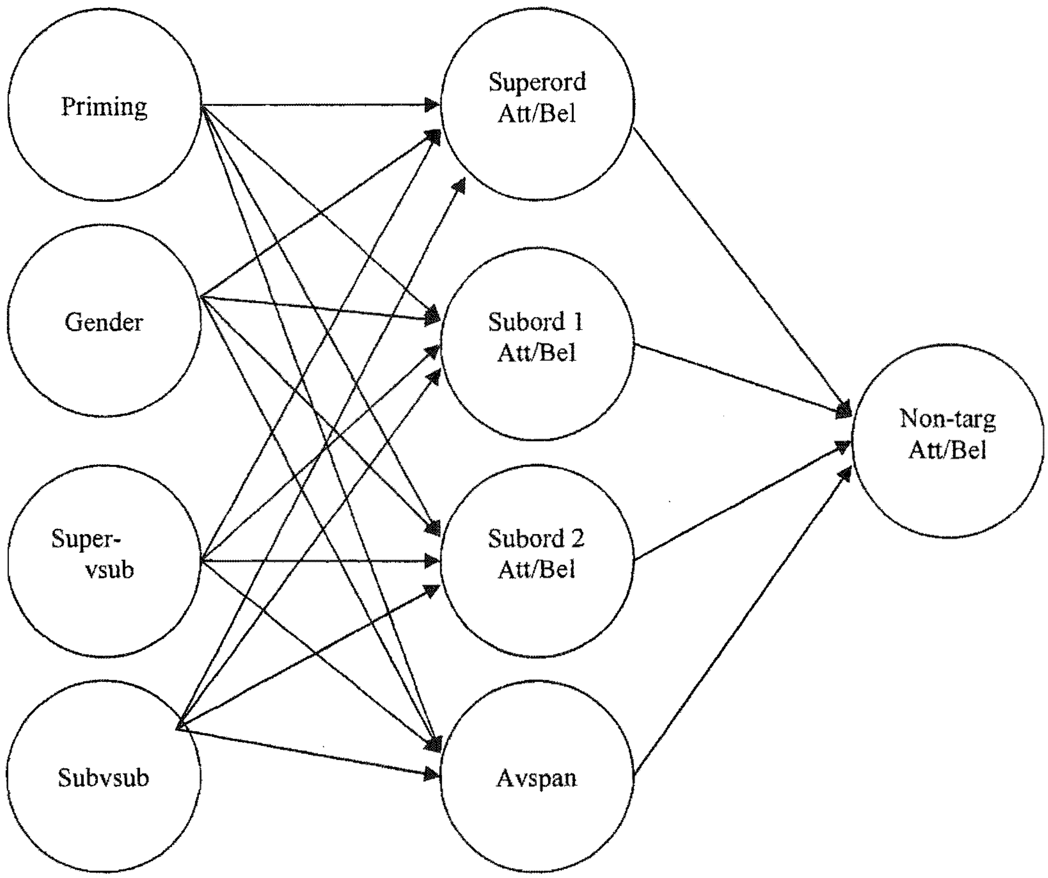


Figure 13. A generic recursive structural equation model designed to test the predictions of the study hypotheses in the attitude, evaluative belief, and non-evaluative belief conditions (i.e., Superord Att/Bel represents the attitude or belief of interest toward the superordinate concept). Individual variance in estimating distances is controlled by the variable Avspan. Errors of prediction do not covary. Covariances among the exogenous variables are free.

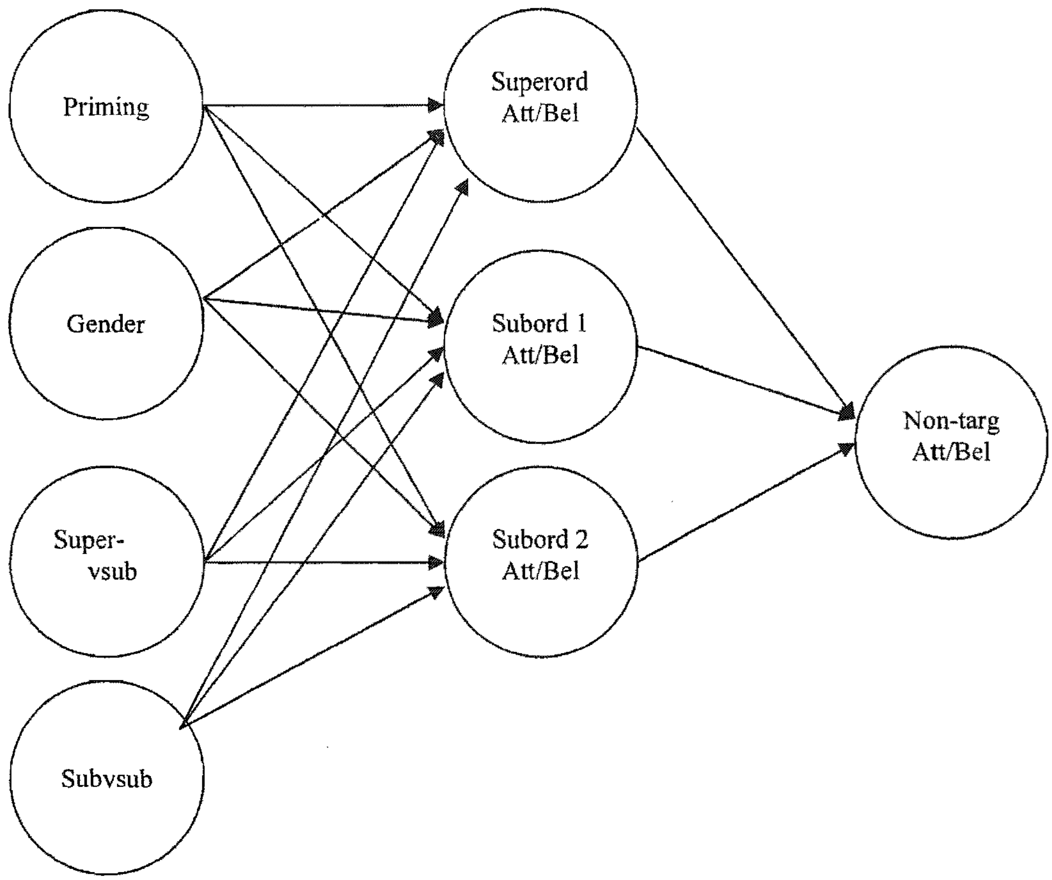


Figure 14. A generic recursive structural equation model designed to test the predictions of the study hypotheses in the attitude, evaluative belief, and non-evaluative belief conditions (i.e., Superord Att/Bel represents the attitude or belief of interest toward the superordinate concept). Individual variance in estimating distances is controlled by subtracting the variable Avspan from each dependent variable. Errors of prediction do not covary. Covariances among the exogenous variables are free.

effect for almost every analysis even though a covariate is controlling for general size of the distances.

The purpose of these models is to determine the significant causal relationships that may exist between the variables of interest. These models represent the specific hypothesized effects of the hierarchical and Galileo spatial models and illustrate the variable relationships input into the LISREL structural equation modeling computer program for both the explicit and implicit hierarchy conditions. The models specifically reflect the following five predictions:

(1) Priming increases accessibility, and so may affect the spreading activation of attitude (and belief) change to related concepts. Therefore, priming is an independent variable in the model, with paths leading toward the superordinate and two subordinate concepts.

(2) Gender shows a significant main effect in two ANOVAs that were conducted on attitude variables; in both cases, women liked the concepts more than men did. Therefore, gender is an independent variable in the model, with paths leading to attitudes (and beliefs) toward the superordinate and the two subordinate concepts.

(3) Message target shows a significant main effect in three of three ANOVAs that were conducted on dependent variables that represent the non-targeted distances. Furthermore, a fundamental difference between the hierarchical and Galileo spatial models is the direction of the effects among superordinate and subordinate variables. The effects that a message (i.e., "Animals are good," "Dogs are good, "Cats are

good," "Shopping is good," "Clothes are good," or "Food is good") has on a superordinate concept as opposed to the subordinate concepts, and vice versa, are represented by the variable supervsub. As discussed in detail in Chapter 3, supervsub represents polar opposition between participants who receive a message directed toward the superordinate concept (animals/shopping) versus participants who receive any message directed toward a subordinate concept (dogs/cats/clothes/food). Supervsub is an independent variable in the model, with paths leading to attitudes (and beliefs) toward the superordinate and the two subordinate concepts.

(4) Message target is the source of another fundamental difference between the hierarchical and Galileo spatial models, namely the direction of the effects among equipollent subordinate variables. As discussed in detail in Chapter 3, the variable subvsub represents polar opposition between participants who received a message directed toward subordinate concept 1 (dogs/clothes) versus participants who received a message directed toward subordinate concept 2 (cats/food) such that the positivity or negativity of any significant path emanating from the variable can be interpreted as representing the effect of a message directed toward subordinate concept 1 versus the effect of a message directed toward subordinate concept 2. Subvsub is an independent variable in the model, with paths leading to attitudes and beliefs toward the superordinate and the two subordinate concepts.

(5) According to the hierarchical and Galileo spatial models, attitudes and beliefs affect related attitudes and beliefs in systematic ways; this idea was discussed at length in Chapter 2. Attitudes toward concepts that are specifically named in

persuasive messages are assumed to be the first attitudes affected by the message if the message is persuasive. Therefore, in the structural equation models, paths from the message target variables (animals/shopping, dogs/clothes, and cats/food) to the set of non-targeted concepts ({mammals, reptiles, snakes and lizards} or {needs, wants, gifts, and luxuries}) are free.

There are five dependent variables in each structural equation model. The first four dependent variables receive paths from each of the independent variables. Each of these dependent variables, in turn, has a path to the fifth dependent variable, a measure of the non-targeted distances. This fifth variable receives no direct path from the independent variables; its changes are caused only by the other attitudes (or beliefs) represented in the model. A detailed description of the dependent variables employed in the attitude, evaluative belief and non-evaluative belief models follows.

In the attitude models, the dependent variables are attitude toward the superordinate concept (animals for participants in the explicit hierarchy condition, shopping in the implicit hierarchy condition), attitude toward subordinate concept 1 (dogs or clothes), attitude toward subordinate concept 2 (cats or food), attitude toward the non-targeted space set of concepts ({mammals, reptiles, snakes, and lizards} or {needs, wants, gifts, and luxuries}) and in model A, avspan. Priming, gender, and message target (i.e., supervsub and subvsub) directly affect attitudes toward animals, dogs, and cats, for example, and the resulting attitudes toward animals, dogs, and cats directly affect attitudes toward the set {mammals, reptiles, snakes, and lizards}.

In the evaluative belief models, the dependent variables are evaluations of the goodness of animals or shopping, the goodness of dogs or clothes, the goodness of cats or food, the goodness of the non-targeted space set of concepts ({mammals, reptiles, snakes, and lizards} or {needs, wants, gifts, and luxuries}) and in model A, avspan. Priming, gender, and message target directly affect evaluations of the goodness of shopping, clothes, and food, for example, and the resulting evaluations of the goodness of shopping, clothes, and food directly affect evaluations about the set {needs, wants, gifts, and luxuries}.

In the non-evaluative belief models, the dependent variables are evaluations about the associations between animals and dogs (or shopping and clothes), between animals and cats (or shopping and food), between dogs and cats (or clothes and food), among the non-targeted space set of concepts (i.e., between mammals and reptiles, mammals and snakes, mammals and lizards, reptiles and snakes, reptiles and lizards, and, snakes and lizards, or between needs and wants, needs and gifts, needs and luxuries, wants and gifts, wants and luxuries, and, gifts and luxuries), and in model A, avspan. Priming, gender, and message target directly affect non-evaluative beliefs, or associations, between animals and dogs, between animals and cats, and between dogs and cats, for example, and these non-evaluative beliefs directly affect associations among the set {mammals, reptiles, snakes, and lizards}.

Finally, consistent with the results of the ANOVAs and ANCOVAs, there are no interaction effects represented in the model because there were no noteworthy disordinal interactions found in the separate ANOVAs and ANCOVAs for the explicit and implicit hierarchies.

The sample size for most of the explicit hierarchy models is 154; the sample size for most of the implicit hierarchy models is 177. These values may vary slightly because of missing values. Control participants (n = 60) were not included in these analyses.

As discussed in Chapter 3, a total of twelve models were run: six models in the explicit hierarchy condition (2 [Strategy: avspan variable vs. avspan subtraction] x 3 [Dependent variable set: attitude vs. evaluative belief vs. non-evaluative belief]) and six models were run in the implicit hierarchy condition (see Table 4). In sum, each set of six models consists of:

(1) A model of attitudes using attitude variables from which avspan has not been subtracted, the non-targeted distance variable midlike, and an additional dependent variable, avspan, which accounts for the fact that some participants may report larger values for distances in their spaces than do others.

(2) A model of attitudes using an avspan-correction of both the attitude variables and the non-targeted distances variable

(3) A model of evaluative beliefs using the uncorrected evaluative belief variables, the non-targeted distance variable midgood, and the additional dependent variable, avspan.

(4) A model of evaluative beliefs using variables from which avspan has been subtracted.

(5) A model of non-evaluative beliefs using the uncorrected non-evaluative belief variables, the non-targeted distance variable midsize, and an additional dependent variable, avspan.

(6) A model of non-evaluative beliefs using variables from which avspan has been subtracted.

Comparing the models. The covariance matrices for all 12 of the models are presented in Appendix R. In these originally recursive models, there are 36 ([8 x 9] / 2 = 36 for models without the avspan variable) or 45 ([9 x 10] / 2 = 45 for models with the avspan variable) non-redundant elements in the unconstrained covariance matrix Σ_U. Because automatic modification is used, the final number of degrees of freedom ranges from 4 to 7. All of the models meet the necessary conditions for over-identification by the counting rule, all with positive degrees of freedom.

Tables 8-10 summarize the degrees of freedom, chi-square values, goodness of fit, and R^2 values for each of the 12 models. Chapter 3 discussed three criteria for choosing the best models: convergence, chi-square, and Normed Fit Index (NFI). The results of the models are now examined against these criteria. The avspan-subtraction strategy (i.e., running a model where avspan was not a separate dependent variable, but instead it had been subtracted from the non-targeted distance variables midlike, midgood, and midsize) converged 6 of 6 times (100%); the avspan-variable strategy (i.e., running a model where avspan appeared as a separate dependent variable and the non-targeted distance variables midlike, midgood, and midsize

Table 8

Results of Comparison Criteria for Avspan-variable and Avspan-corrected Structural Equation Models on the Attitude Dependent Variables

	df	$\chi^2(p)$	NFI	R^2 for structural equations[a]
Explicit Models[b]				
Avspan-variable	6	5.09 (.53)	.99	.59, .30, .45, .03, .45
Avspan-corrected	5	4.08 (.54)	.97	.26, .15, .03, .31
Implicit Models[c]				
Avspan-variable	5	4.30 (.51)	.99	.79, .63, .23, .58, .02
Avspan-corrected	6	4.33 (.63)	.93	.01, .06, .20, .04

Note. Variable abbreviations are defined in Appendix L. Degrees of freedom reported are after automatic modification. [a] For variables MIDLIKE, LNSUPLIK, LNS1LIK, LNS2LIK and AVSPAN (when applicable) or their corrections, respectively. [b] $n = 154$. [c] $n = 150$.

Table 9

Results of Comparison Criteria for Avspan-variable and Avspan-corrected Structural Equation Models on the Evaluative Belief Dependent Variables

	df	$\chi^2(p)$	NFI	R^2 for structural equations[a]
Explicit Models[b]				
Avspan-variable	6	9.64 (.14)	.99	.73, .01, .43, .63, .80
Avspan-corrected	4	2.96 (.56)	.99	.25, .49, -.01[c], .25
Implicit Models[d]				
Avspan-variable[e]	10	356.12 (.00)	.16	.20, .05, .04, .01, .05
Avspan-corrected	5	2.36 (.80)	.99	.07, .52, .01, .14

Note. Variable abbreviations are defined in Appendix L. Degrees of freedom reported are after automatic modification. [a] For variables MIDGOOD, LNSUGO, LNS1GO, LNS2GO and AVSPAN (when applicable) or their corrections, respectively. [b] $n = 154$. [c] The value rounds to .00, which is an acceptable value. [d] $n = 150$. [e] This model did not converge. The results presented represent the last acceptable modification iteration.

Table 10

Results of Comparison Criteria for Avspan-variable and Avspan-corrected Structural Equation Models on the Non-evaluative Belief Dependent Variables

	df	$\chi^2(p)$	NFI	R^2 for structural equations[a]
Explicit Models[b]				
Avspan-variable[c]	7	12.29 (.09)	.98	.86, .01, .72, .28, .53
Avspan-corrected	5	4.15 (.53)	.97	.12, .01, .52, .09
Implicit Models[d]				
Avspan-variable[c]	10	242.00 (.00)	.52	.87, .04, .04, .03, .05
Avspan-corrected	7	3.91 (.79)	.94	.20, .05, .06, .03

Note. Variable abbreviations are defined in Appendix L. Degrees of freedom reported are after automatic modification. [a] For variables MIDSIZE, LNS1SUP, LNSUPS2, LNS1S1 and AVSPAN (when applicable) or their corrections, respectively. [b] $n = 154$. [c] This model did not converge. The results presented represent the last acceptable modification iteration. [d] $n = 150$.

appeared in the model uncorrected) converged 4 of 6 times (67%). The avspan-subtraction strategy had a lower chi-square and higher associated *p* value 6 of 6 times (100%). Finally, the avspan-subtraction strategy had a higher NFI value 2 of 6 times (33%); the avspan-variable strategy had a higher NFI value 3 times (50%); the NFI values were the same once (16%). Therefore, the avspan-subtraction strategy was chosen to represent the models. Figures 15 - 20 depict the final six models generated for the explicit attitude, evaluative belief, and non-evaluative belief conditions and the corresponding implicit conditions, respectively.

Implications of automatic modification. As was explained in Chapter 3, automatic modification was used in all of the models to release paths that significantly increase the goodness of fit of the models. The decision to use automatic modification was made because although the hierarchical and Galileo spatial models make predictions about the beginning and end states of attitude and belief change, the intermediate processes that may generate these end states is unknown. Thus, there may be additional possible paths between variables whose causal order is not known in advance.

Automatic modification released significant paths in five of the six final models (which will hereafter be referred to simply as "the models"). In four of those five models, at least one iteration of the automatic modification resulted in a circumstance in which both a path and the one representing the reverse direction (i.e., β_{23} and β_{32}) had equal modification values from which the LISREL computer

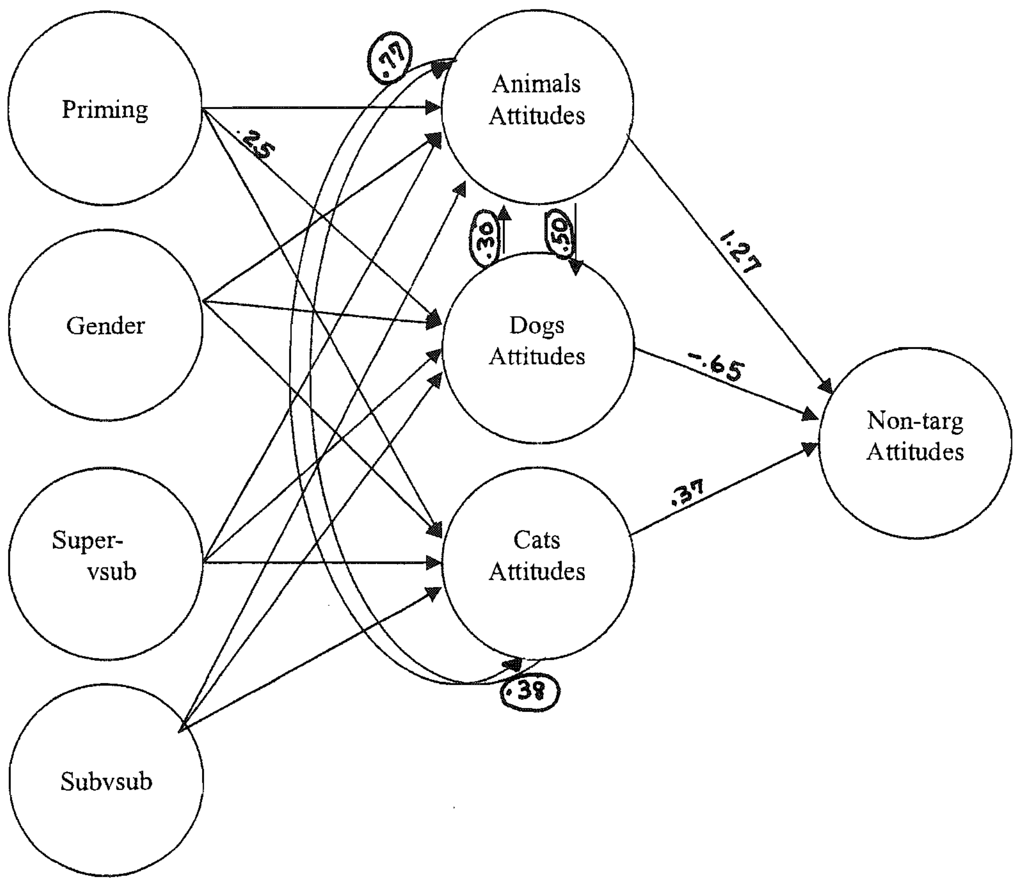


Figure 15. Results of the LISREL structural equation model on the attitude dependent variables in the explicit condition. Only significant ($p < .05$) path values are indicated; path values are unstandardized. Circled path values indicate ambiguous paths.

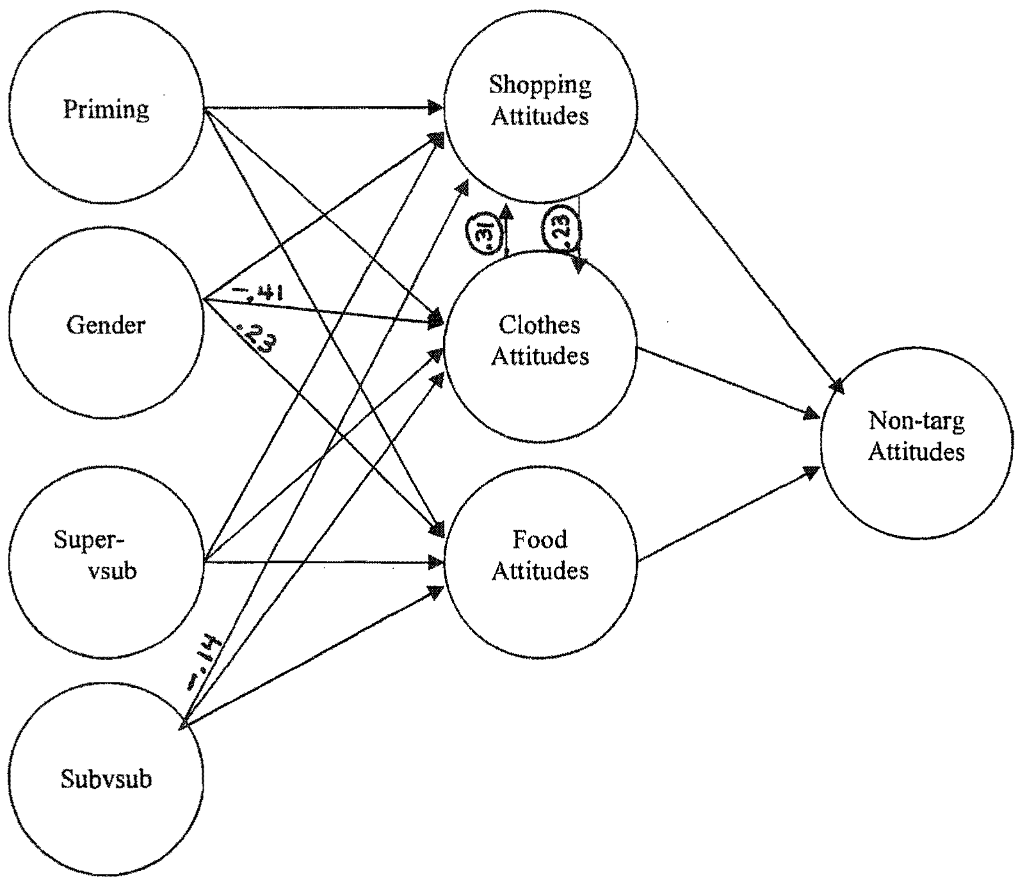


Figure 16. Results of the LISREL structural equation model on the attitude dependent variables in the implicit condition. Only significant ($p < .05$) path values are indicated; path values are unstandardized. Circled path values indicate ambiguous paths.

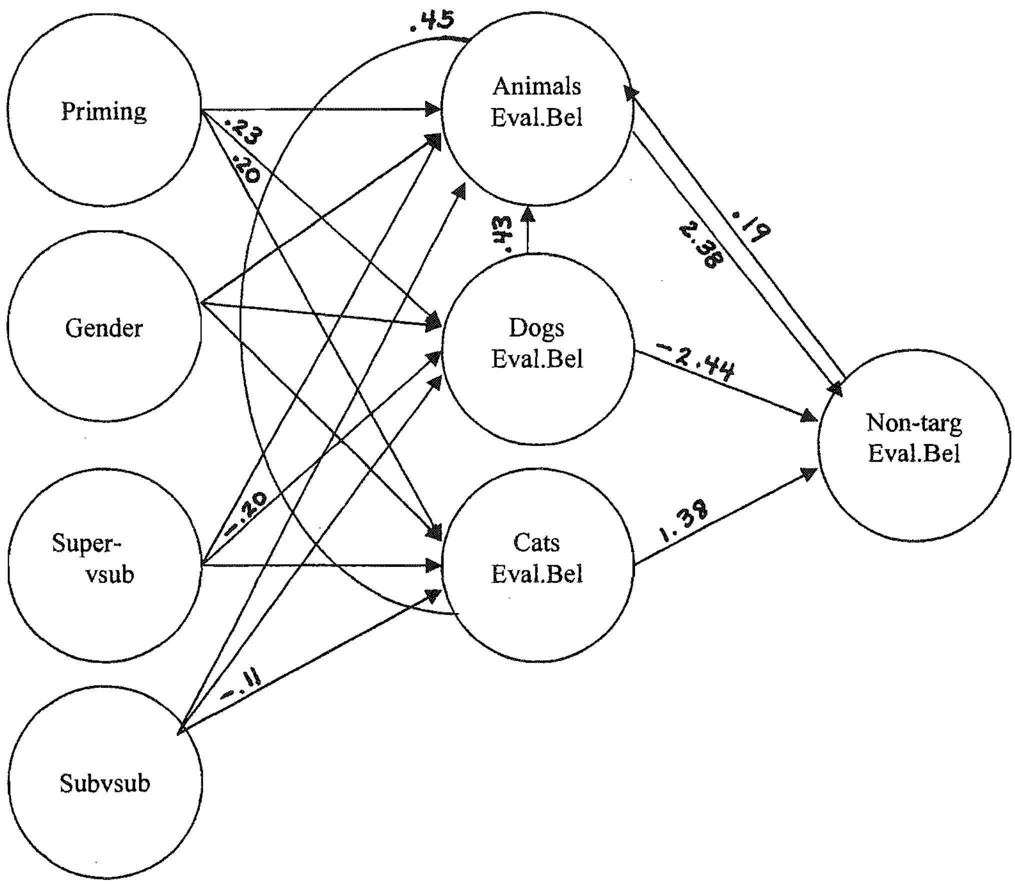


Figure 17. Results of the LISREL structural equation model on the evaluative belief dependent variables in the explicit condition. Only significant ($p < .05$) path values are indicated; path values are unstandardized. Circled path values indicate ambiguous paths.

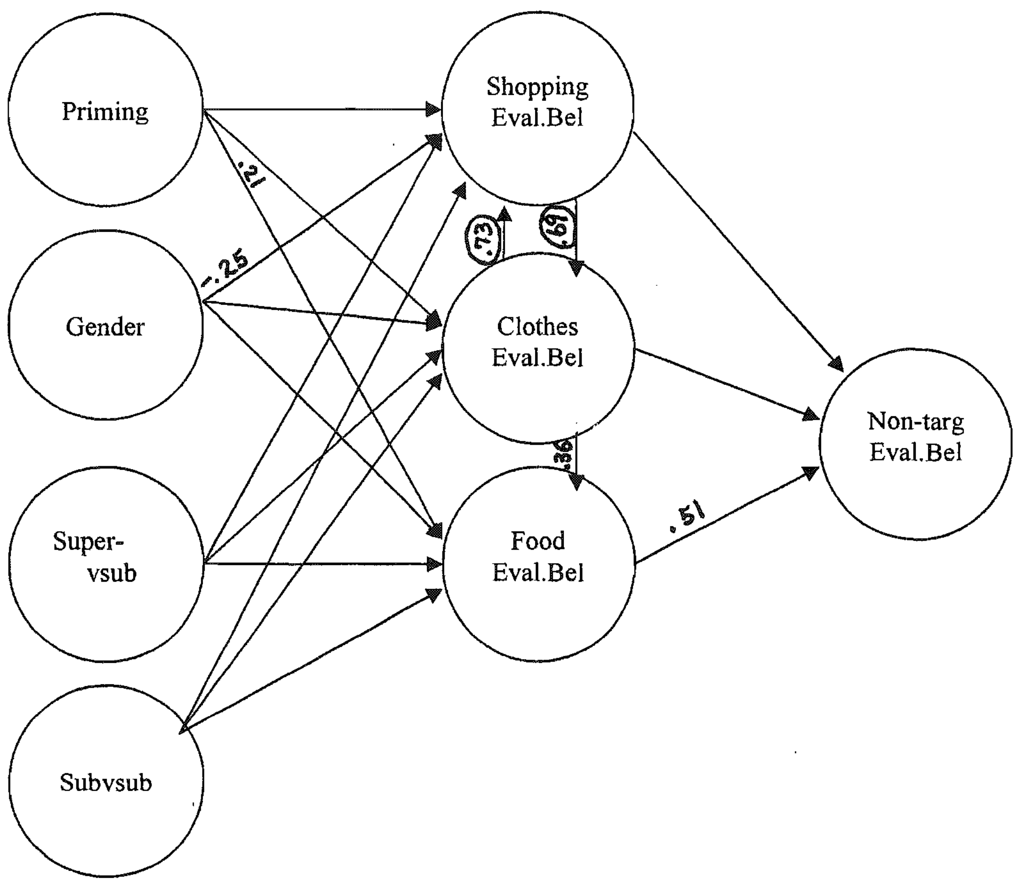


Figure 18. Results of the LISREL structural equation model on the evaluative belief dependent variables in the implicit condition. Only significant ($p < .05$) path values are indicated; path values are unstandardized. Circled path values indicate ambiguous paths.

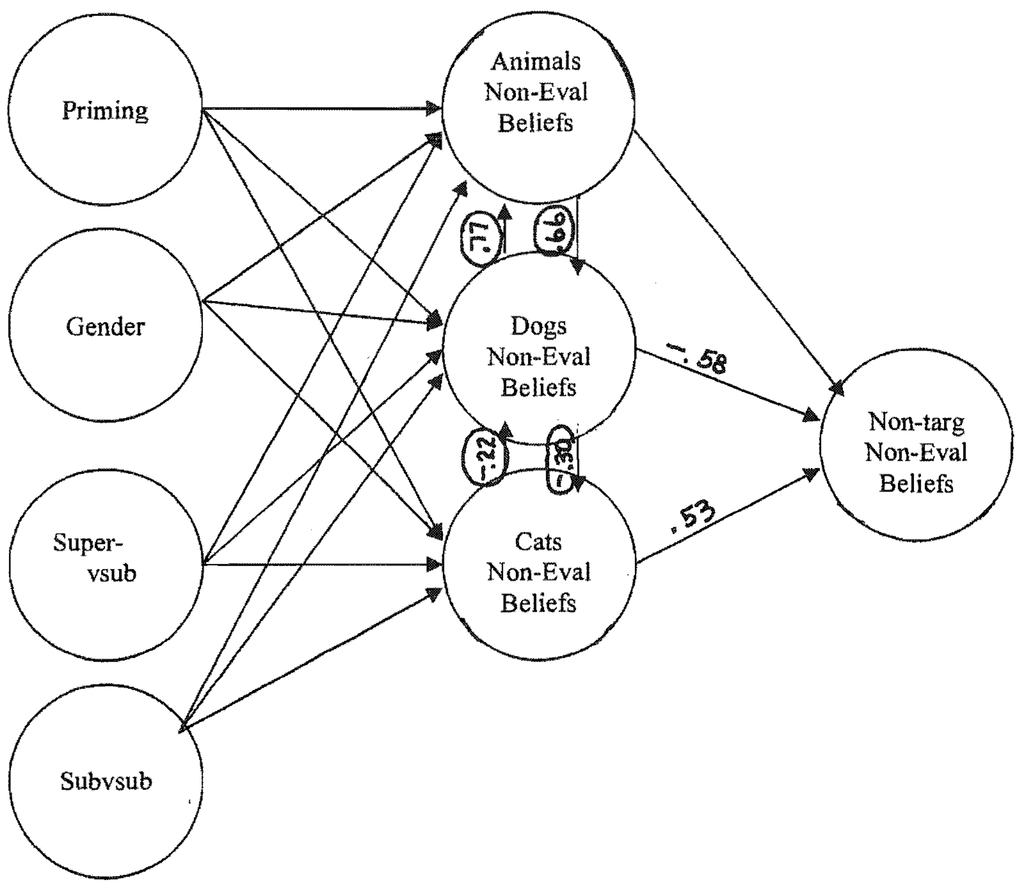


Figure 19. Results of the LISREL structural equation model on the non-evaluative belief dependent variables in the explicit condition. Only significant ($p < .05$) path values are indicated; path values are unstandardized. Circled path values indicate ambiguous paths.

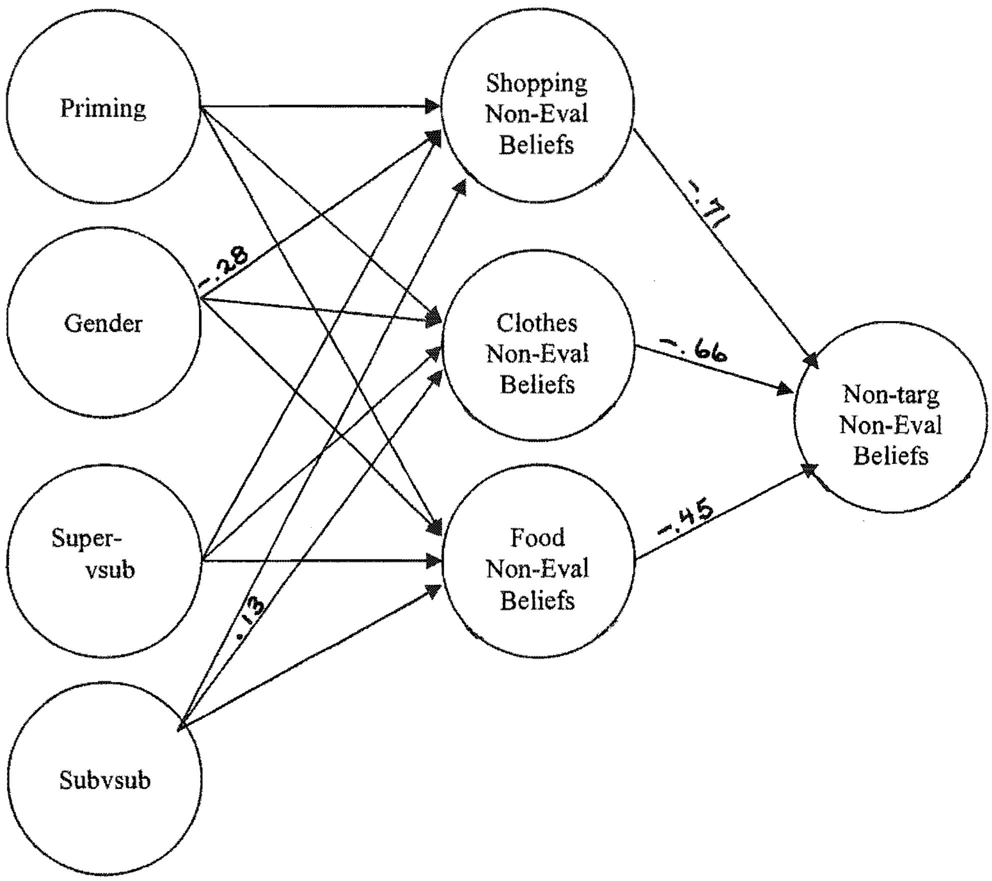


Figure 20. Results of the LISREL structural equation model on the non-evaluative belief dependent variables in the implicit condition. Only significant ($p < .05$) path values are indicated; path values are unstandardized. Circled path values indicate ambiguous paths.

program's decision tree could choose. The program's choice for freeing paths that have equal modification indices is arbitrary.

It was necessary to discover what the model results would be if LISREL had arbitrarily chosen the alternative path that has an equal modification index. So, all four of the models that contained an arbitrary path were subsequently modified manually and re-run as if LISREL had arbitrarily chosen the *other* path. In every case of arbitrary path choice, the direction of the path definitely changed (i.e., from β_{23} to β_{32}) but the (unstandardized) magnitude changed only slightly (i.e.,. from .22 to .30). Consequently, because there is no way to determine which of the arbitrary paths is correct, the directions of these paths remains ambiguous. The models in Figures 15 – 20 represent these paths with two separate arrows and two path coefficients. Note that for ease of interpretation, only significant path coefficients are displayed on the model figures. For a complete list of parameter estimates, standard errors, and *t*–values, see Appendix S.

Hypothesis regarding attitude change and belief change in the superordinate → subordinate direction. The first hypothesis, H1 (Convergent), addresses conditions that are predicted by both the hierarchical and the Galileo spatial models, namely that attitudes and/or beliefs about a superordinate concept should affect attitudes and/or beliefs about subordinate concepts.

The effects that attitudes or beliefs about a superordinate concept have on attitudes or beliefs about a subordinate concept can be seen in two places in every model. First, significant paths from the independent variable supervsub (see description of supervsub earlier in this chapter) represent the direct effect of a persuasive message directed toward a superordinate concept versus the effect of a persuasive message directed toward a subordinate concept. Only one of these paths was significant in the six models. In the explicit evaluative belief model, the path from supervsub to the evaluation of the goodness of dogs (avrels1g) is significant and negative; receiving the message "Animals are good" causes participants to evaluate dogs as better than do participants who receive other messages (e.g., "Dogs are good," or "Cats are good"). This supports Hypothesis 1, part (b).

Second, the effect that attitudes or beliefs about a superordinate concept have on attitudes or beliefs about a subordinate concept can also be seen in significant paths than emanate from the superordinate-concept dependent variables in each model. That is, the relevant significant paths are *from* attitudes toward animals or shopping, beliefs about the goodness of animals or shopping, and non-evaluative associations between the superordinate concept and dogs/clothes and cats/food *to* any other dependent variable in the model, all of which are subordinate to the animals/shopping variables. These significant paths represent direct influence of attitudes or beliefs about a superordinate concept on attitudes or beliefs about a subordinate concept. There are a number of such significant paths in the attitude, evaluative belief, and non-evaluative belief models.

In the explicit attitude model, the path from attitude toward animals is significant and positive toward the non-targeted distances; liking animals causes participants to like the set {mammals, reptiles, snakes, and lizards}, all concepts that are subordinate to animals. This supports Hypothesis 1, part (a). Attitudes toward animals might also directly and positively affect participants' attitudes toward dogs and cats, but these paths are ambiguous. In the implicit attitude model, the path from attitude toward shopping might be significant and positive to attitude toward clothes. That is, liking shopping might cause the liking of clothes, but this path is also ambiguous.

In the evaluative belief models, the results are extremely similar to the results of the attitude model; attitude change and evaluative belief change are operating in very much the same way for these explicit and implicit sets of concepts. In the explicit evaluative belief model, the path from the evaluation of the goodness of animals is significant and positive to the evaluation of the goodness of both cats and the non-targeted distances. When participants believe animals are good, this causes a belief that both cats and the set {mammals, reptiles, snakes, and lizards} are good; these concepts are all subordinate to animals. This supports Hypothesis 1, part (b). In the implicit evaluative belief model, the path from the evaluation of the goodness of shopping might be significant and positive to the evaluation of the goodness of clothes. That is, it might be the case that if shopping is good, clothes tend to be perceived as good also, but this path is ambiguous.

In the explicit non-evaluative belief model, the path from the association of animals and dogs to the association of animals and cats is ambiguous. However, participants who closely relate the concepts of animals and dogs might also closely relate animals and cats. In the implicit non-evaluative belief model, the path from the association of shopping and clothes is significant and negative to the non-targeted distances. Close associations between shopping and clothes cause distant associations in the set {needs, wants, gifts, and luxuries}. This supports Hypothesis 1, part (c).

To summarize, Hypothesis 1 predicted that when an individual receives a persuasive message directed toward a superordinate concept in a particular concept hierarchy, (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change will occur with respect to concepts subordinate in the hierarchy. For all six models, all parts of the hypothesis were supported. With respect to hierarchical condition, however, parts (a) and (b) are supported for the explicit hierarchy only; there was no evidence of downward influence on non-evaluative belief change. For the implicit hierarchy, only part (c) is supported; there is no evidence of downward influence on attitude or evaluative belief change in the implicit models.

Hypotheses regarding attitude and belief change in the subordinate → superordinate direction. Hypothesis 2 and 2_{ALT} represent the divergent predictions that the theoretical models make. Hunter et al.'s (1976) model indicates that attitudes and/or beliefs about concepts should not affect attitudes and/or beliefs about concepts that are superordinate to them. Woelfel and Fink's (1980) model posits that all linked concepts, regardless of hierarchical position, can and do affect each other.

The effects that attitudes or beliefs toward a subordinate concept have on a superordinate concept can be seen in three places in the models. First, as discussed earlier in this chapter, the paths from the independent variable supervsub represent the direct effect of a persuasive message directed toward a superordinate concept versus the direct effect of a persuasive message directed toward a subordinate concept. A significant positive path from supervsub to any superordinate dependent variable (e.g., liking of the superordinate concept, goodness of the superordinate concept, and associations between the superordinate concept and subordinate concept 1 or subordinate concept 2) would suggest that the superordinate variables directly affected subordinate concepts. There are no such significant paths in the six models.

Second, the effects that attitudes or beliefs toward a subordinate concept have on a superordinate concept can be seen in significant paths that come *from* subordinate dependent variables and point *to* the superordinate dependent variables (e.g., attitude toward the superordinate concept, evaluative belief of the superordinate concept, and associations between the superordinate concept and subordinate concept 1 or subordinate concept 2). These significant paths were not part of the original model, but were added during automatic modification. In the explicit attitude model, there is an ambiguous path from attitude toward dogs to attitude toward animals. Liking of dogs might cause liking of animals. In the implicit attitude model, there is also an ambiguous path from attitude toward clothes to attitude toward shopping; liking of clothes might cause liking of shopping.

In the explicit evaluative belief model, there is a significant and positive path from the evaluation of the goodness of dogs to the evaluation of the goodness of animals; if dogs are good, then animals tend to be good. This supports Hypothesis

2_{ALT} (b). In the implicit evaluative belief model, there is an ambiguous path from the evaluation of clothes to the evaluation of shopping. It might be the case that if clothes are good, then shopping tends to be good as well.

In both the explicit and implicit non-evaluative belief models, no significant paths of this type were added during automatic modification.

Finally, the effects that attitudes or beliefs toward a subordinate concept have on a superordinate concept can be seen in significant paths *from* the single-concept subordinate dependent variables (e.g., attitude toward dogs or clothes) *to* the non-targeted set of distances (i.e., the attitude non-targeted set of distances, the evaluative belief non-targeted set of distances, and the non-evaluative belief non-targeted set of distances). However, these upward effects are confounded with the effects that attitudes or beliefs about a subordinate concept have on attitudes or beliefs about an equipollent subordinate concept (which will discussed further below). These significant paths represent upward influence because the sets of non-targeted distances contain attitudes or beliefs about concepts that are above subordinate concepts 1 (dogs/clothes) and 2 (cats/food) in the hierarchy, as well as about two concepts that are equipollent, or sideways, to subordinate concepts 1 (dogs/clothes) and 2 (cats/food) in the hierarchy. However, even though the set of non-targeted distances includes both superordinate and equipollent significant paths *from* attitudes or beliefs about subordinate concepts 1 and 2 *to* the sets of non-targeted distances can still aid in evaluation of the hypotheses because such significant paths contradict the predictions of the Hunter et al. (1976) theory.

In the explicit attitude model, there is a significant and negative path from attitude toward dogs to the non-targeted distances. Liking dogs causes participants to dislike the set {mammals, reptiles, lizards, and snakes}. This supports Hypothesis 2_{ALT}, part (a) and Hypothesis 3_{ALT}, part (a). There is also a significant and positive path from attitude toward cats to the non-targeted distances. Liking cats causes participants to like the set {mammals, reptiles, lizards, and snakes}; this also supports both Hypothesis 2_{ALT}, part (a) and Hypothesis 3_{ALT}, part (a) In the implicit attitude model there are no significant paths of this type.

In the explicit evaluative belief model, there is a significant and negative path from evaluations of the goodness of dogs to the set of non-targeted distances. If participants rate dogs as good, then they rate the set {mammals, reptiles, lizards, and snakes} as bad. Furthermore, there is a small but significant path from the non-targeted distances to the evaluation of the goodness of animals; evaluations of animals, mammals, reptiles, lizards, and snakes affect each other. Finally in the explicit hierarchy condition, there is a significant and positive path from the evaluation of cats' goodness to the set of non-targeted distances. Participants' evaluation of the goodness of cats directly affects their evaluations of the set {mammals, reptiles, lizards, and snakes}. All of these significant paths support Hypotheses 2_{ALT} and 3_{ALT}, part (b). In the implicit evaluative belief model there is one significant and positive path from the evaluation of the goodness of food to the set of non-targeted distances. If participants evaluate food as good, then they tend to also evaluate the set {needs, wants, gifts, and luxuries} as good. This also supports Hypotheses 2_{ALT} and 3_{ALT} part (b).

In the explicit non-evaluative belief model, there is a significant and negative path from the association between animals and cats to the set of non-targeted distances. Positive associations between animals and cats result in overall negative associations among the set {mammals, reptiles, lizards, and snakes}. There is also a significant and positive path from the association between dogs and cats to the non-targeted space. If dogs and cats are closely related, then the associations among the set {mammals, reptiles, lizards, and snakes} are closer than if dogs and cats are not closely related. Both of these significant paths support Hypotheses 2_{ALT} and 3_{ALT}, part (c). In the implicit non-evaluative belief model, there is a significant and negative path from the association between shopping and clothes to the set of non-targeted distances. If shopping and clothes are closely related then the distances among the set {needs, wants, gifts, and luxuries} are greater. There is also a significant and negative path from the association between shopping and food to the non-targeted set {needs, wants, gifts, and luxuries}. Once again, if shopping and food are closely related then the association among the set {needs, wants, gifts, and luxuries} is less. Finally, there is a significant and negative path from the association between clothes and food to the set of non-targeted distances. As clothes and food are more closely related, so are the associations among the set {needs, wants, gifts, and luxuries}. These three significant paths support Hypothesis 2_{ALT}, part (c).

To summarize, Hypothesis 2 predicts that when an individual receives a persuasive message directed toward a subordinate concept in a particular concept hierarchy, (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change will occur for the targeted concept, but not for any superordinate concept. However, Hypothesis 2_{ALT} predicts that (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change will occur for the targeted concept, and also for any linked superordinate concept. Among all six models, Hypothesis 2 was not supported and all three parts of Hypothesis 2_{ALT} were supported. All three parts of Hypothesis 2_{ALT} are supported for the explicit hierarchy concepts; Hypothesis 2_{ALT} parts (b) and (c) are supported for the implicit hierarchy.

Hypotheses regarding attitude and belief change in the subordinate → subordinate direction. Hypothesis 3 and 3_{ALT} address another set of the divergent predictions that the theoretical models make. Hunter et al.'s (1976) model indicates that attitudes and/or beliefs about concepts should not affect attitudes and/or beliefs about concepts that are equipollent (i.e., sideways) to them. Woelfel and Fink's (1980) model posits that all linked concepts, regardless of hierarchical position, can and do affect each other.

The effects that attitudes or beliefs toward a subordinate concept have on an equipollent subordinate concept can be seen in three places in the models. First, significant paths from the single-evaluation dependent variables (e.g., attitude toward dogs or clothes to the non-targeted distance dependent variables can represent sideways influence. These types of significant paths were just discussed above.

Second, significant paths from the independent variable subvsub (see discussion earlier in this chapter) represent the direct effect of a persuasive message on subordinate concept 1 versus the direct effect of a persuasive message on subordinate concept 2. Recall that subvsub creates polar opposition between participants who receive a message directed toward subordinate concept 1 and participants who received a message directed toward subordinate concept 2, with a message directed to the superordinate concept having an intermediate value. Participants who receive a message directed toward the superordinate concept are assigned a value of 0 on this variable, participants who receive a message directed toward subordinate concept 1 receive a value of 1, and participants who receive a message directed toward subordinate concept 2 receive a value of -1. Therefore, for example, a positive path from subvsub to attitudes or beliefs about dogs or clothes (concept S1), would suggest that participants who receive a message directed toward subordinate concept 2 (cats or food) like subordinate concept 1 *more* that participants who receive a message directed toward subordinate concept 1 itself. Such a path would be one way to reflect sideways influence. There were no significant paths of this type in the attitude models.

For the explicit evaluative belief model, there is a significant, negative path from subvsub to the evaluation of the goodness of cats. Participants who receive the message "Cats are good" rate cats as worse than participants who receive other messages. Conversely, because subvsub creates polar opposites, participants who receive the message "Dogs are good" rate cats as better than participants who receive other messages. This indicates sideways influence and supports Hypothesis 3_{ALT}, part (b). None of these types of paths is significant for the implicit evaluative belief model.

For the non-evaluative belief models, a path from subvsub to the association between animals and dogs (or shopping and clothes), or from subvsub to the association between animals and cats (or shopping and food) would suggest that the associations represented by the subordinate dependent variables were affected by messages directed toward equipollent subordinate concepts (i.e., the association between shopping and food was affected by the message "Clothes are good"), thus reflecting sideways influence. None of these paths is significant for the explicit non-evaluative belief model. For the implicit non-evaluative belief model, there is a significant and positive path from subvsub to the association between shopping and clothes. Participants who receive the message "Food is good" evaluate shopping and clothes as more closely associated than participants who receive other messages; conversely, because subvsub creates polar opposites, participants who receive the message "Clothes are good" evaluate shopping and clothes as less closely associated than participants who receive other messages. This supports Hypothesis 3_{ALT}, part (c).

The third representation of sideways influence in the models comes from significant paths between equipollent subordinate-concept dependent variables, for example a path *from* attitude toward dogs *to* attitude toward cats. These types of paths were not part of the original model, but were added during automatic modification. In neither the explicit or implicit attitude models were any of these paths added.

In the implicit evaluative belief model, there is a significant and positive path from the evaluation of the goodness of clothes to the evaluation of the goodness of food. Evaluating clothes as good causes participants to evaluate food as good. This finding supports Hypothesis 3_{ALT}, part (b).

In the explicit non-evaluative belief model, there is an ambiguous path from the association between animals and cats to the association between cats and dogs. Close associations between animals and cats might result in close association between cats and dogs. In the implicit model, none of these paths were added.

To summarize, Hypothesis 3 predicts that when an individual receives a persuasive message directed toward a subordinate concept in a particular concept hierarchy, (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change will occur for the targeted concept, but not for any equipollent concept. Hypothesis 3_{ALT} predicts change will occur for the targeted concept, and also for any linked equipollent concept. Among all six models, Hypothesis 3 is not supported and all parts of Hypothesis 3_{ALT} are supported. Furthermore, all parts of Hypothesis 3_{ALT} are supported for the explicit hierarchy condition and parts (b) and (c) are supported for the implicit hierarchy condition.

Priming and gender in the models. Priming has a significant influence in three of the six models: the explicit attitude, explicit evaluative belief, and implicit evaluative belief models. In the explicit attitude model, participants primed with a diagram of the experimental hierarchy liked dogs more than did unprimed participants. In the explicit evaluative belief model, priming caused participants to evaluate both dogs and cats as better than did unprimed participants. And in the implicit evaluative belief model, priming caused participants to evaluate food as better than did unprimed participants.

Gender has a significant influence in all three implicit models. In the implicit attitude model, there was a negative path to attitude about clothes and a positive path to attitude about food. Women liked clothes more and food less than men did. In the implicit evaluative belief model, there was a negative path from gender to the evaluation of the goodness of shopping. Women found shopping to be better than men did. Finally, in the implicit non-evaluative belief model, there was a positive path from gender to the association between shopping and clothes. Women associated shopping and clothes more closely than men did.

Summary

To summarize, the study hypotheses predict changes in attitudes, evaluative beliefs, and non-evaluative beliefs among hierarchically superordinate, subordinate, and equipollent concepts after participants read persuasive messages about specific target concepts. Analyses of 12 extremely reliable Galileo aggregate space plots support predictions about the downward (superordinate to subordinate) influence of attitudes and beliefs throughout a network of related concepts. The Galileo plots also inform the study's two research questions, revealing significant differences between explicit and implicit concept spaces. The explicit concepts appear to fall into a much neater and more concise organizational pattern than the implicit concepts, but appear to span a larger space. The explicit hierarchy is also organized well outside of the boundaries of the self (i.e., far from the concept things I like), which may be important to understanding the processes that drive attitude and belief change in any network of related concepts.

The analyses of variance provided a solid base of information from which some of the parameters of the structural equation models (e.g., the presence or absence of interaction effects) were determined.

Finally, the results of six final structural equation models support Hypothesis 1, 2_{ALT} and 3_{ALT}. Thus, the Galileo spatial model provides a theoretical structure that makes a correct set of predictions about how concepts affect one another. And regarding the concepts themselves, the well established structure of an explicit hierarchy of concepts appears to facilitate inter-attitudinal and inter-belief influence much more than the fuzzy structure of an implicit hierarchy of concepts. And the key to this facilitation seems to be accessibility of the organizational structure.

CHAPTER V

Discussion

The first part of this chapter is a summary of the study. Second, the results and their implications are discussed. The third section of this chapter is an exploration of the limitations of the study and directions for future research. Finally, the significance of the study is discussed.

Summary of the Study

This study was designed to advance our understanding of the structure and dynamics of inter-attitudinal—and inter-belief—change that is theorized to occur for concepts that are not directly targeted by persuasive messages. To investigate these mechanics, I chose two competing, testable theories in the communication literature, each of which makes some unique predictions about how attitudes and beliefs change for concepts that are related to persuasive message target concepts. These theories are the Poole and Hunter (1979) hierarchical model and the Woelfel and Fink (1980) Galileo spatial model. An understanding about which of these cognitive representations of attitudes and beliefs makes predictions about attitude and belief change that are experimentally supported should contribute to the development of a more comprehensive model of inter-attitudinal structure, with implications for the dynamics of inter-attitudinal influence.

The two theories suggested three primary hypotheses about how attitudes and beliefs change for concepts that are related to persuasive message target concepts.

The first hypothesis is convergent (i.e., similar predictions are made by both theories), whereas the second and third hypotheses are divergent:

H1 (Convergent): When an individual receives a persuasive message directed toward a superordinate concept in a particular concept hierarchy, (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change will occur with respect to concepts subordinate in the hierarchy.

H2 (Hierarchical): When an individual receives a persuasive message directed toward a subordinate concept in a particular concept hierarchy, (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change will occur for the targeted concept, but not for any superordinate concept.

$H2_{ALT}$ (Galileo): When an individual receives a persuasive message directed toward a subordinate concept in a particular concept hierarchy, the force of that message will cause (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change that will be reflected by motion in linked superordinate concepts in that space.

H3 (Hierarchical): When an individual receives a persuasive message directed toward a subordinate concept in a particular concept hierarchy, (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change will occur for the targeted concept, but not for any equipollent concept.

$H3_{ALT}$ (Galileo): When an individual receives a persuasive message directed toward a subordinate concept in a particular concept hierarchy, the force of that message will cause (a) attitude change, (b) belief change with respect to an evaluative component, and/or (c) non-evaluative belief change that will be reflected by motion in linked equipollent concepts in that space.

To test the hierarchical model, it was necessary to use hierarchically-related concepts. However, Poole and Hunter (1979) are relatively ambiguous about the specific mechanisms (e.g., categorization processes or linguistic structures) that might cause hierarchical inter-attitudinal change. Therefore, it was decided that the study needed to examine an explicit hierarchy, in which the hierarchical structure of the concepts is inherent in their common, pragmatic meanings, and an implicit hierarchy, in which the relationships among the concept meanings are not so obvious. Theoretical ambiguities about explicit and implicitness also resulted in the following research questions:

RQ1: How does attitude change in explicit hierarchies differ from attitude change in implicit hierarchies?

RQ2: How does accessibility of a hierarchy affect that hierarchy's influence on attitude change?

Five pilot studies (subsumed under Pilot Studies 1 and 2) were required to ensure that the study hierarchies were perceived to be hierarchical to the population from which the sample would be drawn. The shared purpose of these pilot studies was to extract concept hierarchies from participants. The results of these pilot studies, particularly Pilot Studies 2B and 2D, indicated that at least 80% of a sample of participants were able to construct the final study hierarchies from a list that included, but was not limited to, the final study concepts. Based on the pilot studies, the final study's explicit hierarchy consisted of animals, mammals, dogs, cats, reptiles, snakes, and lizards; the implicit hierarchy was comprised of shopping, needs, food, clothes, wants, gifts, and luxuries. The control hierarchy contained vegetation, flowers, daisies, tulips, plants, ferns, and holly.

Participants in the final study were 391 students enrolled in Communication classes as a large eastern university. All participants were randomly assigned to an experimental or control condition in the study's 2 (Hierarchy: explicit vs. implicit) x 2 (Priming: primed vs. unprimed) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2) + 2 control (explicit vs. implicit) between-subjects design. The study questionnaire first asked each participant to closely examine a hierarchy, the concepts of which depended upon his or her assigned condition (i.e., explicit, implicit, or control), then read a fictional research passage, also condition dependent. For non-control participants, the research passage ended with a simple persuasive message, as discussed in Chapter 3. Participants assigned to an experimental explicit hierarchy condition received one of three following messages at the end of their research passage: "Animals are good," "Dogs are good," or, "Cats are good." Participants assigned to an experimental implicit hierarchy condition received one of these three simple persuasive messages: "Shopping is good," "Clothes are good," or, "Food is good." Participants assigned to a control condition received no persuasive message. Aside from the persuasive message (or lack thereof), the fictional research passages of the participants were otherwise identical.

To encourage participants to think about the persuasive message and to foster attitude change, the questionnaire then asked participants to write for five minutes about why the target concept in the research passage was good. Control participants were asked to write about the topic of the research passage, college students' self-esteem.

The importance of concept linkages was discussed with respect to Pilot Study 4 in Chapter 3. The average number of links that concepts have to other words is important to the assessment of attitude change; too few or too many links can be a hindrance. Accordingly, in the next section of the final study questionnaire, the linkages of five concepts were assessed. All participants estimated how many words of the words they regularly use are associated with shopping, animals, college, self-esteem, and goodness. The primary dependent variables were then measured as participants completed a set of 36 paired-comparison judgments for either the explicit or implicit hierarchy concepts, depending upon their assigned condition. Finally, participants were asked to draw a hierarchy using any or all of 13 provided words.

The data were examined in three ways: Galileo plot analysis, analysis of variance, and structural equation modeling. For the structural equation models, it was decided that allowing automatic modification of the models would be the most appropriate strategy for uncovering the influences of attitudes or beliefs upon other attitudes or beliefs. This decision was made because although the hierarchical and

Galileo spatial models make predictions about the beginning and end states of attitude and belief change, the intermediate processes that may generate these end states is unknown. That is, a basic model could be drawn to represent relationships between attitudes and beliefs that are specifically suggested by the theories, but there may be additional possible paths representing relations between concepts whose causal order is not known in advance. Thus, using automatic modification to release paths that significantly improve the goodness of fit of the models helps to clarify the pattern of inter-attitudinal or inter-belief influence.

Summary and Interpretation of Results

Hypothesis 1: The Effects of Attitudes and Beliefs about Superordinate Concepts on Attitudes and Beliefs about Subordinate Concepts

Both the hierarchical model and the Galileo spatial model predict that a message directed toward a superordinate concept will affect attitudes and beliefs about subordinate (hierarchical) or linked (spatial) concepts.

Summary. In the explicit hierarchy models, participants who receive the message "Animals are good" evaluate dogs, a subordinate concept, as better than participants who received other messages (e.g., "Dogs are good," or "Cats are good"). Furthermore, if participants believe that animals are good then they believe that cats and the set {mammals, reptiles, snakes, and lizards} are good as well, all concepts that are subordinate to animals. Similarly, liking animals causes participants to like the set {mammals, reptiles, snakes, and lizards}. However, because the directions of the paths between animals and dogs, and animals and cats, are ambiguous in the explicit attitude model, it is unclear whether or not attitudes about animals directly and positively affect attitudes about dogs and cats or vice versa.

Likewise, in the implicit hierarchy models, it is unclear whether attitudes and beliefs about shopping cause attitudes and beliefs about clothes or vice versa. The direction of the path between shopping and clothes is ambiguous in both the attitude and the evaluative belief model. However, believing in a high degree of similarity between shopping and clothes, or between shopping and food, causes a belief that the set of non-targeted concepts {needs, wants, gifts, and luxuries} is *dissimilar*. Because all concepts in the set of non-targeted concepts are subordinate to shopping, this relationship represents the downward influence of shopping beliefs upon subordinate beliefs.

Interpretation. Overall, the results support Hypothesis 1 parts (a), (b) and (c). There is evidence of the influence of attitudes or beliefs about superordinate concepts upon attitudes or beliefs about subordinate concepts. As a result, these findings affirm predictions of both the hierarchical and Galileo spatial models.

Research Question 1, however, asks how such influence might differ between the explicit and implicit hierarchies. The explicit hierarchy models demonstrate direct downward influences only in the attitude and evaluative belief models. For example, a persuasive message about the goodness of animals directly increases goodness evaluations of dogs. In addition, attitudes and beliefs about animals caused similar attitudes and beliefs about the subordinate concept set {mammals, reptiles, snakes, and lizards}. There is no unambiguous evidence of downward influence, however, in the explicit non-evaluative belief model.

In direct contrast to the explicit hierarchy models, there is no unambiguous evidence of downward influence in either the implicit attitude or implicit evaluative belief models. The only implicit model to demonstrate downward influence is the non-evaluative belief model, in which beliefs about the relative similarity of shopping and clothes cause beliefs about the *dis*similarity of the set {needs, wants, gifts, and luxuries}.

In sum, two of the three explicit hierarchy models, as compared to one of the three implicit hierarchy models, demonstrate the predicted downward influence. Furthermore, visual inspection of the structural equation models reveals that the explicit models have more than twice as many unambiguous paths of inter-attitudinal or inter-belief influence (11) as do the implicit models (5). Thus, it readily appears as if the well-established concept relationships of explicitness facilitate the spreading of attitudes and beliefs among related concepts.

Hypothesis 2 and 2_{ALT}: The Effects of Attitudes and Beliefs about Subordinate Concepts on Attitudes and Beliefs about Superordinate Concepts

The hierarchical model predicts that a message directed toward a subordinate concept will not affect attitudes and beliefs about a superordinate concept (Hypothesis 2). The Galileo spatial model, however, predicts that a message directed toward a subordinate concept will affect attitudes and beliefs about any linked concept, regardless of hierarchical position (Hypothesis 2_{ALT}).

Summary. An individual's high evaluation of the goodness of dogs causes high evaluation of the goodness of animals, a clearly superordinate concept. But evaluating dogs as good, and liking them, also causes participants both to evaluate as poor and to dislike the set {mammals, reptiles, lizards, and snakes}, which contains the superordinate concept mammals. Conversely, liking cats, and evaluating them well, causes participants to like the set {mammals, reptiles, lizards, and snakes} and to evaluate it as good. Furthermore, believing dogs and cats to be similar results in the belief that the concepts within the set {mammals, reptiles, snakes, and lizards} are similar to each other.

In the implicit hierarchical condition, if participants evaluate food as good, then they also tend to evaluate the set {needs, wants, gifts, and luxuries}, which contains the superordinate concept needs, as good. Additionally, believing food and clothes to be similar results in the belief that the members of the set {needs, wants, gifts, and luxuries} are dissimilar. Liking clothes, and evaluating them as good, might affect liking and evaluations of the superordinate concept shopping but, as discussed above, the direction of the path between shopping and clothes is ambiguous.

Interpretation. There is clear evidence that attitudes and beliefs about subordinate concepts affect attitudes and beliefs about superordinate concepts. Therefore, the results support Hypothesis 2_{ALT}, but not Hypothesis 2; the results of the structural equation model analyses support the predictions of the Galileo spatial model over the predictions of the hierarchical model. Attitudes and beliefs about subordinate concepts significantly affect attitudes and beliefs about superordinate concepts. This upward influence is represented by a direct, unambiguous path from a subordinate concept to a superordinate concept only once, in the explicit evaluative belief model. For the rest of the models (except for the implicit attitude model), the upward influence is inferred from significant paths from a subordinate concept (e.g., dogs or clothes) to the set of non-targeted distances, a measure that includes superordinate concepts (e.g., mammals or needs) within it.

Interestingly, the direction of the spreading attitude or belief change is not consistent. For example, participants who like cats consequently like the set {mammals, reptiles, lizards, and snakes}, but liking dogs causes participants to *dislike* the set {mammals, reptiles, lizards, and snakes}. So it is not the case that the diffusion of attitude change among a set of linked concepts could be accounted for by a simple consistency explanation (e.g., increased liking of any animal leads to increased liking of all linked animals). But why should attitudes about cats yield different effects than attitudes about dogs? The study employed random assignment in order to achieve equivalent manipulation groups. Furthermore, there is no significant difference among the message target groups of explicit experimental participants with respect to attitudes toward the non-targeted set of concepts (F [2, 154] = 1.11, $p > .05$, observed power = .24).

In the explicit attitude model, it appears that inter-attitudinal influence could start with positive attitudes toward animals spreading downward to positively affect attitudes toward cats (although this path is ambiguous), which in turn positively affect the non-targeted set {mammal, reptiles, snake, and lizards}. Positive attitudes toward animals also directly and positively affect the non-targeted set. These changes would represent a chain of *positive* inter-attitudinal influence from which dogs are excluded. Because the path between dogs and animals is ambiguous, it is impossible to know whether attitudes toward dogs are affecting attitudes toward animals or vice versa. In either case, the dogs concept is still linked to animals, but its own downward (and sideways) influences, with respect to the small domain of concepts considered here, are negative. This finding is consistent with Judd and Krosnick's (1989) suggestion that attitudes as nodes in associative networks have either positive or negative valenced relationships. An interesting question to consider in later studies might be to greatly expand the number of animals considered in the hierarchy to determine (1) if there are groups of animals that consistently yield either positive or negative influences, and (2) what a linked network of those animals looks like.

Hypothesis 3 and 3_{ALT}: The Effects of Attitudes and Beliefs about Subordinate Concepts on Attitudes and Beliefs about Equipollent Subordinate Concepts

The hierarchical model predicts that a message directed toward a subordinate concept will not affect attitudes and beliefs about an equipollent subordinate concept (Hypothesis 3). The Galileo spatial model also predicts that a message directed toward a subordinate concept will affect attitudes and beliefs about any linked concept, regardless of hierarchical position (Hypothesis 3_{ALT}).

Summary. As discussed above, liking dogs, and evaluating them as good, also causes participants to *dislike* and evaluate as *poor* the set {mammals, reptiles, lizards, and snakes}, which contains the equipollent subordinate concepts lizards and snakes. Conversely, liking cats, and evaluating them well, causes participants to like the set {mammals, reptiles, lizards, and snakes} and to evaluate it as good.

In the implicit structural equation models, if participants evaluate clothes as good, they consequently evaluate food, an equipollent subordinate concept, as good. Furthermore, rating food as good leads to evaluating the set {needs, wants, gifts, and luxuries} as good. However, as discussed above, believing food and clothes to be similar results in the belief that the concepts in the set {needs, wants, gifts, and luxuries} are *dissimilar*.

Interpretation. The results support Hypothesis 3_{ALT}, but not Hypothesis 3. Attitudes and beliefs about subordinate concepts directly and significantly affect attitudes and beliefs about equipollent subordinate concepts. These effects are consistent with the Galileo spatial model, but the hierarchical model clearly predicts, for example, that evaluative beliefs about a subordinate concept like clothes should not effect beliefs about an equally subordinate concept like food.

Once again, however, there is a complex pattern to the manner in which attitudes and beliefs are influencing each other. It would be easy to assume that the participants in the study who positively evaluated clothes, food, and the set {needs, wants, gifts, and luxuries} simply failed to make distinctions among their consumables. Yet this does not explain why participants' beliefs that clothes are good positively affect their beliefs about food, but—despite the significant correlations between attitudes and about food and clothes ($\text{attitude}_{\text{food}}$ and attitude$_{clothes}$ $r = .44, p < .01$)—liking of clothes does not *cause* liking of food. Additionally, there are significant positive correlations between the similarity of the concepts in the non-targeted set {needs, wants, gifts, and luxuries} and the similarity of the pairs (1) shopping and clothes ($r = .33, p < .01$), (2) shopping and food ($r = .38, p < .01$), and (3) clothes and food ($r = .27, p < .01$). However in the non-evaluative belief model, for each of the three pairs, beliefs about increasing similarity cause belief in the *dis*similarity of the concepts in the set {needs, wants, gifts, and luxuries}.

In summary, the structural equation models demonstrated excellent goodness of fit and consistent results that informed a theoretically sound model. The originally-designed model provided for both the hierarchical and the Galileo spatial models to be tested: if there was only hierarchical influence, then only superordinate to subordinate paths would be significant; if there was Galileo spatial influence, then paths between linked concepts would be significant. Furthermore, automatic modification did not compromise the initial design of the models. Modification added three paths to one model, two paths to three models, one path to one model, and no paths to one model, with many of the modified paths being the same across conditions (particularly the path between superordinate and subordinate 1 added in four models). Rather than detract from the model, these similarities suggest an important path of influence to be studied further.

Furthermore, the structural equation models illuminate the fact that attitudes and beliefs about concepts can cause change, often in unexpected directions, in related attitudes and beliefs. And patterns in the structural equation models suggest that the Galileo model is generally supported if we assume that some, but not all, concepts in the hierarchy are linked.

Research Questions

The two research questions concerned the related, if not synonymous, notions of explicitness and accessibility in a hierarchy: Research Question 1 asked how attitude change in explicit hierarchies differs from attitude change in implicit hierarchies, and Research Question 2 asked how accessibility affected a hierarchy's influence. The results clearly showed that explicitness, which by our definition included concepts whose hierarchical relationships were accessible, facilitated the propagation of attitude change within the hierarchy in a manner that the implicit hierarchy did not. In the explicit hierarchy models, fourteen (58%) of twenty-four possible paths of inter-attitudinal or inter-belief influence were significant. In the implicit hierarchy, only seven (29%) of those paths were significant. This difference may be explained by the accessibility of the explicit hierarchy. Furthermore, we expect that evaluations emanating from one concept in the hierarchy will move among the other concepts in the hierarchy with little effort because the relationships between concepts are embedded in individuals' basic understandings of the concepts themselves.

Looking at the models another way, the explicit hierarchy models still clearly and accordantly demonstrate a greater degree of inter-attitudinal or inter-belief influence. Seventy-five percent (15/20) of all the significant paths in the explicit hierarchy models are between endogenous variables (i.e., the paths that represent inter-attitudinal or inter-belief influence). Only fifty percent (7/14) of all the significant paths in the implicit hierarchy models are between endogenous variables, reflecting the difficulty of the implicit concept network to facilitate attitude and belief change.

If it is true that the explicitness of a hierarchy creates the conditions that foster evaluative change in concepts related to the focal concept of the message, then we expect that an implicit hierarchy made accessible by priming should behave similarly. In other words, priming a specific hierarchy, even an implicit one, makes that hierarchy temporarily accessible. Priming of the implicit hierarchy resulted in significantly better evaluations (i.e., more goodness) of food, which in turn caused better evaluations of the set of non-targeted concepts {needs, wants, gifts, luxuries}. Thus, it appears that activating an implicit hierarchy, providing an evaluative message (e.g., "Shopping is good"), and making the relationships between abstract concepts accessible in a particular context facilitates the spread of the message throughout the hierarchy. Consequently, concepts not directly targeted by the persuasive message become more favorable than if participants had to expend more cognitive effort to establish the hierarchical relationships among the concepts for themselves.

Limitations of the Study and Directions for Future Research

There were three principal issues that have arisen during the course of the study which serve to both constrain the inferences that can be made and advance possible directions for future study. These are the use of automatic modification to improve the goodness of fit of the structural equation models, the role of time in attitude formation and change processes, and the threat to validity of case-category confounding. In addition, more attention needs to be paid to the role of concept linkages in inter-attitudinal and inter-belief change processes.

Use of Automatic Modification

First, although automatic modification was clearly the best strategy to maximize our understanding of the various structural equation models, it also produced some ambiguities that need to be studied further as we develop a more detailed theory of the dynamics of spreading inter-attitudinal change. Automatic modification was used in all six of the final study models. In four of the models, at least one iteration of the automatic modification resulted in a circumstance in which both a path and its reverse (i.e., β_{23} and β_{32}) had equal modification values from which the LISREL computer programs could choose. Thus, in these instances, the path that LISREL chose as the modification was completely arbitrary. As was discussed in Chapter 4, all four of these models were subsequently modified and re-run as if LISREL had arbitrarily chosen the *other* path; this procedure was done to determine how the choice of path affected the resulting models.

In all of these cases of arbitrary path choice, the directions of the paths changed but the magnitudes of the paths changed only slightly (i.e,. the unstandardized path value from attitudes about animals to attitudes about dogs is .50 and the reverse path, from attitudes about dogs to attitudes about animals, is .30). The resulting models are presented with all six such paths (two models contained two arbitrary choices each) labeled as ambiguous. This ambiguity ultimately does not detract from the major conclusions of the study because the conclusions arise from redundant evidence, but resolving the ambiguity could support and strengthen either the conclusions that are based on the analyses of different, unambiguous paths. For example, if the true path between attitudes toward animals and attitude toward dogs is from animals to dogs, then the path supports conclusions about downward influence; if the path is from dogs to animals, then the path supports conclusions about upward influence. Four of the six ambiguous paths are between the superordinate concept and the subordinate 1 concept (β_{23} and β_{32}). A fifth ambiguous path is also a superordinate-subordinate pathway (β_{24}/ β_{42}). If these paths were found to be in the direction of superordinate to subordinate, it would supplement the evidence of superordinate influence found in three of the six models. If these paths were found to be in the direction of subordinate to superordinate, this result would augment the pattern of upwards influence found in all of the six models. The sixth ambiguous path represents the causal relationship between two equipollent concepts (β_{34}/ β_{43}); resolution of this ambiguity makes no difference to the conclusion that one subordinate concept is affecting another.

Effect of Time on Attitude Change

The uniformity in time of participants' responses to the questionnaire presents a second limitation to the study. All participants read the fictional research passage, wrote about the persuasive message (or other message if in the control condition) for five minutes, and answered the paired-comparison judgments, which measured their attitudes and beliefs at exactly the same time. The study used Kaplowitz et al.'s (1983) finding that attitude change induced by a discrepant message is 99% completed in 271 seconds as a guide for the decision to instruct participants to write and think about the persuasive message for five minutes. Kaplowitz et al. were concerned with the direct effect of a message upon an attitude concept; however, the current study examines the spreading of attitude change across related concepts. How long should such spreading activation take? Hunter et al. (1984) suggest that the farther away any two hierarchical levels are from each other, the longer a time period will be needed for the superordinate level to affect the subordinate level. But, "the time required for indirect effects will be much shorter for concepts embedded in a frequently referenced hierarchy than for concepts that are rarely considered" (p. 243).

Two distinct possibilities exist for future study to clarify the effects of time on the dynamics of inter-attitudinal change and provide additional elucidation for the models. First, a study should be conducted to try to determine more distinctly the dynamics of inter-attitudinal change as it proceeds, much like the Kaplowitz et al. (1983) design in which groups of participants responded to questionnaires at 30 second intervals for 10 minutes. Such a study would enable us to make precise predictions about the status of various related attitudes throughout the process of inter-attitudinal change.

Second, Hunter et al.'s (1984) suggestion that the time required for indirect effects will be much shorter for concepts embedded in a frequently referenced hierarchy (i.e., an explicit hierarchy) than for concepts that are rarely considered (i.e., an implicit hierarchy) might provide additional explanation for the differences between the final structural equation models of the explicit and implicit concept hierarchies. In the attitude and evaluative belief conditions, the explicit models had twice as many paths between attitudes or beliefs than the implicit models. Could it be the case that a much longer consideration of not the persuasive message but the implicit hierarchy is necessary to make it accessible enough to perform like the explicit hierarchy? Future research needs to explore the length of time that is necessary for an implicit hierarchy to become temporarily explicit, and to determine how long the effects of the explicitness last.

Case-category Confounding Threats to Validity

A third limitation of the study concerns threats to valid inference. Jackson (1992) discusses the limitations of unreplicated comparisons such as the comparisons made in this study. The current study examined only one explicit hierarchy and one implicit hierarchy. Jackson identifies this situation as a case-category confounding threat to the validity of a study, suggesting it is possible that the results of the current study are unique to these individuals sets and not generalizable (here) to the categories of all explicit and implicit hierarchies. According to Jackson, "there is no way to untangle the effects of the class from the effects that are peculiar to cases within the class" (1992, p. 31). An effective solution for addressing the threats to validity from unreplicated comparison is replication. Plans are being formulated for a replication of this study in which multiple sets of concepts and multiple persuasive messages are used, in order to further test the findings of the current study.

Role of Concept Linkages in Inter-attitudinal and Inter-belief Change

More of an omission than a limitation is the issue of greater consideration of concept linkages— the number of linkages that the concepts of interest have both to each other and to other concepts in participants' cognitions— in inter-attitudinal and inter-belief change processes. The predictions of the Galileo spatial model rest upon links between concepts and the hierarchical model states that it "assumes that [a] person perceives the [hierarchical] link as definite" (Hunter et al., 1984, p. 237). Additionally, Eagly and Chaiken (1998) explain that many attitudes are formed by "forging linkages between the attitude object and other attitude objects. The linkages are stored [in memory] along with the target attitude itself." (p. 271)

Linkages were examined only superficially in the current study. Moreover, there was no evidence of validity to the assessments of linkages that were made, which is an additional limitation to this aspect of the study. Participants were asked to estimate, out of every 100 words they use, how many words were associated with shopping, animals, college, self-esteem, and goodness. The responses were examined to determine if there were any systematic differences among participants with respect to the number of linkages that they appeared to hold for each concept; such differences could interfere with attitude and belief change processes that were being assessed. The data revealed no systematic differences among the manipulation groups of participants. However, the data could not indicate if the number of linkages that were held by the participants, in general, was relatively too large or too small such that it would interfere with the attitude and belief change processes that were being assessed.

Future research should seek to determine the optimal number of links that a concept should have both internal and external to the inter-attitudinal structure of interest in order to facilitate spreading attitude change.

Significance of the Study

This study began with the purpose of advancing inter-attitudinal theory by comparing two competing models of attitude and belief structure. Each of these models has specific implications for attitude and belief change. Few theories have a well developed picture of both the structure and dynamics of attitudes. The current study successfully demonstrated that (1) persuasive messages may affect not only the target attitude, but also attitudes related to the target, and (2) attitudes and beliefs about one concept affect attitudes and beliefs about related concepts, often in unexpected ways; for example, persuasive messages can affect attitudes related to their targets without necessarily affecting the target itself.

A good analogy for this kind of effect (attitude change moving through a target without actually affecting it) is the Newtonian demonstrator, a device in which five steel balls, each at the end of a thin line of rigid wire, hang in a linear series from a piece of wood (see Figure 21). If the first ball (ball #1) in the series is pulled back and then released, it swings back to the series and hits the next ball (ball #2). Ball #2 does not move, however. The force from ball #1 moves through balls 2-4, and causes ball #5, on the other end of the series, to move. In the current study, persuasive

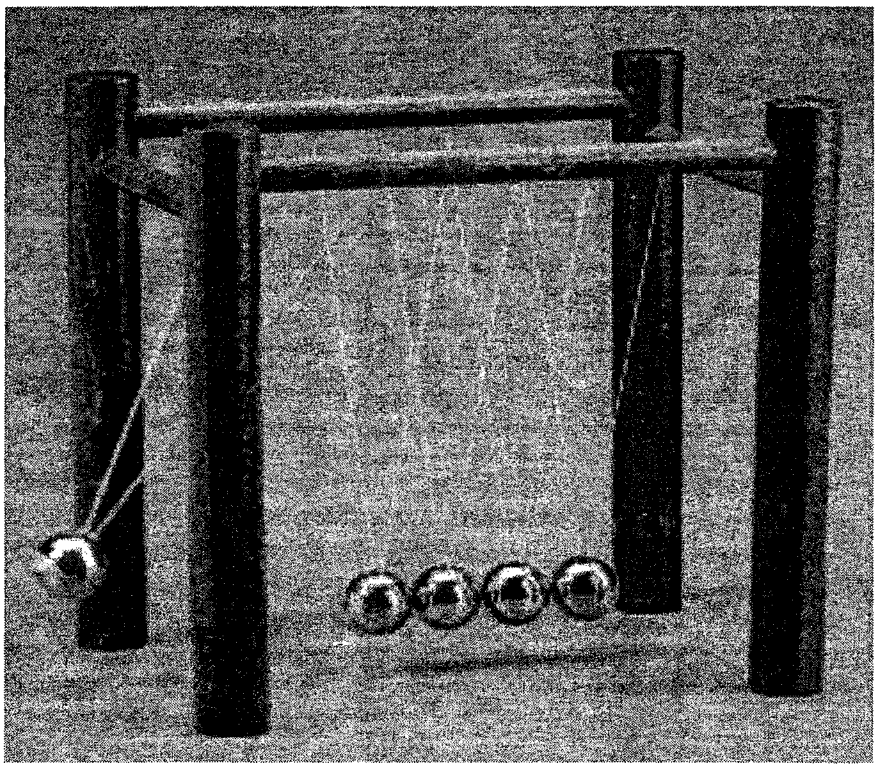


Figure 21. A Newtonian demonstrator.

messages act like the force that moves ball #1. Often, these messages did not move attitudes or beliefs of their target concepts (ball #2), but significant attitude or belief change was demonstrated in related concepts (ball #5).

The study provided evidence to support the Galileo spatial model, one of the two possible theoretical models tested by the study. As such, this dissertation represents a significant development in the inter-attitudinal literature. The demonstrated support for the Galileo spatial model contributes greatly to our understanding about how particular architectures of attitude structures can make successful predictions about the spread of attitude change within such structures. Additionally, the flexibility of the spatial model to account not only for attitudes but also for beliefs represents a move toward a more comprehensive and unified explanation of attitudes and attitude change.

The results of the study have more far-reaching theoretical implications as well. First, the results can be seen as an extension of balance theory (Heider, 1946) as discussed in Chapter 2. Heider was concerned with how an individual's attitudes interact to create a state of balance; if a person perceives his or her attitudes to be contradictory, a state of psychological tension is created that must be resolved. Heider demonstrated how different types of attitude change could occur in dyads and triads of related attitudes. What would happen, however, if a particular triad was connected to another triad, or several triads? What would happen if the contradictory attitude in question was connected to more than two other attitudes? How could balance be restored? The evidence provided by the dissertation, and its support of the

Galileo spatial model of attitudes (and beliefs), add depth to Heider's theory that attitudes change in response to one another. The dissertation results suggest that it is possible for attitude change to move throughout a system of attitudes (i.e., an attitude space) to yield an unpredictable result ranging from minor attitude adjustments to fundamental and whole-scale change of the entire attitude space (e.g., sudden religious conversion).

Second, the results of this dissertation are relevant to recent connectionist approaches to inter-attitude structure that posit a spreading activation model, in which positive or negative relationships between attitude concepts (i.e., nodes) move from one concept to the next through a network of related concepts. A spreading activation model represents a map of attitudinal structure derived from an assessment of people's attitudes in a given domain (Eagly & Chaiken, 1998). And according to Petty (1995), one of the most important implications of this approach is "that if you modify some particular aspect of the attitude structure . . . this will likely lead to some change in the overall evaluation of the object (i.e., the attitude) itself" (p. 200). Thus, the Galileo spatial model and the spreading activation models are remarkably similar; support for the Galileo model as was provided by the dissertation can be inferred as providing support for the spreading activation models. Furthermore, similarities between the Galileo spatial model and spreading activation models could make the Galileo model a more prominent and useful tool in the future of spreading activation research.

Moreover, the notion of spreading activation is pertinent to recent developments in network analysis. As discussed in Chapter 2, network researchers are discovering patterns in all manner of connected objects. It seems very likely that the linkages between attitudes and beliefs as evidenced in this dissertation could be specifically reconceptualized as network connections, and consequently, subject to network analysis.

In addition to its theoretical contributions, the results have significant practical implications as well. First, they suggest that more attention should be paid to the possible unintended consequences of persuasive messages on attitudes related to the target attitude. Second, and more importantly, the results suggest that it is possible to affect attitudes indirectly, which could have tremendous implications for those who design persuasive messages about sensitive topics. For example, health communicators attempting to persuade people at moderate to high-risk of colon cancer to undergo colonoscopies encounter difficulty in producing messages with which people will seriously engage; most of the current messages focus on concepts like *colon* and *risk of death*, which are distasteful to many people. Based on the results of this research, it is feasible that a cognitive space of concepts related—even indirectly—to *colon* and *risk of death* could be generated. Persuasive messages could then be produced that use the existing inter-attitudinal and inter-belief structures to generate attitude change indirectly and increase the number of people persuaded to undergo the procedure. Thus, overall, the evidence of attitude and belief dynamics that this dissertation has provided fills a gap in our fundamental understanding of inter-attitudinal structure, and suggests important directions for future study.

Footnotes

[1]Consumerism was chosen as a content domain for this study because this dissertation represents the beginning of a much larger project to study a significant social problem, hyperconsumerism, and to develop successful consumer education messages and counseling programs. Over the past 20 years, Americans have significantly increased their personal debt obligations. In 1980, personal debt payments (not including mortgages) represented about 12.25% of disposable personal income; in 2000, that figure had increased to 15.5% (American Bankruptcy Institute, 2001). At the same time, the number of consumer (i.e., non-business) bankruptcy filings also increased from about 288,000 to over 1.2 million. This trend toward ever-increasing consumer debt and bankruptcy filings has serious implications for both the indebted individuals and the economic structures of which they are a part.

For individuals, the stress of debt can lead to an array of psychological and physical symptoms that range from mere annoyance to life-threatening, suicidal depression (Hatcher, 1994; Pierce, 1967). Changes in people's economic conditions (e.g., the accumulation of debt) have been shown to correlate with increased rates of mental problems; on a macro-level, in American society, general economic downturn has been shown to correlate with increases in the incidence of mental illness (Brenner, 1973; Catalano & Dooley, 1977; Cockerham, 1989). Furthermore, increased debt loads and resultant depleted savings often force individuals to undertake stressful life-changing activities such as securing a new, cheaper place to live, finding additional income sources, reducing expenditures, and managing harassing creditors. These activities can impose severe emotional strain and significant situational stress upon individuals (Ferman & Gordus, 1979, pp. 195-196), and this stress can manifest itself as a variety of physical symptoms, including heart disease, high blood pressure, peptic ulcer, and migraine headaches (Cockerham, 1989). Furthermore, these stresses, and their physical manifestations, affect not just individuals, but entire families (Ferman & Gordus, 1979). As families become involved in individuals' problems, the number of people negatively affected by the consequences of debt increases far beyond the estimates of individual credit delinquency statistics.

In addition to contributing to a variety of personal health maladies, increasing amounts of consumer debt also create public problems. Indebtedness has a negative effect on local, state and national economies because consumer spending is inextricably tied to them. Although consumer spending stimulates economies, and accounts for about two-thirds of the nation's Gross Domestic Product, consumer debt has caused banks' net chargeoffs (credit delinquencies that have been converted to loss) to increase 58% in the past five years, which depresses economies (*Condition of consumer credit, 1996, and its effects on financial institutions: Hearing before the Subcommittee on Financial Institutions and Regulatory Relief, United States Senate,* 1996). According to its Congressional testimony, the Mortgage Bankers Association of America believes that these delinquencies, as well as increasing numbers of mortgage defaults, foreshadow major financial industry losses. And, to the extent that banks find their loan portfolios overexposed as they are forced to write-off increasing consumer debt losses, it becomes more likely that any dip in the economy will cause unforeseen negative consequences throughout the American financial sector. Senator Richard C. Shelby (R-AL), Chairman of the Senate Banking Subcommittee on Financial Institutions and Regulatory Relief has suggested that "If consumer debt problems become serious, they won't be limited to the consumer. Virtually every business in the country will feel the impact" (*Condition of Consumer Credit*, 1996, p. 22). The concerns of Senator Shelby and others led to recent passage of the Bankruptcy Reform Act of 2001 (H.R. 333), which will make it more difficult for individuals to declare personal bankruptcy to erase all of their debts.

As demonstrated by the thousands of people who seek counseling at Consumer Credit Counseling Service each year, many people want to change their spending behaviors and avoid debt. Despite charges that American consumer society is increasingly characterized by hyperconsumerism (e.g., Ritzer, 1999), change *is* possible for a behavior whose norms are as culturally-embedded as consumption's. In the public health field, for example major changes in other types of culturally-embedded behaviors have been recorded (e.g., persuading women to perform monthly breast self-examinations; Young, Lierman, Powell-Cope, Kasprzyk, & Benoliel, 1991). Public health communication programs have used persuasive messages to raise awareness of problem behaviors, have suggested behaviors which were advantageous, and have demonstrated the measurable benefits of the suggested behaviors such as exercise (Van Ryan, Lytle, & Kirscht, 1996), dental hygiene (McCaul, Sandgren, O'Neill, & Hinsz, 1993), and weight loss (Schifter & Ajzen, 1985); each of these studies has reported success in demonstrating behavior change. These successes provide support to the notion that certain consumption behaviors can be changed.

Determining a model of attitude and belief change that makes valid and reliable predictions about both the structure and dynamics of individuals' attitudes toward and beliefs about consumer behaviors would aid in the production of messages and programs that could be effective in changing people's spending behavior in ways that they desire (Petty & Cacioppo, 1996). At the applied level, this dissertation represents the first component of a long-term project to achieve that goal.

[2]The difference between many people's pragmatic understanding of shopping and their understanding of spending is a critical factor in people's difficulty with internalizing messages about consumerism. Failure to address the differences in these understandings is, I believe, a major component of the problem with current consumer help programs. The pragmatics of shopping and spending will be examined in detail in the author's future research.

[3]Recall that the values of the paired-comparison judgments were logarithmically transformed (natural log) to achieve normality and homoscedasciticy. For more information, please see the discussions of Pilot Study 3 in Chapter 3, and data transformations in Chapter 4.

[4]Control group participants are not included in this calculation. They did not receive a target message to recall.

[5]Recall that the smaller the distance, the greater the liking. This result is consistent with the generally accepted belief that women like the activity of shopping more than men do.

[6]Because the design of the experiment is 2 x 2 x 3 + 2, this study devotes much of its examination of attitude and belief change to relative effects. For a detailed discussion on this topic, see Himmelfarb (1975).

[7]There are three significant two-way interaction effects that are common to all of the attitude, evaluative belief and non-evaluative belief distances: a hierarchy by priming interaction, a hierarchy by message target interaction, and a priming by message target interaction. (See Appendix Q.) The hierarchy by priming significant interaction in the attitude distances is ordinal and indicates that the participants in the explicit primed condition like the non-targeted set {mammals, reptiles, snakes, and lizards} least (*M* = 22.29, *SD* = .35), followed very closely by the explicit unprimed participants (*M* = 22.16, *SD* = .40), who are in turn followed by the implicit, primed (*M* = 19.43, *SD* = .34) and finally, reflecting a relatively large departure from the other three conditions, the implicit, unprimed (*M* = 16.72, *SD* = .38). In other words, the implicit, unprimed participants like the non-targeted concept set {needs, wants, gifts, and luxuries}most, and the explicit, primed participants like the non-targeted concept set {mammals, reptiles, snakes, and lizards}least.

The hierarchy by message target interaction is disordinal, with a partial eta-squared of .02; it can be described as follows. In the explicit condition, participants who receive the message "Animals (superordinate concept) are good" like the set of non-targeted concepts the least, and evaluate it as the worst. Participants who received the message "Dogs (subordinate concept 1) are good" like the non-targeted concepts slightly more, and evaluate the set as somewhat better. Participants who received the message "Cats (subordinate concept 2) are good" like the set of non-targeted concepts the most, and evaluate it as the best.

On the other hand, in the implicit condition, participants who received the message directed to subordinate concept 1 like the set of non-targeted concepts less than participants who received the message directed to the superordinate concept. However, consistent with the explicit condition, participants who received the message directed to subordinate concept 2 most like the non-targeted set. That is, participants who received the message "Clothes [subordinate concept 1] are good" like the set of non-targeted concepts the least, and evaluate it as the worst. Participants who received the message "Shopping [superordinate concept] is good" like the non-targeted concepts slightly more, and evaluate the set as marginally better than participants who received the message "Clothes are good." Participants who received the message "Food [subordinate concept 2] is good" like the set of non-targeted concepts the most, and evaluate it as the best.

The final significant two-way interaction is for priming by message target. This interaction is disordinal, with a partial eta-squared of .001. Primed participants who received a message directed at the superordinate concept (animals or shopping) like the non-targeted set of concepts the least, followed by primed participants who received a message directed toward subordinate concept 1 (dogs/clothes). Those primed participants who received a message directed toward subordinate concept 2 (cats/food) like the non-targeted concepts the most. Unprimed participants who received a message directed at subordinate concept 1 like the non-targeted set of concepts the least, followed by those who received a message directed toward the superordinate concept. Still, like their primed counterparts, unprimed participants who received a message directed toward subordinate concept 2 like the non-targeted concepts the most.

In addition to the significant two-way interactions that are present for the evaluative belief and non-evaluative belief distances, there is one three-way interaction of hierarchy by priming by message target that is significant for the two belief analyses, and nearly significant ($p = .058$) for the attitude analysis. It does not meet the criteria of a noteworthy interaction as discussed in Chapter 4 (partial eta-squared < .05).

[8]Hierarchy has the only significant main effect for the newmdlk, newmdgd, and newmdsz ANOVAs. Consistent with the analyses in which avspan was a covariate, the avspan-subtracted non-targeted distances of the explicit hierarchy is significantly larger than the avspan-subtracted non-targeted distances of the implicit hierarchy for (1) the attitude distances: newmdlk (explicit: $M = 1.96$, $SD = 1.84$, implicit: $M = -.75$, $SD = 1.14$, $F[1, 304] = 177.11$, $p < .001$, $\eta^2 = .39$), and (2) the evaluative belief distances: newmdgd (explicit: $M = 1.89$, $SD = 1.96$, implicit: $M = -48$, $SD = 1.44$, $F[1, 304] = 111.39$, $p < .001$, $\eta^2 = .29$). However, in contrast, the distances of the explicit hierarchy are smaller than the distances of the implicit

hierarchy for the non-evaluative belief distances: newmdsz (explicit: M = -.94, SD = 1.48, implicit: M = 1.31, SD = 1.54, F [1, 303] = 98.90, $p < .001$, $\eta^2 = .26$). So, although the overall liking and goodness of the set of non-targeted animal concepts {mammals, reptiles, snakes, and lizards} is less than the overall liking and goodness of the shopping concepts {needs, wants, gifts, and luxuries} for these avspan-subtracted variables, the set of animal concepts is a tighter group, closer together than the set of shopping concepts. That is, the animal non-targeted set is a more compacted group and farther from things I like and good than the shopping non-targeted set.

Appendix A

Pilot Study 1 Questionnaire

Course: __________ Section: __________ Starting Time: __________ Gender: _________

Questionnaire PS1

Understanding Attitudes: Attitudes about Consumerism

Below there are five questions that ask you to think about certain concepts relating to consumerism, and then list everything that comes to your mind. For each question, think about the concept for a moment and then record as many words, phrases, and ideas as you can about the concept. You may write anything you think of; there are no correct answers. The questions may seem similar to you, and some of the ideas you have about the concepts in more than one question may be the same. This is okay. Please write down as many words, phrases, and ideas as you can about each concept even if you have already written down some of those words for a previous question.

1. List everything that comes to your mind when you think about the concept of "Buying."

____

____

____

____

____

2. List everything that comes to your mind when you think about the concept of "Spending."

____

____

____

____

____

3. List everything that comes to your mind when you think about the concept of "Shopping."

____

____

____

____

____

4. List everything that comes to your mind when you think about the concept of "Money."

____

____

____

____

____

5. List everything that comes to your mind when you think about the concept of "Debt."

____

____

____

____

____

Appendix B

List of Concepts Generated by Pilot Study 1

BUYING	**SHOPPING**	**SPENDING**	**MONEY**	**DEBT**
Having	Price	Useless crap	Rich	Owe
Ownership	Value	I Want	Work/Earn	Expenses
Possession	Coupons	Luxuries	Checkbook	Out of control
Enjoy	Sales	Cost	Budget	Waste
Goods	Services	Impulse	Necessary	Guilt
Materialism	Browsing	New clothes/shoes	Bank	Addiction
Usefulness	Walking around	Treat self/others	Cash	Bankrupt
	Mall	Gifts	Dollars	Remorse
	Stores	Birthdays	Bills (to pay)	Reckless
	Time-consuming	Holidays	Jail	Social classes
	Barter	Spree	Car payment	Welfare
	Needs	Vacation	Rent	Poor
	Food		Loans	Poverty
	Grocery store		College	Problems
	Cash register		Not enough	Burden
	Internet		Lose	Credit card
	Happy		Expensive	Visa
	Fun		No clothes	Discover
	Style		Broke	
	New clothes		Bad	
	Rewards		Sad	
	Stress-relief			

Appendix C

Pilot Study 2A Questionnaire

Course: __________ Section: __________ Starting Time: __________ Gender: __________

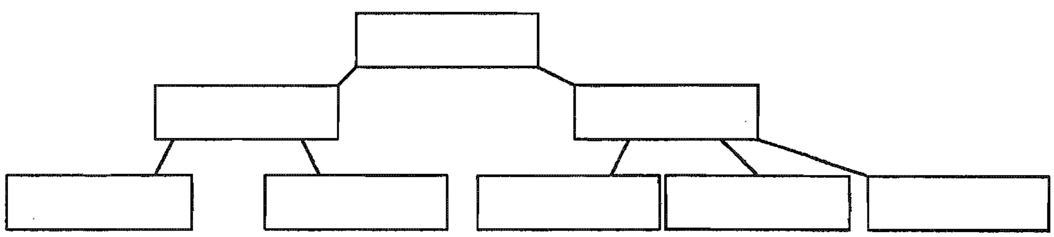
Questionnaire PS2

Constructing Hierarchies

INSTRUCTIONS

Today we are interested in how people organize words into hierarchies.

A **hierarchy** is a group of words that are ranked, some above others, usually from the most general word to the most specific. At the very top of the hierarchy is one overall word into which all of the other words of the hierarchy fall. Underneath the overall, or most abstract, word are two or more major words into which the overall word can be logically divided based on some criterion. Each of these major words are then further divided into more specific words, and so on. So, the structure of a hierarchy might look something like this:



Many of the words you use everyday could probably be placed in some sort of hierarchy like this.

Please take a few minutes to think of the words that you know, and consider the hierarchies that they are a part of. Then, on the attached sheet of paper, **draw any three hierarchies** that come to your mind. The structure of your hierarchies should look similar to the structure above (although the number of words per level is not restricted to two or three; this is just an example).

Appendix D

Pilot Study 2B Questionnaire

Course: ________ Section: ________ Starting Time: ________ Gender: ________

Questionnaire PS2

Constructing Hierarchies

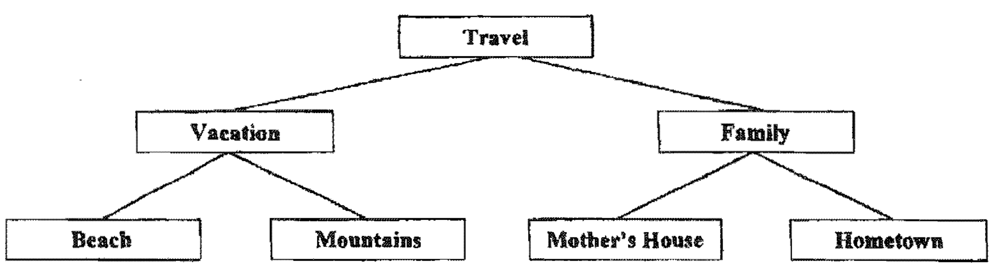
INSTRUCTIONS

Today we are interested in how people organize words into hierarchies.

A **hierarchy** is a group of words that are ranked some above others, usually from the most general word to the most specific. At the very top of the hierarchy is one overall word into which all of the other words of the hierarchy fall. Underneath the overall, or most abstract, word are two or more major words into which the overall word can be logically divided based on some criterion. Each of these major words are then further divided into more specific words, and so on.

Here is an example of one way in which a respondent in another study arranged some sample words into a hierarchy. *Note that, depending on the meaning of these words to you, you might find other, different hierarchies in these words, or no hierarchy at all.*

Words: beach, mother's house, mountains, cousins, hometown, vacation, travel, family, ski



In this example, the respondent felt that, given the word list, the word "travel" could be divided by types of travel purposes: Travel to take a vacation, and Travel to visit family (note that this means the respondent generally didn't think of visiting family as a vacation). The respondent then felt that each of those major word categories could be further divided by where she would go to do the travel: For a vacation, she could go to the beach or the mountains; For travel to visit family, she could go to her mother's house or to her hometown. The respondent did not consider her mother's house or her hometown as places she would go to take a vacation and, similarly, she did not consider the beach or the mountains as places she would go to visit family. You might have noticed that this respondent did not use the words "cousins" or "ski" in her hierarchy. This is because she did not find them to fit into this particular hierarchy with these particular divisions.

Are there any questions?

Below you will find a list of words and phrases. Please read the list carefully and consider the relationships that may exist between the concepts. Do any of the words form "overall" categories or major categories that can be divided into other, more specific words?

Next to each word you will find a block. When you first consider the list, mark the blocks next to the words that you think are hierarchically related--like the travel words in the example were hierarchically related. You might find that you can divide the word list in many ways, into many hierarchies. If you find yourself considering a second hierarchy among the words, you will be able to make another, different hierarchy on the next page. For now, please focus on the organization of the first hierarchy.

In your two hierarchies, you may use any of the words once, more than once, or not at all, so don't "save" any words to use on your second hierarchy on the next page.

Using the words for which you have checked the blocks, draw the hierarchy that these words form in the space marked "Draw Hierarchy A." Please draw the hierarchy in a manner similar to the picture of the travel example, although there can be more than two divisions for any word; that was just an example. It is okay to make mistakes and start over. It is okay to make cross-outs if you discover that a word you originally thought was related, now doesn't work. It is okay to not use all the words you checked, or to add a word from the list that suddenly appears to fit as you are drawing the hierarchy.

When you are completely done with Hierarchy A, please turn the page. The same word list and blocks will appear. If you find a second hierarchy, please draw it in the space marked "Draw Hierarchy B."

Please remember that, for this exercise, it is important you create hierarchies that are obvious and meaningful to <u>you</u>, even if you think they might not seem obvious and meaningful to anyone else.

If the word is a part of HIERARCHY A, check this block:

clothes ☐

gifts ☐

money ☐

needs ☐

buying ☐

spending ☐

credit cards ☐

luxuries ☐

shopping ☐

bills ☐

wants ☐

food ☐

<u>DRAW HIERARCHY A</u>

Just as on the previous page, below you will find a list of words and phrases. Please read the list carefully and consider the relationships that may exist between the words. Do any of the words form "overall" categories or major categories that can be divided into other, more specific words? Next to each word you will find a block. Mark the blocks next to the words that you think are hierarchically related--like the travel words in the example were hierarchically related.

In your two hierarchies, you may use any of the words once, more than once, or not at all, so it's okay to use words that you used on in Hierarchy A.

Using the words for which you have checked the blocks, draw the hierarchy that these words form in the space marked "Draw Hierarchy B." Please draw the hierarchy in a manner similar to the picture of the travel example, although there can be more than two divisions for any word; that was just an example. It is okay to make mistakes and start over. It is okay to make cross-outs if you discover that a word you originally thought was related, doesn't work. It is okay to not use all the words you checked, or to add a word from the list that suddenly appears to fit as you are drawing the hierarchy.

Please remember that, for this exercise, it is important you create hierarchies that are obvious and meaningful to <u>you</u>, even if you think they might not seem obvious and meaningful to anyone else.

If the word is a part of HIERARCHY B, check this block:

☐ clothes

☐ gifts

☐ money

☐ needs

☐ buying

☐ spending

☐ credit cards

☐ luxuries

☐ shopping

☐ bills

☐ wants

☐ food

<u>DRAW HIERARCHY B</u>

Appendix E

Pilot Study 2C Questionnaire

Course: __________ Section: __________ Starting Time: __________ Gender: __________

Questionnaire PS2

Constructing Hierarchies

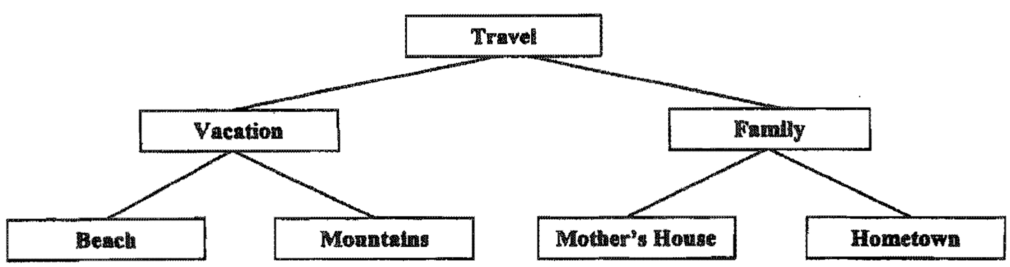
INSTRUCTIONS

Today we are interested in how people organize words into hierarchies.

A **hierarchy** is a group of words that are ranked some above others, usually from the most general word to the most specific. At the very top of the hierarchy is one overall word into which all of the other words of the hierarchy fall. Underneath the overall, or most abstract, word are two or more major words into which the overall word can be logically divided based on some criterion. Each of these major words are then further divided into more specific words, and so on.

Here is an example of one way in which a respondent in another study arranged some sample words into a hierarchy. *Note that, depending on the meaning of these words to you, you might find other, different hierarchies in these words, or no hierarchy at all.*

Words: beach, mother's house, mountains, cousins, hometown, vacation, travel, family, ski

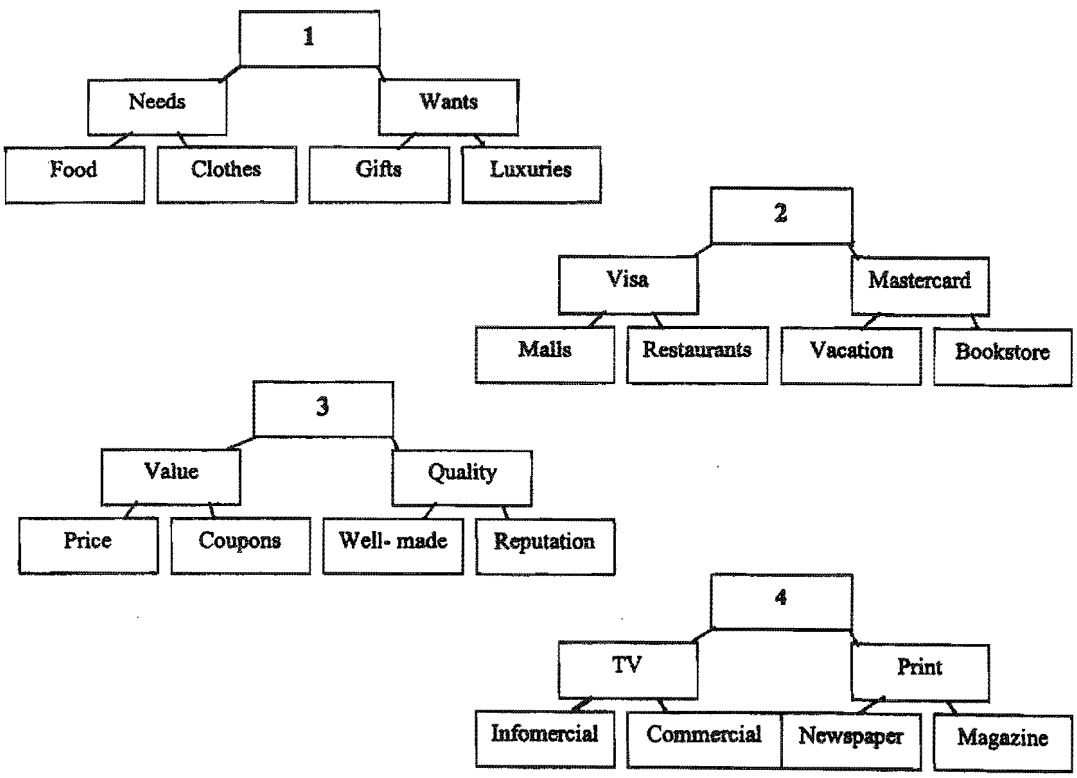


In this example, the respondent felt that, given the word list, the word "travel" could be divided by types of travel purposes: Travel to take a vacation, and Travel to visit family (note that this means the respondent generally didn't think of visiting family as a vacation). The respondent then felt that each of those major word categories could be further divided by where she would go to do the travel: For a vacation, she could go to the beach or the mountains; For travel to visit family, she could go to her mother's house or to her hometown. The respondent did not consider her mother's house or her hometown as places she would go to take a vacation and, similarly, she did not consider the beach or the mountains as places she would go to visit family. You might have noticed that this respondent did not use the words "cousins" or "ski" in her hierarchy. This is because she did not find them to fit into this particular hierarchy with these particular divisions.

Are there any questions?

Choosing from the list of words in the box, please complete the hierarchies shown below. Please remember that, for this exercise, it is important you create hierarchies that are obvious and meaningful to <u>you</u>, even if you think they might not seem obvious and meaningful to anyone else. You may use any of the words once, more than once, or not at all.

SPENDING	MONEY	SHOPPING	CREDIT CARDS
MARKETING	TRANSACTIONS	PROMOTION	RETAIL
BRAND	ADVERTISING	DOLLARS	PRODUCT SELECTION



1. ______________________________

2. ______________________________

3. ______________________________

4. ______________________________

Appendix F

Pilot Study 2D Questionnaire

Course: __________ Section: __________ Starting Time: __________ Gender: __________

Questionnaire PS2

Constructing Hierarchies

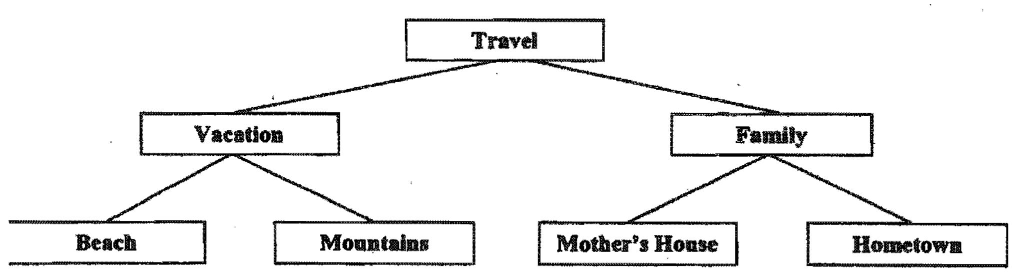
INSTRUCTIONS

Today we are interested in how people organize words into hierarchies.

A **hierarchy** is a group of words that are ranked some above others, usually from the most general word to the most specific. At the very top of the hierarchy is one overall word into which all of the other words of the hierarchy fall. Underneath the overall, or most abstract, word are two or more major words into which the overall word can be logically divided based on some criterion. Each of these major words are then further divided into more specific words, and so on.

Here is an example of one way in which a respondent in another study arranged some sample words into a hierarchy. *Note that, depending on the meaning of these words to you, you might find other, different hierarchies in these words, or no hierarchy at all.*

Words: beach, mother's house, mountains, cousins, hometown, vacation, travel, family, ski



In this example, the respondent felt that, given the word list, the word "travel" could be divided by types of travel purposes: Travel to take a vacation, and Travel to visit family (note that this means the respondent generally didn't think of visiting family as a vacation). The respondent then felt that each of those major word categories could be further divided by where she would go to do the travel: For a vacation, she could go to the beach or the mountains; For travel to visit family, she could go to her mother's house or to her hometown. The respondent did not consider her mother's house or her hometown as places she would go to take a vacation and, similarly, she did not consider the beach or the mountains as places she would go to visit family. You might have noticed that this respondent did not use the words "cousins" or "ski" in her hierarchy. This is because she did not find them to fit into this particular hierarchy with these particular divisions.

Are there any questions?

Below you will find a list of words and phrases. Please read the list carefully and consider the relationships that may exist between the concepts. Do any of the words form "overall" categories or major categories that can be divided into other, more specific words?

Next to each word you will find a block. When you first consider the list, mark the blocks next to the words that you think are hierarchically related--like the travel words in the example were hierarchically related. You might find that you can divide the word list in many ways, into many hierarchies. If you find yourself considering a second hierarchy among the words, you will be able to make another, different hierarchy on the next page. For now, please focus on the organization of the first hierarchy.

In your two hierarchies, you may use any of the words once, more than once, or not at all, so don't "save" any words to use on your second hierarchy on the next page.

Using the words for which you have checked the blocks, draw the hierarchy that these words form in the space marked "Draw Hierarchy A." Please draw the hierarchy in a manner similar to the picture of the travel example, although there can be more than two divisions for any word; that was just an example. It is okay to make mistakes and start over. It is okay to make cross-outs if you discover that a word you originally thought was related, now doesn't work. It is okay to not use all the words you checked, or to add a word from the list that suddenly appears to fit as you are drawing the hierarchy.

When you are completely done with Hierarchy A, please turn the page. The same word list and blocks will appear. If you find a second hierarchy, please draw it in the space marked "Draw Hierarchy B."

Please remember that, for this exercise, it is important you create hierarchies that are obvious and meaningful to you, even if you think they might not seem obvious and meaningful to anyone else.

If the word is a part of HIERARCHY A, check this block:

- monkeys ☐
- lizards ☐
- fish ☐
- mammals ☐
- pets ☐
- snakes ☐
- animals ☐
- zoos ☐
- reptiles ☐
- dogs ☐

DRAW HIERARCHY A

Just as on the previous page, below you will find a list of words and phrases. Please read the list carefully and consider the relationships that may exist between the words. Do any of the words form "overall" categories or major categories that can be divided into other, more specific words? Next to each word you will find a block. Mark the blocks next to the words that you think are hierarchically related--like the travel words in the example were hierarchically related.

In your two hierarchies, you may use any of the words once, more than once, or not at all, so it's okay to use words that you used on in Hierarchy A.

Using the words for which you have checked the blocks, draw the hierarchy that these words form in the space marked "Draw Hierarchy B." Please draw the hierarchy in a manner similar to the picture of the travel example, although there can be more than two divisions for any word; that was just an example. It is okay to make mistakes and start over. It is okay to make cross-outs if you discover that a word you originally thought was related, doesn't work. It is okay to not use all the words you checked, or to add a word from the list that suddenly appears to fit as you are drawing the hierarchy.

Please remember that, for this exercise, it is important you create hierarchies that are obvious and meaningful to you, even if you think they might not seem obvious and meaningful to anyone else.

If the word is a part of HIERARCHY B, check this block:

- ☐ monkeys
- ☐ lizards
- ☐ fish
- ☐ mammals
- ☐ pets
- ☐ snakes
- ☐ animals
- ☐ zoos
- ☐ reptiles
- ☐ dogs

DRAW HIERARCHY B

Appendix G

Pilot Study 3 Questionnaires

Course: __________ Section: __________ Starting Time: __________ Gender: __________

<u>Questionnaire PS3</u>

<u>Paired-Comparison Judgments</u>

For each word or phrase pair listed below, please use a number to estimate how closely related the two words or phases are to each other. The more **different** the concepts seem to be, the **larger the number** you should write; the more **similar** the concepts seem to be, the **smaller the number** you should write. Use the following comparison as a reference, to give you an idea of the amount of difference your numbers represent:

Red and White are 100 Units apart.

So, if two words or phrases are **not different at all**, you would write **zero** (0). If two words or phrases are, for example, **three times as different** as compared with the difference between the concepts "Red" and "White," you would write **300**. If two words or phrases are, for example, **half as different** than "Red" and "White" are from each other, you would write **50**. If two words or phrases are, for example, **about the same** as "Red" and "White" are from each other you would write **100**. There are no limits to how large a number can be, but it cannot be lower than zero. Remember that every 100 units of difference between the concepts is the same as the difference that you perceive between "Red" and "White." <u>Please answer all of the questions, even though they may seem difficult or unusual.</u>

This example might help you:

Q: How far apart are breakfast and omelets?

To answer this question, you might consider how much breakfast and omelets are different (or the same) WITH RESPECT TO YOU, not to anyone else. Then, to determine a numerical value for this difference, you should think about how different "Red" and "White" are to you. There is no "right" answer. Are breakfast and omelets *more different* than Red and White, *or less different*, and by what degree? One individual in a previous study has indicated that if the difference between Red and White is 100, then the difference between breakfast and omelets is about *one-tenth as much*, or about 10 . . . but your value would depend completely on your own views.

<u>Practice Items</u>

How far apart are

Red and **White?** __________

Breakfast and **Omelet?** __________

Red and White are 100 units apart.

How far apart are . . .

1. **Clothes and Needs?** __________
2. **Clothes and Wants?** __________
3. **Clothes and Food?** __________
4. **Clothes and Gifts?** __________
5. **Clothes and Luxuries?** __________
6. **Clothes and Shopping?** __________
7. **Clothes and Things I Like?** __________
8. **Clothes and Good?** __________
9. **Needs and Wants?** __________
10. **Needs and Food?** __________
11. **Needs and Gifts?** __________
12. **Needs and Luxuries?** __________
13. **Needs and Shopping?** __________
14. **Needs and Things I Like?** __________
15. **Needs and Good?** __________
16. **Wants and Food?** __________
17. **Wants and Gifts?** __________
18. **Wants and Luxuries?** __________
19. **Wants and Shopping?** __________
20. **Wants and Things I Like?** __________
21. **Wants and Good?** __________

Red and White are 100 units apart.

How far apart are . . .

22. **Food** and **Gifts?** __________

23. **Food** and **Luxuries?** __________

24. **Food** and **Shopping?** __________

25. **Food** and **Things I Like?** __________

26. **Food** and **Good?** __________

27. **Gifts** and **Luxuries?** __________

28. **Gifts** and **Shopping?** __________

29. **Gifts** and **Things I Like?** __________

30. **Gifts** and **Good?** __________

31. **Luxuries** and **Shopping?** __________

32. **Luxuries** and **Things I Like?** __________

33. **Luxuries** and **Good?** __________

34. **Shopping** and **Things I Like?** __________

35. **Shopping** and **Good?** __________

36. **Things I Like** and **Good?** __________

Course: __________ Section: __________ Starting Time: __________ Gender: __________

Questionnaire PS3A

Paired-Comparison Judgments

For each word or phrase pair listed below, please use a number to estimate how closely related the two words or phases are to each other. The more **different** the concepts seem to be, the **larger the number** you should write; the more **similar** the concepts seem to be, the **smaller the number** you should write. Use the following comparison as a reference, to give you an idea of the amount of difference your numbers represent:

Red and White are 100 Units apart.

So, if two words or phrases are **not different at all**, you would write **zero** (0). If two words or phrases are, for example, **three times as different** as compared with the difference between the concepts "Red" and "White," you would write **300**. If two words or phrases are, for example, **half as different** than "Red" and "White" are from each other, you would write **50**. If two words or phrases are, for example, **about the same** as "Red" and "White" are from each other you would write **100**. There are no limits to how large a number can be, but it cannot be lower than zero. Remember that every 100 units of difference between the concepts is the same as the difference that you perceive between "Red" and "White." Please answer all of the questions, even though they may seem difficult or unusual.

This example might help you:

Q: How far apart are breakfast and omelets?

To answer this question, you might consider how much breakfast and omelets are different (or the same) WITH RESPECT TO YOU, not to anyone else. Then, to determine a numerical value for this difference, you should think about how different "Red" and "White" are to you. There is no "right" answer. Are breakfast and omelets *more different* than Red and White, *or less different*, and by what degree? One individual in a previous study has indicated that if the difference between Red and White is 100, then the difference between breakfast and omelets is about *one-tenth as much*, or about 10 . . . but your value would depend completely on your own views.

Practice Items

How far apart are

Red and **White?** __________

Breakfast and **Omelet?** __________

Red and White are 100 units apart.

How far apart are . . .

1. **Snakes** and **Reptiles?** __________
2. **Snakes** and **Mammals?** __________
3. **Snakes** and **Lizards?** __________
4. **Snakes** and **Dogs?** __________
5. **Snakes** and **Monkeys?** __________
6. **Snakes** and **Animals?** __________
7. **Snakes** and **Things I Like?** __________
8. **Snakes** and **Good?** __________
9. **Reptiles** and **Mammals?** __________
10. **Reptiles** and **Lizards?** __________
11. **Reptiles** and **Dogs?** __________
12. **Reptiles** and **Monkeys?** __________
13. **Reptiles** and **Animals?** __________
14. **Reptiles** and **Things I Like?** __________
15. **Reptiles** and **Good?** __________
16. **Mammals** and **Lizards?** __________
17. **Mammals** and **Dogs?** __________
18. **Mammals** and **Monkeys?** __________
19. **Mammals** and **Animals?** __________
20. **Mammals** and **Things I Like?** __________
21. **Mammals** and **Good?** __________

Red and White are 100 units apart.

How far apart are . . .

22. **Lizards** and **Dogs?** __________
23. **Lizards** and **Monkeys?** __________
24. **Lizards** and **Animals?** __________
25. **Lizards** and **Things I Like?** __________
26. **Lizards** and **Good?** __________
27. **Dogs** and **Monkeys?** __________
28. **Dogs** and **Animals?** __________
29. **Dogs** and **Things I Like?** __________
30. **Dogs** and **Good?** __________
31. **Monkeys** and **Animals?** __________
32. **Monkeys** and **Things I Like?** __________
33. **Monkeys** and **Good?** __________
34. **Animals** and **Things I Like?** __________
35. **Animals** and **Good?** __________
36. **Things I Like** and **Good?** __________

Appendix H

Pilot Study 4A Questionnaire

Course: __________ Section: __________ Starting Time: __________ Gender: _____

Questionnaire PS4

Determining the "Goodness" of Concepts

This questionnaire has two parts. In part one, you will be asked to list all of the reasons why a concept is good. For example, you might be asked, "List all of the reasons why SCHOOL is good." Please write all of the reasons that you think might be generated for why the concept is good, even if you personally don't find the concept particularly good.

Do not proceed to part two until you are instructed.

In part two, you will be asked to rate the goodness of various words and phrases. For example, you might be asked to determine the goodness of the idea that "School increases your knowledge."

Please answer all of the questions even though they may seem difficult or unusual.

Thank you for your participation.

PART I - Please DO NOT move on to Part II until you are instructed to do so.

1. List all the reasons why SHOPPING is good:

2. List all the reasons why CLOTHES are good:

3. List all the reasons why FOOD is good:

PART II

Paired-Comparison Judgments

For each word or phrase pair listed below, please use a number to estimate how closely related the two words or phases are to each other. The more **different** the concepts seem to be, the **larger the number** you should write; the more **similar** the concepts seem to be, the **smaller the number** you should write. Use the following comparison as a reference, to give you an idea of the amount of difference your numbers represent:

Snakes and Lizards are *moderately* different from each other. Consider for a moment how you compare snakes and lizards, and how closely related you consider the words to be...We are going to say these words are **100 units apart**. All of your responses on this questionnaire will be comparisons based on the distance that YOU consider exists between the words snakes and lizards, and this distance will be called 100 units.

So, if two words or phrases are **not different at all**, you would write **zero** (0). The terms "Snakes" and "Rattlers" might be 0 units apart to some people.

If two words or phrases are, for example, **three times as different** as compared with the difference between the concepts "Snakes" and "Lizards," you would write **300**. The terms "Breakfast" and "Hot Dogs" might be 300 units apart to some people

If two words or phrases are, for example, **half as different** than "Snakes" and "Lizards" are from each other, you would write **50.** The terms "Flowers" and "Bees" might be 50 units apart to some people.

There are no limits to how large a number can be, but it cannot be lower than zero. Remember that every 100 units of difference between the concepts is the same as the difference that you perceive between "Snakes" and "Lizards." <u>Please answer all of the questions, even though they may seem difficult or unusual.</u>

Please consider each of the following comparisons very carefully, and make your responses are precise as possible.

Snakes and Lizards are 100 units apart, which is a moderate distance.

How far apart do you find . . .

1. **"Getting something new"** and **Good?** __________
2. **"A Unique Identity"** and **Good?** __________
3. **"Nutritional nourishment"** and **Good?** __________
4. **"Promoting the economy"** and **Good?** __________
5. **"Looking nice"** and **Good?** __________
6. **"Tasty food"** and **Good?** __________
7. **"Feeling positive about yourself"** and **Good?** __________
8. **"Keeping warm"** and **Good?** __________
9. **"Community building"** and **Good?** __________
10. **"Clothes keep you from being naked"** and **Good?** __________
11. **"Animal companionship"** and **Good?** __________
12. **"Cute animals"** and **Good?** __________
13. **"Cuddly animals"** and **Good?** __________
14. **"Vibrant ecosystem"** and **Good?** __________
15. **"Animals teach us about ourselves"** and **Good?** __________
16. **"Monkeys are fun to watch"** and **Good?** __________
17. **"Dogs are loyal"** and **Good?** __________
18. **"Animals provide us with food"** and **Good?** __________
19. **"Animals provide us with clothing"** and **Good?** __________
20. **"All life, even animals, is sacred"** and **Good?** __________

Appendix I

Pilot Study 4B (Message A) Questionnaires

Course: __________ Section: __________ Starting Time: __________ Gender: __________

Questionnaire PS4

Understanding Messages

PART ONE. Please read the following passage carefully. At the end of the passage, please answer the questions that follow.

*****

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have examined the mental health of college students and found that as many as half of all students suffer from low levels of self-esteem. This is a critical finding because decreased levels of self-esteem can negatively affect academic performance, and can contribute to campus problems such as alcohol misuse and abuse. Conversely, increased levels of self-esteem are related to improved academic performance and better health. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of students, and studied some of the many methods that students have reported using to improve the way they feel about themselves. Interestingly, a number of students have reported that shopping can represent an excellent source of a type of pleasure that has been shown to directly increase self-esteem. According to Zimmer et al., "*Shopping is good;* shopping provides some individuals with a small amount of comfort that they use to support overall well-being" (p. 199).

*****

For the following statements, please indicate the number that best represents your agreement with the statement, based upon the passage you just read.

	I don't agree at all						**I agree very much**
While I was reading the passage,							
1. I could easily understand the concepts.	1	2	3	4	5	6	7
2. I found the statements to be believable.	1	2	3	4	5	6	7
3. I thought about how this information might relate to my own life.	1	2	3	4	5	6	7
4. I thought about my own levels of self-esteem	1	2	3	4	5	6	7
5. I agreed that shopping is good.	1	2	3	4	5	6	7

While I was reading the passage,	Not at All						Very Much
6. I easily understood the language used in the passage.	1	2	3	4	5	6	7
7. I questioned the accuracy of the Zimmer et al. study results.	1	2	3	4	5	6	7
8. I thought that shopping could make me feel good, too.	1	2	3	4	5	6	7
9. It seemed to me that I had heard some or all of this information before.	1	2	3	4	5	6	7
10. I thought the information in the passage could be true.	1	2	3	4	5	6	7
11. I thought about people I know who exhibit behaviors that could result from low self-esteem.	1	2	3	4	5	6	7
12. I thought about my own shopping experiences.	1	2	3	4	5	6	7
In general,							
13. Compared to other academic readings that I have done, this passage was difficult.	1	2	3	4	5	6	7
14. I believe the finding that shopping can be related to self-esteem	1	2	3	4	5	6	7
15. Right now, I can still remember the main points of the passage without looking back.	1	2	3	4	5	6	7

The three main points are:

1. ______________________________

2. ______________________________

3. ______________________________

PART TWO. People differ in the amount of exposure they have to concepts and ideas. Think for a moment about how often you encounter the concept of **shopping**, and then answer the following questions.

1. In the last month, how many times do you recall . . .

Talking about **shopping?**	__________
Reading about **shopping?**	__________
Seeing on television a program with an emphasis on **shopping?**	__________
Going **shopping** yourself?	__________

2. People also differ in how much they know about things, regardless of their exposure. Compared to the average University of Maryland undergraduate student here at College Park, how much would you say **you know about shopping?**

To answer this question, call the amount that the average University of Maryland undergraduate student knows about shopping 100. If you know about **twice** as much as the average student, you would rate your knowledge to be **200**; if you know about **half as much,** you would rate your knowledge to be **50**. You can use any number greater than zero to rate your knowledge about shopping.

Compared to the average University of Maryland undergraduate student, I rate the amount of knowledge I have about **shopping** to be __________.

PLEASE TURN THE PAGE.

3. People differ in how they link together different concepts. Think of things that you believe are associated with **shopping**.

First, list words that you associate with ***shopping***. Then, next to each word write a number that indicates how closely linked the word is with ***shopping***. If the word is **very closely** linked to ***shopping***, write a small number (i.e., smaller numbers = more closely linked). If the word is **very loosely** related to ***shopping***, write a large number (i.e., larger numbers = more distantly linked). To guide your responses, consider the distance of **100** be represent a "medium" distance, or moderate linkage. Like your responses in question #2, if the word is **twice as far as a "medium" distance**, you would call that linkage **200**; if the word is **half as far as a "medium" distance**, you would call that linkage **50**. And, again, you can use any number greater than 0.

<u>WORD</u>	<u>AMOUNT LINKED</u>

4. Finally, estimate the <u>total</u> number of words that you think you probably know which are associated with **shopping**. Please consider your response without regard to the number of words that you have listed above. __________

Course: __________ Section: __________ Starting Time: __________ Gender: __________

Questionnaire PS4-A

Understanding Messages

PART ONE. Please read the following passage carefully. At the end of the passage, please answer the questions that follow.

*****

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have examined the mental health of college students and found that as many as half of all students suffer from low levels of self-esteem. This is a critical finding because decreased levels of self-esteem can negatively affect academic performance, and can contribute to campus problems such as alcohol misuse and abuse. Conversely, increased levels of self-esteem are related to improved academic performance and better health. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of students, and studied some of the many methods that students have reported using to improve the way they feel about themselves. Interestingly, a number of students have reported that one's clothes can represent an excellent source of a type of pleasure that has been shown to directly increase self-esteem. According to Zimmer et al., "*Clothes are good;* clothes provide some individuals with a small amount of comfort that they use to support overall well-being" (p. 199).

*****

For the following statements, please indicate the number that best represents your agreement with the statement, based upon the passage you just read.

	I don't agree at all						**I agree very much**
While I was reading the passage,							
1. I could easily understand the concepts.	1	2	3	4	5	6	7
2. I found the statements to be believable.	1	2	3	4	5	6	7
3. I thought about how this information might relate to my own life.	1	2	3	4	5	6	7
4. I thought about my own levels of self-esteem	1	2	3	4	5	6	7
5. I agreed that clothes are good.	1	2	3	4	5	6	7

While I was reading the passage,	**Not at All**						**Very Much**
6. I easily understood the language used in the passage.	1	2	3	4	5	6	7
7. I questioned the accuracy of the Zimmer et al. study results.	1	2	3	4	5	6	7
8. I thought that clothes could make me feel good, too.	1	2	3	4	5	6	7
9. It seemed to me that I had heard some or all of this information before.	1	2	3	4	5	6	7
10. I thought the information in the passage could be true.	1	2	3	4	5	6	7
11. I thought about people I know who exhibit behaviors that could result from low self-esteem.	1	2	3	4	5	6	7
12. I thought about my own clothes and how much I enjoy them.	1	2	3	4	5	6	7
In general,							
13. Compared to other academic readings that I have done, this passage was difficult.	1	2	3	4	5	6	7
14. I believe the finding that clothes can be related to self-esteem	1	2	3	4	5	6	7
15. Right now, I can still remember the main points of the passage without looking back.	1	2	3	4	5	6	7

The three main points are:

1. ____

2. ____

3. ____

PART TWO. People differ in the amount of exposure they have to concepts and ideas. Think for a moment about how often you encounter the concept of **clothes**, and then answer the following questions.

1. In the last month, how many times do you recall . . .

Talking about **clothes?** __________

Reading about **clothes?** __________

Seeing on television a program with an emphasis on **clothes?** __________

Buying **clothes?** __________

2. People also differ in how much they know about things, regardless of their exposure. Compared to the average University of Maryland undergraduate student here at College Park, how much would you say **you know about clothes?**

To answer this question, call the amount that the average University of Maryland undergraduate student knows about clothes "100." If you know about **twice** as much as the average student, you would rate your knowledge to be **200**; if you know about **half as much,** you would rate your knowledge to be **50**. You can use any number greater than zero to rate your knowledge about clothes.

Compared to the average University of Maryland undergraduate student, I rate the amount of knowledge I have about **clothes** to be __________.

PLEASE TURN THE PAGE.

3. People differ in how they link together different concepts. Think of things that you believe are associated with **clothes.**

First, list words that you associate with ***clothes***. Then, next to each word write a number that indicates how closely linked the word is with ***clothes***. If the word is **very closely** linked to ***clothes***, write a small number (i.e., smaller numbers = more closely linked). If the word is very **loosely** related to ***clothes***, write a large number (i.e., larger numbers = more distantly linked). To guide your responses, consider the distance of **100** be represent a "medium" distance, or moderate linkage. Like your responses in question #2, if the word is **twice as far as a "medium" distance**, you would call that linkage **200**; if the word is **half as far as a "medium" distance**, you would call that linkage **50.** And, again, you can use any number greater than 0.

WORD	AMOUNT LINKED

4. Finally, estimate the total number of words that you think you probably know which are associated with **clothes**. Please consider your response without regard to the number of words that you have listed above. __________

Course: __________ Section: __________ Starting Time: __________ Gender: __________

Questionnaire PS4-B

Understanding Messages

PART ONE. Please read the following passage carefully. At the end of the passage, please answer the questions that follow.

*****

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have examined the mental health of college students and found that as many as half of all students suffer from low levels of self-esteem. This is a critical finding because decreased levels of self-esteem can negatively affect academic performance, and can contribute to campus problems such as alcohol misuse and abuse. Conversely, increased levels of self-esteem are related to improved academic performance and better health. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of students, and studied some of the many methods that students have reported using to improve the way they feel about themselves. Interestingly, a number of students have reported that eating food can represent an excellent source of a type of pleasure that has been shown to directly increase self-esteem. According to Zimmer et al., "*Food is good;* food provides some individuals with a small amount of comfort that they use to support overall well-being" (p. 199).

*****

For the following statements, please indicate the number that best represents your agreement with the statement, based upon the passage you just read.

	I don't agree at all						**I agree very much**
While I was reading the passage,							
1. I could easily understand the concepts.	1	2	3	4	5	6	7
2. I found the statements to be believable.	1	2	3	4	5	6	7
3. I thought about how this information might relate to my own life.	1	2	3	4	5	6	7
4. I thought about my own levels of self-esteem	1	2	3	4	5	6	7
5. I agreed that food is good.	1	2	3	4	5	6	7

While I was reading the passage,	Not at All						Very Much
6. I easily understood the language used in the passage.	1	2	3	4	5	6	7
7. I questioned the accuracy of the Zimmer et al. study results.	1	2	3	4	5	6	7
8. I thought that food could make me feel good, too.	1	2	3	4	5	6	7
9. It seemed to me that I had heard some or all of this information before.	1	2	3	4	5	6	7
10. I thought the information in the passage could be true.	1	2	3	4	5	6	7
11. I thought about people I know who exhibit behaviors that could result from low self-esteem.	1	2	3	4	5	6	7
12. I thought about the food that I eat and how much I enjoy it.	1	2	3	4	5	6	7
In general,							
13. Compared to other academic readings that I have done, this passage was difficult.	1	2	3	4	5	6	7
14. I believe the finding that food can be related to self-esteem	1	2	3	4	5	6	7
15. Right now, I can still remember the main points of the passage without looking back.	1	2	3	4	5	6	7

The three main points are:

1. ______________________________

2. ______________________________

3. ______________________________

PART TWO. People differ in the amount of exposure they have to concepts and ideas. Think for a moment about how often you encounter the concept of **food**, and then answer the following questions.

1. In the last month, how many times do you recall . . .

Talking about **food?** __________

Reading about **food?** __________

Seeing on television a program with an emphasis on **food?** __________

Enjoying **food** yourself? __________

2. People also differ in how much they know about things, regardless of their exposure. Compared to the average University of Maryland undergraduate student here at College Park, how much would you say **you know about food?**

To answer this question, call the amount that the average University of Maryland undergraduate student knows about food 100. If you know about **twice** as much as the average student, you would rate your knowledge to be **200**; if you know about **half as much,** you would rate your knowledge to be **50**. You can use any number greater than zero to rate your knowledge about food.

Compared to the average University of Maryland undergraduate student, I rate the amount of knowledge I have about **food** to be __________.

PLEASE TURN THE PAGE.

3. People differ in how they link together different concepts. Think of things that you believe are associated with **food**.

First, list words that you associate with ***food***. Then, next to each word write a number that indicates how closely linked the word is with ***food***. If the word is **very closely** linked to ***food***, write a small number (i.e., smaller numbers = more closely linked). If the word is **very loosely** related to ***food***, write a large number (i.e., larger numbers = more distantly linked). To guide your responses, consider the distance of **100** be represent a "medium" distance, or moderate linkage. Like your responses in question #2, if the word is **twice as far as a "medium" distance**, you would call that linkage **200**; if the word is **half as far as a "medium" distance**, you would call that linkage **50**. And, again, you can use any number greater than 0.

<u>WORD</u> <u>AMOUNT LINKED</u>

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4. Finally, estimate the <u>total</u> number of words that you think you probably know which are associated with **food**. Please consider your response without regard to the number of words that you have listed above. ________

Course: __________ Section: __________ Starting Time: __________ Gender: __________

Questionnaire PS4-C

Understanding Messages

PART ONE. Please read the following passage carefully. At the end of the passage, please answer the questions that follow.

*****

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have examined the mental health of college students and found that as many as half of all students suffer from low levels of self-esteem. This is a critical finding because decreased levels of self-esteem can negatively affect academic performance, and can contribute to campus problems such as alcohol misuse and abuse. Conversely, increased levels of self-esteem are related to improved academic performance and better health. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of students, and studied some of the many methods that students have reported using to improve the way they feel about themselves. Interestingly, a number of students have reported that animals can represent an excellent source of a type of pleasure that has been shown to directly increase self-esteem. According to Zimmer et al., "*Animals are good;* animals provide some individuals with a small amount of comfort that they use to support overall well-being" (p. 199).

*****

For the following statements, please indicate the number that best represents your agreement with the statement, based upon the passage you just read.

	I don't agree at all						**I agree very much**
While I was reading the passage,							
1. I could easily understand the concepts.	1	2	3	4	5	6	7
2. I found the statements to be believable.	1	2	3	4	5	6	7
3. I thought about how this information might relate to my own life.	1	2	3	4	5	6	7
4. I thought about my own levels of self-esteem	1	2	3	4	5	6	7
5. I agreed that animals are good.	1	2	3	4	5	6	7

While I was reading the passage,	**Not at All**						**Very Much**
6. I easily understood the language used in the passage.	1	2	3	4	5	6	7
7. I questioned the accuracy of the Zimmer et al. study results.	1	2	3	4	5	6	7
8. I thought that animals could make me feel good, too.	1	2	3	4	5	6	7
9. It seemed to me that I had heard some or all of this information before.	1	2	3	4	5	6	7
10. I thought the information in the passage could be true.	1	2	3	4	5	6	7
11. I thought about people I know who exhibit behaviors that could result from low self-esteem.	1	2	3	4	5	6	7
12. I thought about my own experiences with animals and how much I enjoyed them.	1	2	3	4	5	6	7
In general,							
13. Compared to other academic readings that I have done, this passage was difficult.	1	2	3	4	5	6	7
14. I believe the finding that animals can be related to self-esteem	1	2	3	4	5	6	7
15. Right now, I can still remember the main points of the passage without looking back.	1	2	3	4	5	6	7

The three main points are:

1. ______________________________

2. ______________________________

3. ______________________________

PART TWO. People differ in the amount of exposure they have to concepts and ideas. Think for a moment about how often you encounter the concept of **animals**, and then answer the following questions.

1. In the last month, how many times do you recall . . .

Talking about **animals**? __________

Reading about **animals**? __________

Seeing on television a program with an emphasis on **animals**? __________

Encountering **animals** yourself? __________

2. People also differ in how much they know about things, regardless of their exposure. Compared to the average University of Maryland undergraduate student here at College Park, how much would you say **you know about animals?**

To answer this question, call the amount that the average University of Maryland undergraduate student knows about animals "100." If you know about **twice** as much as the average student, you would rate your knowledge to be **200**; if you know about **half as much,** you would rate your knowledge to be **50**. You can use any number greater than zero to rate your knowledge about animals.

Compared to the average University of Maryland undergraduate student, I rate the amount of knowledge I have about **animals** to be __________.

PLEASE TURN THE PAGE.

3. People differ in how they link together different concepts. Think of things that you believe are associated with **animals**.

First, list words that you associate with ***animals***. Then, next to each word write a number that indicates how closely linked the word is with ***animals***. If the word is **very closely** linked to ***animals***, write a small number (i.e., smaller numbers = more closely linked). If the word is **very loosely** related to ***animals***, write a large number (i.e., larger numbers = more distantly linked). To guide your responses, consider the distance of **100** be represent a "medium" distance, or moderate linkage. Like your responses in question #2, if the word is **twice as far as a "medium" distance**, you would call that linkage **200**; if the word is **half as far as a "medium" distance**, you would call that linkage **50**. And, again, you can use any number greater than 0.

<u>WORD</u> <u>AMOUNT LINKED</u>

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4. Finally, estimate the <u>total</u> number of words that you think you probably know which are associated with **animals**. Please consider your response without regard to the number of words that you have listed above. __________

Course: __________ Section: __________ Starting Time: __________ Gender: __________

Questionnaire PS4-D

Understanding Messages

PART ONE. Please read the following passage carefully. At the end of the passage, please answer the questions that follow.

*****

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have examined the mental health of college students and found that as many as half of all students suffer from low levels of self-esteem. This is a critical finding because decreased levels of self-esteem can negatively affect academic performance, and can contribute to campus problems such as alcohol misuse and abuse. Conversely, increased levels of self-esteem are related to improved academic performance and better health. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of students, and studied some of the many methods that students have reported using to improve the way they feel about themselves. Interestingly, a number of students have reported that dogs can represent an excellent source of a type of pleasure that has been shown to directly increase self-esteem. According to Zimmer et al., "*Dogs are good;* dogs provide some individuals with a small amount of comfort that they use to support overall well-being" (p. 199).

*****

For the following statements, please indicate the number that best represents your agreement with the statement, based upon the passage you just read.

	I don't agree at all						**I agree very much**
While I was reading the passage,							
1. I could easily understand the concepts.	1	2	3	4	5	6	7
2. I found the statements to be believable.	1	2	3	4	5	6	7
3. I thought about how this information might relate to my own life.	1	2	3	4	5	6	7
4. I thought about my own levels of self-esteem	1	2	3	4	5	6	7
5. I agreed that dogs are good.	1	2	3	4	5	6	7

While I was reading the passage,	**Not at All**						**Very Much**
6. I easily understood the language used in the passage.	1	2	3	4	5	6	7
7. I questioned the accuracy of the Zimmer et al. study results.	1	2	3	4	5	6	7
8. I thought that dogs could make me feel good, too.	1	2	3	4	5	6	7
9. It seemed to me that I had heard some or all of this information before.	1	2	3	4	5	6	7
10. I thought the information in the passage could be true.	1	2	3	4	5	6	7
11. I thought about people I know who exhibit behaviors that could result from low self-esteem.	1	2	3	4	5	6	7
12. I thought about my own experiences with dogs and how much I enjoyed them.	1	2	3	4	5	6	7
In general,							
13. Compared to other academic readings that I have done, this passage was difficult.	1	2	3	4	5	6	7
14. I believe the finding that dogs can be related to self-esteem	1	2	3	4	5	6	7
15. Right now, I can still remember the main points of the passage without looking back.	1	2	3	4	5	6	7

The three main points are:

1. ____

2. ____

3. ____

PART TWO. People differ in the amount of exposure they have to concepts and ideas. Think for a moment about how often you encounter the concept of **dogs**, and then answer the following questions.

1. In the last month, how many times do you recall . . .

   Talking about **dogs?** __________

   Reading about **dogs?** __________

   Seeing on television a program with an emphasis on **dogs?** __________

   Encountering **dogs** yourself? __________

2. People also differ in how much they know about things, regardless of their exposure. Compared to the average University of Maryland undergraduate student here at College Park, how much would you say **you know about dogs?**

To answer this question, call the amount that the average University of Maryland undergraduate student knows about dogs "100." If you know about **twice** as much as the average student, you would rate your knowledge to be **200**; if you know about **half as much,** you would rate your knowledge to be **50**. You can use any number greater than zero to rate your knowledge about dogs.

Compared to the average University of Maryland undergraduate student, I rate the amount of knowledge I have about **dogs** to be __________.

PLEASE TURN THE PAGE.

3. People differ in how they link together different concepts. Think of things that you believe are associated with **dogs**.

First, list words that you associate with ***dogs***. Then, next to each word write a number that indicates how closely linked the word is with ***dogs***. If the word is **very closely** linked to ***dogs***, write a small number (i.e., smaller numbers = more closely linked). If the word is **very loosely** related to ***dogs***, write a large number (i.e., larger numbers = more distantly linked). To guide your responses, consider the distance of **100** be represent a "medium" distance, or moderate linkage. Like your responses in question #2, if the word is **twice as far as a "medium" distance**, you would call that linkage **200**; if the word is **half as far as a "medium" distance**, you would call that linkage **50**. And, again, you can use any number greater than 0.

<u>WORD</u>	<u>AMOUNT LINKED</u>

4. Finally, estimate the <u>total</u> number of words that you think you probably know which are associated with **dogs**. Please consider your response without regard to the number of words that you have listed above. __________

Course: __________ Section: __________ Starting Time: __________ Gender: __________

Questionnaire PS4-E

Understanding Messages

PART ONE. Please read the following passage carefully. At the end of the passage, please answer the questions that follow.

*****

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have examined the mental health of college students and found that as many as half of all students suffer from low levels of self-esteem. This is a critical finding because decreased levels of self-esteem can negatively affect academic performance, and can contribute to campus problems such as alcohol misuse and abuse. Conversely, increased levels of self-esteem are related to improved academic performance and better health. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of students, and studied some of the many methods that students have reported using to improve the way they feel about themselves. Interestingly, a number of students have reported that watching monkeys can represent an excellent source of a type of pleasure that has been shown to directly increase self-esteem. According to Zimmer et al., "*Monkeys are good;* monkeys provide some individuals with a small amount of comfort that they use to support overall well-being" (p. 199).

*****

For the following statements, please indicate the number that best represents your agreement with the statement, based upon the passage you just read.

	I don't agree at all						**I agree very much**
While I was reading the passage,							
1. I could easily understand the concepts.	1	2	3	4	5	6	7
2. I found the statements to be believable.	1	2	3	4	5	6	7
3. I thought about how this information might relate to my own life.	1	2	3	4	5	6	7
4. I thought about my own levels of self-esteem	1	2	3	4	5	6	7
5. I agreed that monkeys are good.	1	2	3	4	5	6	7

While I was reading the passage,	**Not at All**						**Very Much**
6. I easily understood the language used in the passage.	1	2	3	4	5	6	7
7. I questioned the accuracy of the Zimmer et al. study results.	1	2	3	4	5	6	7
8. I thought that monkeys could make me feel good, too.	1	2	3	4	5	6	7
9. It seemed to me that I had heard some or all of this information before.	1	2	3	4	5	6	7
10. I thought the information in the passage could be true.	1	2	3	4	5	6	7
11. I thought about people I know who exhibit behaviors that could result from low self-esteem.	1	2	3	4	5	6	7
12. I thought about my own experiences watching monkeys and how much I enjoyed them.	1	2	3	4	5	6	7
In general,							
13. Compared to other academic readings that I have done, this passage was difficult.	1	2	3	4	5	6	7
14. I believe the finding that monkeys can be related to self-esteem	1	2	3	4	5	6	7
15. Right now, I can still remember the main points of the passage without looking back.	1	2	3	4	5	6	7

The three main points are:

1. ______________________________________

2. ______________________________________

3. ______________________________________

PART TWO. People differ in the amount of exposure they have to concepts and ideas. Think for a moment about how often you encounter the concept of **monkeys**, and then answer the following questions.

1. In the last month, how many times do you recall . . .

Talking about **monkeys?** __________

Reading about **monkeys?** __________

Seeing on television a program with an emphasis on **monkeys?** __________

Encountering **monkeys** yourself? __________

2. People also differ in how much they know about things, regardless of their exposure. Compared to the average University of Maryland undergraduate student here at College Park, how much would you say **you know about monkeys?**

To answer this question, call the amount that the average University of Maryland undergraduate student knows about monkeys "100." If you know about **twice** as much as the average student, you would rate your knowledge to be **200**; if you know about **half as much,** you would rate your knowledge to be **50.** You can use any number greater than zero to rate your knowledge about monkeys.

Compared to the average University of Maryland undergraduate student, I rate the amount of knowledge I have about **monkeys** to be __________.

PLEASE TURN THE PAGE.

3. People differ in how they link together different concepts. Think of things that you believe are associated with **monkeys**.

First, list words that you associate with ***monkeys***. Then, next to each word write a number that indicates how closely linked the word is with ***monkeys***. If the word is **very closely** linked to ***monkeys***, write a small number (i.e., smaller numbers = more closely linked). If the word is **very loosely** related to ***monkeys***, write a large number (i.e., larger numbers = more distantly linked). To guide your responses, consider the distance of **100** be represent a "medium" distance, or moderate linkage. Like your responses in question #2, if the word is **twice as far as a "medium" distance**, you would call that linkage **200**; if the word is **half as far as a "medium" distance**, you would call that linkage **50**. And, again, you can use any number greater than 0.

<u>WORD</u>	<u>AMOUNT LINKED</u>

4. Finally, estimate the <u>total</u> number of words that you think you probably know which are associated with **monkeys**. Please consider your response without regard to the number of words that you have listed above. ________

Appendix J

Pilot Study 4B (Message B) Questionnaires

Course: __________ Section: __________ Starting Time: __________ Gender: __________

Questionnaire PS4-2

Understanding Messages

PART ONE. Please read the following passage carefully. At the end of the passage, please answer the questions that follow.

*****

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have looked at a vast array of elements in our culture that are quietly beneficial to individuals and/or society. These cultural researchers have been searching particularly for ordinary objects and activities that are reported to have positive effects on people in unusual ways. This is important work because the homogenization of American society (i.e., society is becoming more and more the same, no matter where you go) threatens to eliminate small pockets of uniqueness that are sources of pleasure in people's lives. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of people all over the country, and across every socioeconomic boundary, about the objects and activities that bring them personal pleasure or that they believe to be beneficial to society in an uncommon way. Interestingly, quite a large number of people have reported that shopping is an activity that people find to be both personally and socially beneficial. According to Zimmer et al., "*Shopping is good;* many individuals are experiencing shopping as delivering both an immediate personal gain and bigger-picture social benefit." (p. 199).

*****

For the following statements, please indicate the number that best represents your agreement with the statement, based upon the passage you just read.

	I don't agree at all						**I agree very much**
While I was reading the passage,							
1. I could easily understand the concepts.	1	2	3	4	5	6	7
2. I found the statements to be believable.	1	2	3	4	5	6	7
3. I thought about how this information might relate to my own life.	1	2	3	4	5	6	7
4. I thought about my own sources of cultural uniqueness.	1	2	3	4	5	6	7
5. I agreed that shopping is good.	1	2	3	4	5	6	7

While I was reading the passage,	**Not at All**						**Very Much**
6. I easily understood the language used in the passage.	1	2	3	4	5	6	7
7. I questioned the accuracy of the Zimmer et al. study results.	1	2	3	4	5	6	7
8. I thought that shopping could make me feel good, too.	1	2	3	4	5	6	7
9. It seemed to me that I had heard some or all of this information before.	1	2	3	4	5	6	7
10. I thought the information in the passage could be true.	1	2	3	4	5	6	7
11. I thought about objects or activities that I know of, which seem to have disappeared.	1	2	3	4	5	6	7
12. I thought about my own shopping experiences.	1	2	3	4	5	6	7
In general,							
13. Compared to other academic readings that I have done, this passage was difficult.	1	2	3	4	5	6	7
14. I believe the finding that shopping can be both personally and socially beneficial.	1	2	3	4	5	6	7
15. Right now, I can still remember the main points of the passage without looking back.	1	2	3	4	5	6	7

The three main points are:

1. ______________________________

2. ______________________________

3. ______________________________

PART TWO. People differ in the amount of exposure they have to concepts and ideas. Think for a moment about how often you encounter the concept of **shopping**, and then answer the following questions.

1. In the last month, how many times do you recall . . .

Talking about **shopping?** __________

Reading about **shopping?** __________

Seeing on television a program with an emphasis on **shopping?** __________

Going **shopping** yourself? __________

2. People also differ in how much they know about things, regardless of their exposure. Compared to the average University of Maryland undergraduate student here at College Park, how much would you say **you know about shopping?**

To answer this question, call the amount that the average University of Maryland undergraduate student knows about shopping 100. If you know about **twice** as much as the average student, you would rate your knowledge to be **200**; if you know about **half as much,** you would rate your knowledge to be **50.** You can use any number greater than zero to rate your knowledge about shopping.

Compared to the average University of Maryland undergraduate student, I rate the amount of knowledge I have about **shopping** to be __________.

PLEASE TURN THE PAGE.

3. People differ in how they link together different concepts. Think of things that you believe are associated with **shopping**.

First, list words that you associate with ***shopping***. Then, next to each word write a number that indicates how closely linked the word is with ***shopping***. If the word is **very closely** linked to ***shopping***, write a small number (i.e., smaller numbers = more closely linked). If the word is very **loosely** related to ***shopping***, write a large number (i.e., larger numbers = more distantly linked). To guide your responses, consider the distance of **100** be represent a "medium" distance, or moderate linkage. Like your responses in question #2, if the word is **twice as far as a "medium" distance**, you would call that linkage **200**; if the word is **half as far as a "medium" distance**, you would call that linkage **50**. And, again, you can use any number greater than 0.

WORD	AMOUNT LINKED

4. Finally, estimate the total number of words that you think you probably know which are associated with **shopping**. Please consider your response without regard to the number of words that you have listed above. ________

Course: _________ Section: _________ Starting Time: _________ Gender: _________

Questionnaire PS4-A2

Understanding Messages

PART ONE. Please read the following passage carefully. At the end of the passage, please answer the questions that follow.

*****

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have looked at a vast array of elements in our culture that are quietly beneficial to individuals and/or society. These cultural researchers have been searching particularly for ordinary objects and activities that are reported to have positive effects on people in unusual ways. This is important work because the homogenization of American society (i.e., society is becoming more and more the same, no matter where you go) threatens to eliminate small pockets of uniqueness that are sources of pleasure in people's lives. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of people all over the country, and across every socioeconomic boundary, about the objects and activities that bring them personal pleasure or that they believe to be beneficial to society in an uncommon way. Interestingly, quite a large number of people have reported that clothes are items that people find to be both personally and socially beneficial. According to Zimmer et al., "*Clothes are good;* many individuals experience clothes as delivering both an immediate personal gain and bigger-picture social benefit." (p. 199).

*****

For the following statements, please indicate the number that best represents your agreement with the statement, based upon the passage you just read.

	I don't agree at all						**I agree very much**
While I was reading the passage,							
1. I could easily understand the concepts.	1	2	3	4	5	6	7
2. I found the statements to be believable.	1	2	3	4	5	6	7
3. I thought about how this information might relate to my own life.	1	2	3	4	5	6	7
4. I thought about my own sources of cultural uniqueness.	1	2	3	4	5	6	7
5. I agreed that clothes are good.	1	2	3	4	5	6	7

While I was reading the passage,	Not at All						Very Much
6. I easily understood the language used in the passage.	1	2	3	4	5	6	7
7. I questioned the accuracy of the Zimmer et al. study results.	1	2	3	4	5	6	7
8. I thought that clothes could make me feel good, too.	1	2	3	4	5	6	7
9. It seemed to me that I had heard some or all of this information before.	1	2	3	4	5	6	7
10. I thought the information in the passage could be true.	1	2	3	4	5	6	7
11. I thought about objects or activities that I know of, which seem to have disappeared.	1	2	3	4	5	6	7
12. I thought about my own feelings toward clothes.	1	2	3	4	5	6	7
In general,							
13. Compared to other academic readings that I have done, this passage was difficult.	1	2	3	4	5	6	7
14. I believe the finding that clothes can be both personally and socially beneficial.	1	2	3	4	5	6	7
15. Right now, I can still remember the main points of the passage without looking back.	1	2	3	4	5	6	7

The three main points are:

1. ______________________________

2. ______________________________

3. ______________________________

PART TWO. People differ in the amount of exposure they have to concepts and ideas. Think for a moment about how often you encounter the concept of **clothes**, and then answer the following questions.

1. In the last month, how many times do you recall . . .

Talking about **clothes?** __________

Reading about **clothes?** __________

Seeing on television a program with an emphasis on **clothes?** __________

Buying **clothes?** __________

2. People also differ in how much they know about things, regardless of their exposure. Compared to the average University of Maryland undergraduate student here at College Park, how much would you say **you know about clothes?**

To answer this question, call the amount that the average University of Maryland undergraduate student knows about clothes 100. If you know about **twice** as much as the average student, you would rate your knowledge to be **200**; if you know about **half as much,** you would rate your knowledge to be **50.** You can use any number greater than zero to rate your knowledge about clothes.

Compared to the average University of Maryland undergraduate student, I rate the amount of knowledge I have about **clothes** to be __________.

PLEASE TURN THE PAGE.

3. People differ in how they link together different concepts. Think of things that you believe are associated with **clothes**.

First, list words that you associate with ***clothes***. Then, next to each word write a number that indicates how closely linked the word is with ***clothes***. If the word is **very closely** linked to ***clothes***, write a small number (i.e., smaller numbers = more closely linked). If the word is **very loosely** related to ***clothes***, write a large number (i.e., larger numbers = more distantly linked). To guide your responses, consider the distance of **100** be represent a "medium" distance, or moderate linkage. Like your responses in question #2, if the word is **twice as far as a "medium" distance**, you would call that linkage **200**; if the word is **half as far as a "medium" distance**, you would call that linkage **50.** And, again, you can use any number greater than 0.

WORD	AMOUNT LINKED

4. Finally, estimate the total number of words that you think you probably know which are associated with **clothes**. Please consider your response without regard to the number of words that you have listed above. ________

Course: __________ Section: __________ Starting Time: __________ Gender: __________

Questionnaire PS4-B2

Understanding Messages

PART ONE. Please read the following passage carefully. At the end of the passage, please answer the questions that follow.

*****

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have looked at a vast array of elements in our culture that are quietly beneficial to individuals and/or society. These cultural researchers have been searching particularly for ordinary objects and activities that are reported to have positive effects on people in unusual ways. This is important work because the homogenization of American society (i.e., society is becoming more and more the same, no matter where you go) threatens to eliminate small pockets of uniqueness that are sources of pleasure in people's lives. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of people all over the country, and across every socioeconomic boundary, about the objects and activities that bring them personal pleasure or that they believe to be beneficial to society in an uncommon way. Interestingly, quite a large number of people have reported that food is something that people find to be both personally and socially beneficial. According to Zimmer et al., "*Food is good;* many individuals experience food as delivering both an immediate personal gain and bigger-picture social benefit." (p. 199).

*****

For the following statements, please indicate the number that best represents your agreement with the statement, based upon the passage you just read.

	I don't agree at all						I agree very much
While I was reading the passage,							
1. I could easily understand the concepts.	1	2	3	4	5	6	7
2. I found the statements to be believable.	1	2	3	4	5	6	7
3. I thought about how this information might relate to my own life.	1	2	3	4	5	6	7
4. I thought about my own sources of cultural uniqueness.	1	2	3	4	5	6	7
5. I agreed that food is good.	1	2	3	4	5	6	7

	Not at All						Very Much
While I was reading the passage,							
6. I easily understood the language used in the passage.	1	2	3	4	5	6	7
7. I questioned the accuracy of the Zimmer et al. study results.	1	2	3	4	5	6	7
8. I thought that food could make me feel good, too.	1	2	3	4	5	6	7
9. It seemed to me that I had heard some or all of this information before.	1	2	3	4	5	6	7
10. I thought the information in the passage could be true.	1	2	3	4	5	6	7
11. I thought about objects or activities that I know of, which seem to have disappeared.	1	2	3	4	5	6	7
12. I thought about how much I enjoy food.	1	2	3	4	5	6	7
In general,							
13. Compared to other academic readings that I have done, this passage was difficult.	1	2	3	4	5	6	7
14. I believe the finding that food can be both personally and socially beneficial.	1	2	3	4	5	6	7
15. Right now, I can still remember the main points of the passage without looking back.	1	2	3	4	5	6	7

The three main points are:

1. ____

2. ____

3. ____

PART TWO. People differ in the amount of exposure they have to concepts and ideas. Think for a moment about how often you encounter the concept of **food**, and then answer the following questions.

1. In the last month, how many times do you recall . . .

   Talking about **food?** __________

   Reading about **food?** __________

   Seeing on television a program with an emphasis on **food?** __________

   Enjoying **food** yourself? __________

2. People also differ in how much they know about things, regardless of their exposure. Compared to the average University of Maryland undergraduate student here at College Park, how much would you say **you know about food?**

To answer this question, call the amount that the average University of Maryland undergraduate student knows about food 100. If you know about **twice** as much as the average student, you would rate your knowledge to be **200**; if you know about **half as much**, you would rate your knowledge to be **50**. You can use any number greater than zero to rate your knowledge about food.

Compared to the average University of Maryland undergraduate student, I rate the amount of knowledge I have about **food** to be _________.

PLEASE TURN THE PAGE.

3. People differ in how they link together different concepts. Think of things that you believe are associated with **food**.

First, list words that you associate with ***food***. Then, next to each word write a number that indicates how closely linked the word is with ***food***. If the word is **very closely** linked to ***food***, write a small number (i.e., smaller numbers = more closely linked). If the word is **very loosely** related to ***food***, write a large number (i.e., larger numbers = more distantly linked). To guide your responses, consider the distance of **100** be represent a "medium" distance, or moderate linkage. Like your responses in question #2, if the word is **twice as far as a "medium" distance**, you would call that linkage **200**; if the word is **half as far as a "medium" distance**, you would call that linkage **50**. And, again, you can use any number greater than 0.

WORD AMOUNT LINKED

____

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____

4. Finally, estimate the <u>total</u> number of words that you think you probably know which are associated with **food**. Please consider your response without regard to the number of words that you have listed above. _________

Course: _________ Section: _________ Starting Time: _________ Gender: _________

Questionnaire PS4-C2

Understanding Messages

PART ONE. Please read the following passage carefully. At the end of the passage, please answer the questions that follow.

*****

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have looked at a vast array of elements in our culture that are quietly beneficial to individuals and/or society. These cultural researchers have been searching particularly for ordinary objects and activities that are reported to have positive effects on people in unusual ways. This is important work because the homogenization of American society (i.e., society is becoming more and more the same, no matter where you go) threatens to eliminate small pockets of uniqueness that are sources of pleasure in people's lives. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of people all over the country, and across every socioeconomic boundary, about the objects and activities that bring them personal pleasure or that they believe to be beneficial to society in an uncommon way. Interestingly, quite a large number of people have reported that animals are things that people find to be both personally and socially beneficial. According to Zimmer et al., "*Animals are good;* many individuals experience animals as delivering both an immediate personal gain and bigger-picture social benefit." (p. 199).

*****

For the following statements, please indicate the number that best represents your agreement with the statement, based upon the passage you just read.

	I don't agree at all						**I agree very much**
While I was reading the passage,							
1. I could easily understand the concepts.	1	2	3	4	5	6	7
2. I found the statements to be believable.	1	2	3	4	5	6	7
3. I thought about how this information might relate to my own life.	1	2	3	4	5	6	7
4. I thought about my own sources of cultural uniqueness.	1	2	3	4	5	6	7
5. I agreed that animals are good.	1	2	3	4	5	6	7

	Not at All						Very Much
While I was reading the passage,							
6. I easily understood the language used in the passage.	1	2	3	4	5	6	7
7. I questioned the accuracy of the Zimmer et al. study results.	1	2	3	4	5	6	7
8. I thought that animals could make me feel good, too.	1	2	3	4	5	6	7
9. It seemed to me that I had heard some or all of this information before.	1	2	3	4	5	6	7
10. I thought the information in the passage could be true.	1	2	3	4	5	6	7
11. I thought about objects or activities that I know of, which seem to have disappeared.	1	2	3	4	5	6	7
12. I thought about my own feelings toward animals.	1	2	3	4	5	6	7
In general,							
13. Compared to other academic readings that I have done, this passage was difficult.	1	2	3	4	5	6	7
14. I believe the finding that animals can be both personally and socially beneficial.	1	2	3	4	5	6	7
15. Right now, I can still remember the main points of the passage without looking back.	1	2	3	4	5	6	7

The three main points are:

1. ____

2. ____

3. ____

PART TWO. People differ in the amount of exposure they have to concepts and ideas. Think for a moment about how often you encounter the concept of **animals**, and then answer the following questions.

1. In the last month, how many times do you recall . . .

Talking about **animals?** __________

Reading about **animals?** __________

Seeing on television a program with an emphasis on **animals?** __________

Encountering **animals** yourself? __________

2. People also differ in how much they know about things, regardless of their exposure. Compared to the average University of Maryland undergraduate student here at College Park, how much would you say **you know about animals?**

To answer this question, call the amount that the average University of Maryland undergraduate student knows about animals 100. If you know about **twice** as much as the average student, you would rate your knowledge to be **200**; if you know about **half as much,** you would rate your knowledge to be **50.** You can use any number greater than zero to rate your knowledge about animals.

Compared to the average University of Maryland undergraduate student, I rate the amount of knowledge I have about **animals** to be __________.

PLEASE TURN THE PAGE.

3. People differ in how they link together different concepts. Think of things that you believe are associated with **animals**.

First, list words that you associate with ***animals***. Then, next to each word write a number that indicates how closely linked the word is with ***animals***. If the word is **very closely** linked to ***animals***, write a small number (i.e., smaller numbers = more closely linked). If the word is very **loosely** related to ***animals***, write a large number (i.e., larger numbers = more distantly linked). To guide your responses, consider the distance of **100** be represent a "medium" distance, or moderate linkage. Like your responses in question #2, if the word is **twice as far as a "medium" distance**, you would call that linkage **200**; if the word is **half as far as a "medium" distance**, you would call that linkage **50**. And, again, you can use any number greater than 0.

<u>WORD</u> <u>AMOUNT LINKED</u>

4. Finally, estimate the <u>total</u> number of words that you think you probably know which are associated with **animals**. Please consider your response without regard to the number of words that you have listed above. ________

Course: __________ Section: __________ Starting Time: __________ Gender: __________

Questionnaire PS4-D2

Understanding Messages

PART ONE. Please read the following passage carefully. At the end of the passage, please answer the questions that follow.

*****

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have looked at a vast array of elements in our culture that are quietly beneficial to individuals and/or society. These cultural researchers have been searching particularly for ordinary objects and activities that are reported to have positive effects on people in unusual ways. This is important work because the homogenization of American society (i.e., society is becoming more and more the same, no matter where you go) threatens to eliminate small pockets of uniqueness that are sources of pleasure in people's lives. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of people all over the country, and across every socioeconomic boundary, about the objects and activities that bring them personal pleasure or that they believe to be beneficial to society in an uncommon way. Interestingly, quite a large number of people have reported that dogs are things that people find to be both personally and socially beneficial. According to Zimmer et al., "*Dogs are good;* many individuals experience dogs as delivering both an immediate personal gain and bigger-picture social benefit." (p. 199).

*****

For the following statements, please indicate the number that best represents your agreement with the statement, based upon the passage you just read.

	I don't agree at all						**I agree very much**
While I was reading the passage,							
1. I could easily understand the concepts.	1	2	3	4	5	6	7
2. I found the statements to be believable.	1	2	3	4	5	6	7
3. I thought about how this information might relate to my own life.	1	2	3	4	5	6	7
4. I thought about my own sources of cultural uniqueness.	1	2	3	4	5	6	7
5. I agreed that dogs are good.	1	2	3	4	5	6	7

While I was reading the passage,	Not at All						Very Much
6. I easily understood the language used in the passage.	1	2	3	4	5	6	7
7. I questioned the accuracy of the Zimmer et al. study results.	1	2	3	4	5	6	7
8. I thought that dogs could make me feel good, too.	1	2	3	4	5	6	7
9. It seemed to me that I had heard some or all of this information before.	1	2	3	4	5	6	7
10. I thought the information in the passage could be true.	1	2	3	4	5	6	7
11. I thought about objects or activities that I know of, which seem to have disappeared.	1	2	3	4	5	6	7
12. I thought about my own feelings toward dogs.	1	2	3	4	5	6	7
In general,							
13. Compared to other academic readings that I have done, this passage was difficult.	1	2	3	4	5	6	7
14. I believe the finding that dogs can be both personally and socially beneficial.	1	2	3	4	5	6	7
15. Right now, I can still remember the main points of the passage without looking back.	1	2	3	4	5	6	7

The three main points are:

1. ______________________________

2. ______________________________

3. ______________________________

PART TWO. People differ in the amount of exposure they have to concepts and ideas. Think for a moment about how often you encounter the concept of **dogs**, and then answer the following questions.

1. In the last month, how many times do you recall . . .

Talking about **dogs?** __________

Reading about **dogs?** __________

Seeing on television a program with an emphasis on **dogs?** __________

Encountering **dogs** yourself? __________

2. People also differ in how much they know about things, regardless of their exposure. Compared to the average University of Maryland undergraduate student here at College Park, how much would you say **you know about dogs?**

To answer this question, call the amount that the average University of Maryland undergraduate student knows about dogs 100. If you know about **twice** as much as the average student, you would rate your knowledge to be **200**; if you know about **half as much,** you would rate your knowledge to be **50.** You can use any number greater than zero to rate your knowledge about dogs.

Compared to the average University of Maryland undergraduate student, I rate the amount of knowledge I have about **dogs** to be __________.

PLEASE TURN THE PAGE.

3. People differ in how they link together different concepts. Think of things that you believe are associated with **dogs**.

First, list words that you associate with ***dogs***. Then, next to each word write a number that indicates how closely linked the word is with ***dogs***. If the word is **very closely** linked to ***dogs***, write a small number (i.e., smaller numbers = more closely linked). If the word is **very loosely** related to ***dogs***, write a large number (i.e., larger numbers = more distantly linked). To guide your responses, consider the distance of **100** be represent a "medium" distance, or moderate linkage. Like your responses in question #2, if the word is **twice as far as a "medium" distance**, you would call that linkage **200**; if the word is **half as far as a "medium" distance**, you would call that linkage **50**. And, again, you can use any number greater than 0.

WORD AMOUNT LINKED

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4. Finally, estimate the total number of words that you think you probably know which are associated with **dogs**. Please consider your response without regard to the number of words that you have listed above. ________

Course: __________ Section: __________ Starting Time: __________ Gender: __________

Questionnaire PS4-E2

Understanding Messages

PART ONE. Please read the following passage carefully. At the end of the passage, please answer the questions that follow.

*****

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have looked at a vast array of elements in our culture that are quietly beneficial to individuals and/or society. These cultural researchers have been searching particularly for ordinary objects and activities that are reported to have positive effects on people in unusual ways. This is important work because the homogenization of American society (i.e., society is becoming more and more the same, no matter where you go) threatens to eliminate small pockets of uniqueness that are sources of pleasure in people's lives. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of people all over the country, and across every socioeconomic boundary, about the objects and activities that bring them personal pleasure or that they believe to be beneficial to society in an uncommon way. Interestingly, quite a large number of people have reported that monkeys are things that people find to be both personally and socially beneficial. According to Zimmer et al., "*Monkeys are good;* many individuals experience monkeys as delivering both an immediate personal gain and bigger-picture social benefit." (p. 199).

*****

For the following statements, please indicate the number that best represents your agreement with the statement, based upon the passage you just read.

	I don't agree at all						**I agree very much**
While I was reading the passage,							
1. I could easily understand the concepts.	1	2	3	4	5	6	7
2. I found the statements to be believable.	1	2	3	4	5	6	7
3. I thought about how this information might relate to my own life.	1	2	3	4	5	6	7
4. I thought about my own sources of cultural uniqueness.	1	2	3	4	5	6	7
5. I agreed that monkeys are good.	1	2	3	4	5	6	7

While I was reading the passage,	Not at All						Very Much
6. I easily understood the language used in the passage.	1	2	3	4	5	6	7
7. I questioned the accuracy of the Zimmer et al. study results.	1	2	3	4	5	6	7
8. I thought that monkeys could make me feel good, too.	1	2	3	4	5	6	7
9. It seemed to me that I had heard some or all of this information before.	1	2	3	4	5	6	7
10. I thought the information in the passage could be true.	1	2	3	4	5	6	7
11. I thought about objects or activities that I know of, which seem to have disappeared.	1	2	3	4	5	6	7
12. I thought about my own feelings toward monkeys.	1	2	3	4	5	6	7
In general,							
13. Compared to other academic readings that I have done, this passage was difficult.	1	2	3	4	5	6	7
14. I believe the finding that monkeys can be both personally and socially beneficial.	1	2	3	4	5	6	7
15. Right now, I can still remember the main points of the passage without looking back.	1	2	3	4	5	6	7

The three main points are:

1. ____

2. ____

3. ____

PART TWO. People differ in the amount of exposure they have to concepts and ideas. Think for a moment about how often you encounter the concept of **monkeys**, and then answer the following questions.

1. In the last month, how many times do you recall . . .

Talking about **monkeys?** __________

Reading about **monkeys?** __________

Seeing on television a program with an emphasis on **monkeys?** __________

Encountering **monkeys** yourself? __________

2. People also differ in how much they know about things, regardless of their exposure. Compared to the average University of Maryland undergraduate student here at College Park, how much would you say **you know about monkeys?**

To answer this question, call the amount that the average University of Maryland undergraduate student knows about monkeys 100. If you know about **twice** as much as the average student, you would rate your knowledge to be **200**; if you know about **half as much,** you would rate your knowledge to be **50.** You can use any number greater than zero to rate your knowledge about monkeys.

Compared to the average University of Maryland undergraduate student, I rate the amount of knowledge I have about **monkeys** to be __________.

PLEASE TURN THE PAGE.

3. People differ in how they link together different concepts. Think of things that you believe are associated with **monkeys**.

First, list words that you associate with ***monkeys***. Then, next to each word write a number that indicates how closely linked the word is with ***monkeys***. If the word is **very closely** linked to ***monkeys***, write a small number (i.e., smaller numbers = more closely linked). If the word is **very loosely** related to ***monkeys***, write a large number (i.e., larger numbers = more distantly linked). To guide your responses, consider the distance of **100** be represent a "medium" distance, or moderate linkage. Like your responses in question #2, if the word is **twice as far as a "medium" distance**, you would call that linkage **200**; if the word is **half as far as a "medium" distance**, you would call that linkage **50**. And, again, you can use any number greater than 0.

WORD AMOUNT LINKED

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4. Finally, estimate the total number of words that you think you probably know which are associated with **monkeys**. Please consider your response without regard to the number of words that you have listed above. __________

Appendix K

Pilot Study 5 Questionnaire

Please complete the following information:

Course: __________ Section: __________ Starting Time: __________ Gender: __________

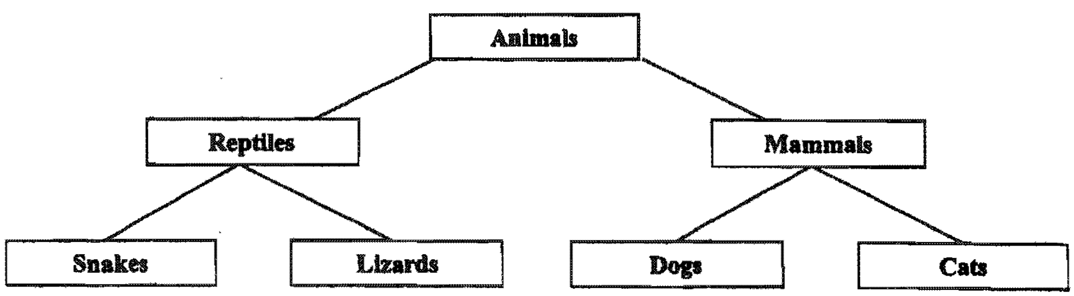
A STUDY OF CONCEPTS

Questionnaire 6

BACKGROUND INFORMATION

Below is a hierarchy that researchers have found many people use to organize this particular set of concepts. A **hierarchy** is a group of words that are ranked some above others, usually from the most general word to the most specific. At the very top of the hierarchy is one overall word into which all of the other words of the hierarchy fall. Underneath the overall, or most abstract, word are two or more major words into which the overall word can be logically divided based on some criterion. Each of these major words are then further divided into more specific words, and so on.

Study this hierarchy until you feel confident that you know it very well, and could repeat it if asked.



PART ONE

Instructions: Please read the following passage very carefully. At the end of the passage, please answer the question that follows. This portion of the questionnaire is timed, so please stop writing when time is called and please do not return to your response.

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have examined the mental health of college students and found that as many as half of all students suffer from low levels of self-esteem. This is a critical finding because decreased levels of self-esteem can negatively affect academic performance, and can contribute to campus problems such as alcohol misuse and abuse. Conversely, increased levels of self-esteem are related to improved academic performance and better health. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of students, and studied some of the many methods that students have reported using to improve the way they feel about themselves. Interestingly, a number of students have reported that one's cats can represent an excellent source of a type of pleasure that has been shown to directly increase self-esteem. According to Zimmer et al., "*Cats are good;* in fact they are better than most people would think they are. Cats provide a number of individuals with some comfort that they use to support their overall sense of well-being" (p. 199).

Think about the paragraph you just read. In it, researchers stated that cats are good because they provide individuals with some comfort that they use to support their overall sense of well-being. What reasons would **you** give why cats are good? Please list all of your reasons why cats are good, or better than most people would think they are, below:

Cats are good because ______________________________

____

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PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED.

PART TWO

<u>Instructions:</u> For each word or phrase pair listed below, please use a number to estimate how closely related you think the two words or phases are to each other. The more **different** the concepts seem to be, the **larger the number** you should write; the more **similar** the concepts seem to be, the **smaller the number** you should write. Use the following comparison as a reference, to give you an idea of the amount of difference your numbers represent:

> Think about the concepts "Snakes" and "Lizards."
> "Snakes" and "Lizards" are a moderate distance apart, and we'll call this distance 100 Units apart.

So, if two words or phrases are **not different at all**, you would write **zero** (0). If two words or phrases are, for example, **three times as different** as compared with the difference between the concepts "Snakes" and "Lizards," you would write **300**. If two words or phrases are, for example, **half as different** than "Snakes" and "Lizards" are from each other, you would write **50**. If two words or phrases are, for example, **about the same** as "Snakes" and "Lizards" are from each other you would write **100**. There are no limits to how large a number can be, but it cannot be lower than zero. Remember that every 100 units of difference between the concepts is the same as the difference that you perceive between "Snakes" and "Lizards." <u>Please answer all of the questions, even though they may seem difficult or unusual.</u>

This example might help you:

> Q: How far apart are breakfast and omelets?

To answer this question, you might consider how much breakfast and omelets are different (or the same) WITH RESPECT TO YOU, not to anyone else. Then, to determine a numerical value for this difference, you should think about how different "Snakes" and "Lizards" are to you. There is no right answer. Are breakfast and omelets *more different* than Snakes and Lizards, *or less different*, and by what degree? One individual in a previous study has indicated that if the difference between Snakes and Lizards is 100, then the difference between breakfast and omelets is about *one-tenth as much*, or about 10 . . . but your value would depend completely on your own views. If you never eat omelets for breakfast, for example, you might not consider these two concepts to be that close.

<u>Practice Items</u>

How far apart are

Snakes and **Lizards?** _________

Breakfast and **Omelets?** __________

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED.

Snakes and Lizards are 100 units apart.

How far apart are . . .

1. **Snakes and Reptiles?** __________
2. **Snakes and Mammals?** __________
3. **Snakes and Lizards?** __________
4. **Snakes and Dogs?** __________
5. **Snakes and Monkeys?** __________
6. **Snakes and Animals?** __________
7. **Snakes and Things I Like?** __________
8. **Snakes and Good?** __________
9. **Reptiles and Mammals?** __________
10. **Reptiles and Lizards?** __________
11. **Reptiles and Dogs?** __________
12. **Reptiles and Monkeys?** __________
13. **Reptiles and Animals?** __________
14. **Reptiles and Things I Like?** __________
15. **Reptiles and Good?** __________
16. **Mammals and Lizards?** __________
17. **Mammals and Dogs?** __________
18. **Mammals and Monkeys?** __________
19. **Mammals and Animals?** __________
20. **Mammals and Things I Like?** __________
21. **Mammals and Good?** __________

Snakes and Lizards are 100 units apart.

How far apart are . . .

22. **Lizards** and **Dogs?** __________
23. **Lizards** and **Monkeys?** __________
24. **Lizards** and **Animals?** __________
25. **Lizards** and **Things I Like?** __________
26. **Lizards** and **Good?** __________
27. **Dogs** and **Monkeys?** __________
28. **Dogs** and **Animals?** __________
29. **Dogs** and **Things I Like?** __________
30. **Dogs** and **Good?** __________
31. **Monkeys** and **Animals?** __________
32. **Monkeys** and **Things I Like?** __________
33. **Monkeys** and **Good?** __________
34. **Animals** and **Things I Like?** __________
35. **Animals** and **Good?** __________
36. **Things I Like** and **Good?** __________

WHEN YOU ARE DONE, PLEASE GO ON TO THE NEXT SECTION.

PART THREE

Instructions: Please answer the questions that follow on the next several pages **without looking back** at any previous pages.

1. In the list below, write as many words as come to your mind that are related to the word on the first line.

ANIMALS

PLEASE TURN THE PAGE.

2. Use the seven words listed below to draw a **hierarchy**. Please **<u>do not look back</u>** at any of the previous pages.

A <u>hierarchy</u> is a group of words that are ranked some above others, usually from the most general word to the most specific. At the very top of the hierarchy is one overall word into which all of the other words of the hierarchy fall. Underneath the overall, or most abstract, word are two or more major words into which the overall word can be logically divided based on some criterion. Each of these major words are then further divided into more specific words, and so on.

dogs snakes reptiles animals mammals cats lizards

PLEASE TURN THE PAGE.

3. Circle every word in the list below that was mentioned in the research report that you read at the beginning of the questionnaire. Please **do not look back** at any of the previous pages.

Alcohol	Culture	Food
Dogs	Money	Clothes
Students	Professors	Animals
Experiment	Shopping	Counseling
Academic	Self-esteem	Cats

THIS CONCLUDES THE QUESTIONNAIRE. THANK YOU FOR YOUR PARTICIPATION.

Appendix L

Description of Variables Used in the Final Study

Table L-1

Names, Labels, Questionnaire Sources, Transformations, and Descriptive Statistics for Transformed Study Variables

Variable Acronym	Conceptual Label	Source[a]	Transformation (Label)	Descriptions of Transformed Variable: Skewness	Levene's[b]	Mean	SD	Min-Max
Assshop	Links to shopping	2/1	LN(Assshop) Lnasshop	-.39	.54	2.97	1.07	0-6.91
Assani	Links to animals	2/2	LN(Assani) Lnassani	.38	.19	2.49	1.10	0-9.21
Asscoll	Links to college	2/3	LN(Asscoll) Lnascoll	-.30	.00	3.67	.86	0-9.39
Assself	Links to self-esteem	2/4	LN(Assself) Lnasself	-.50	.76	2.96	1.08	0-6.22
Assgood	Links to goodness	2/5	LN(Assgood) Lnasgood	-.35	.93	3.19	1.01	0-8.50
Supgood	Distance between superordinate and good	3/1	LN(Supgood) Lnsugo	.18	.38	5.15	.97	3.22-6.93

[a] Refers to questionnaire part number/question number for final questionnaire, question order A (see Appendix N).
[b] Levene's test of homoscedasticity was calculated for the variables in a one-way ANOVA across the independent variable Messtarg.

				Descriptions of Transformed Variable				
Variable Acronym	Conceptual Label	Source[a]	Transformation (Label)	Skewness	Levene's[b]	Mean	SD	Min-Max
S1good	Distance between S1 and good	3/2	LN(S1good) Lns1go	.41	.93	4.91	.95	3.22-6.93
S2good	S2 and good	3/3	LN(S2good) Lns2go	.50	.19	4.97	1.07	3.22-7.33
S3M2	S3 and M2	3/4	LN(S3S4) Lns3m2	-.78	.01	4.69	.54	3.22-6.44
M1good	M1 and good	3/5	LN(M1good) Lnm1go	.50	.98	5.09	.96	3.22-7.61
M2like	M2 and things I like	3/6	LN(M2like) Lnm2lik	.52	.80	5.20	1.32	3.22-8.30
M2M1	M2 and M1	3/7	LN(M2M1) Lnm2m1	.30	.80	5.59	.93	3.22-7.61

[a] Refers to questionnaire part number/question number for final questionnaire, question order A (see Appendix N).
[b] Levene's test of homoscedasticity was calculated for the variables in a one-way ANOVA across the independent variable Messtarg.

Variable Acronym	Conceptual Label	Source[a]	Transformation (Label)	Descriptions of Transformed Variable				
				Skewness	Levene's[b]	Mean	SD	Min-Max
S1S2	Distance between S1 and S2	3/8	LN(S1S2) Lns1s2	.31	.06	5.22	.91	3.22-7.61
SupS4	Superordinate and S4	3/9	LN(SupS4) Lnsups4	.50	.77	5.01	.99	3.22-7.33
S1M1	S1 and M1	3/10	LN(S1M1) Lns1m1	.56	.99	4.65	.93	3.22-7.61
S3S2	S3 and S2	3/11	LN(S3S2) Lns3s2	.58	.49	5.79	.98	3.56-8.30
LikeM1	Things I like and M1	3/12	LN(LikeM1) Lnlikm1	.51	.94	5.24	.88	3.22-7.61
S4M2	S4 and M2	3/13	LN(S4M2) Lns4m2	.37	.90	4.48	.75	3.22-6.93

[a] Refers to questionnaire part number/question number for final questionnaire, question order A (see Appendix N).
[b] Levene's test of homoscedasticity was calculated for the variables in a one-way ANOVA across the independent variable Messtarg.

				Descriptions of Transformed Variable				
Variable Acronym	Conceptual Label	Source[a]	Transformation (Label)	Skewness	Levene's[b]	Mean	SD	Min-Max
M2Sup	Distance between M2 and superordinate	3/14	LN(M2Sup) Lnm2sup	.44	.83	4.80	.96	3.22-6.93
S4S2	S4 and S2	3/15	LN(S3S2) Lns3s2	.63	.91	5.45	1.10	3.22-8.30
Likegood	Things I like and good	3/16	LN(Likegood) Lnlikgoo	1.03	.92	4.23	.87	3.22-6.93
M1S3	M1 and S3	3/17	LN(M1S3) Lnm1s3	.63	.61	5.61	.88	3.46-7.61
S2M2	S2 and M2	3/18	LN(S2M2) Lns2m2	.35	.71	5.37	1.07	3.22-7.61
S3S4	S3 and S4	3/19	LN(S3S4) Lns3s4	-.17	.04	4.79	.84	3.22-6.26

[a] Refers to questionnaire part number/question number for final questionnaire, question order A (see Appendix N).
[b] Levene's test of homoscedasticity was calculated for the variables in a one-way ANOVA across the independent variable Messtarg.

				Descriptions of Transformed Variable				
Variable Acronym	Conceptual Label	Source[a]	Transformation (Label)	Skewness	Levene's[b]	Mean	SD	Min-Max
SupM1	Distance between superordinate and M1	3/20	LN(SupM1) Lnsupm1	.70	.42	4.75	.84	3.22-8.52
S2like	S2 and things I like	3/21	LN(S2like) Lns2lik	.61	.44	5.02	1.10	3.22-7.61
S1S3	S1 and S3	3/22	LN(S1S3) Lns1s3	.35	.75	5.39	.98	3.22-7.33
M2good	M2 and good	3/23	LN(M2good) Lnm2go	.50	.81	5.40	.98	3.22-7.61
Suplike	Superordinate and things I like	3/24	LN(Suplike) Lnsuplik	.47	.32	4.79	.98	3.22-6.93
S4S2	S4 and S2	3/25	LN(S4S2) Lns4s2	.22	.92	5.72	.95	3.22-7.61

[a] Refers to questionnaire part number/question number for final questionnaire, question order A (see Appendix N).
[b] Levene's test of homoscedasticity was calculated for the variables in a one-way ANOVA across the independent variable Messtarg.

				Descriptions of Transformed Variable				
Variable Acronym	Conceptual Label	Source[a]	Transformation (Label)	Skewness	Levene's[b]	Mean	SD	Min-Max
M2S1	Distance between M2 and S1	3/26	LN(M2S1) Lnm2s1	.39	.86	5.34	1.10	3.22-7.61
S3like	S3 and things I like	3/27	LN(S3like) Lns3lik	.09	.41	5.33	1.03	3.22-6.93
M1S2	M1 and S2	3/28	LN(M1S2) Lnm1s2	.49	.95	4.46	.93	3.22-6.93
S3Sup	S3 and superordinate	3/29	LN(S3Sup) Lns3sup	.36	.44	4.87	1.00	3.22-6.93
LikeS4	Things I like and S4	3/30	LN(LikeS4) Lnliks4	.65	.87	5.20	1.27	3.22-8.30
S3good	S3 and good	3/31	LN(S3good) Lns3go	.40	.97	5.28	1.15	3.22-7.61

[a] Refers to questionnaire part number/question number for final questionnaire, question order A (see Appendix N).
[b] Levene's test of homoscedasticity was calculated for the variables in a one-way ANOVA across the independent variable Messtarg.

				Descriptions of Transformed Variable				
Variable Acronym	Conceptual Label	Source[a]	Transformation (Label)	Skewness	Levene's[b]	Mean	SD	Min-Max
SupS2	Superordinate and S2	3/32	LN(SupS2) Lnsups2	.55	.05	4.70	.91	3.22-6.93
S1like	S1 and things I like	3/33	LN(S1like) Lns1lik	.67	.96	4.61	.93	3.22-6.93
S4good	S4 and good	3/34	LN(S4good) Lns4go	.60	.88	5.31	1.13	3.22-8.30
M1S4	M1 and S4	3/35	LN(M1S4) Lnm1s4	.63	.43	5.71	1.00	3.22-8.70
S1sup	S1 and superordinate	3/36	LN(S1sup) Lns1sup	.56	.13	4.40	.84	3.22-6.93
Midgood	Evaluative beliefs in non-targeted space	Computed: SUM(lnm1go, lnm2go, lns3go, lns4go)		-.19	.05	20.22	4.84	7.41-31.14

[a] Refers to questionnaire part number/question number for final questionnaire, question order A (see Appendix N).
[b] Levene's test of homoscedasticity was calculated for the variables in a one-way ANOVA across the independent variable Messtarg.

			Descriptions of Transformed Variable				
Variable Acronym	Conceptual Label	Source[a]	Skewness	Levene's[b]	Mean	SD	Min-Max
Midlike	Attitudes in non-targeted space	Computed: SUM(lnlikm1, lnm2lik, lns3lik, lnliks4)	-.59	.03	20.02	5.19	4.01-31.15
Midsize	Non-evaluative belief in non-targeted space	Computed: SUM(lnm2m1, lns3m2 lns4m2, lnm1s3, lns3s4, lnm1s4)	-1.56	.002	29.79	4.86	4.81-40.86
Avspan	Correction for size of space	Computed: MEAN(lns1sup, lnm1s4, lnsups2, lns3sup, lnm1s2, lnm2s1, lns4s2, lns1s3, lnsupm1, lns3s4, lns2m2, lnm1s3, lns4s1, lns4m2, lns3s2, lns1m1, lns1s2, lnm1m2, lns3m2, lnm2sup, lnsups4)	-1.46	1.00	5.07	.65	3.91-6.95
Newmdgd	Midgood corrected for size of space	Computed: Midgood – Avspan	.12	.43	.72	2.09	-8.47-7.21
Newmdlk	Midlike corrected for size of space	Computed: Midlike – Avspan	.43	.36	.61	2.15	-4.81-6.79
Newmdsz	Midsize corrected for size of space	Computed: Midsize – Avspan	-.15	.45	.31	1.84	-5.79-5.75

[a] Refers to questionnaire part number/question number for final questionnaire, question order A (see Appendix N).
[b] Levene's test of homoscedasticity was calculated for the variables in a one-way ANOVA across the independent variable Messtarg.

			Descriptions of Transformed Variable				
Variable Acronym	Conceptual Label	Source[a]	Skewness	Levene's[b]	Mean	SD	Min-Max
Avrelsug	Corrected lnsugo	Computed: Lnsugo – Avspan	-.38	.66	.004	.63	-2.75-1.60
Avrels1g	Corrected lns1go	Computed: Lns1go – Avspan	-.22	.93	-.19	.66	-2.28-1.62
Avrels2g	Corrected lns2go	Computed: Lns2go – Avspan	-.06	.52	-.13	.74	-3.01-3.04
Avrelsul	Corrected lnsuplik	Computed: Lnsuplik – Avspan	-.34	.64	.30	.67	-3.06-2.21
Avrels1l	Corrected lns1lik	Computed: Lns1lik – Avspan	-.56	1.00	-.48	.72	-3.43-1.59
Avrels2l	Corrected lns2lik	Computed: Lns2lik – Avspan	.11	.06	-.07	.81	-2.57-3.33
Avrelsus1	Corrected lns1sup	Computed: Lns1sup – Avspan	-.34	.33	.68	.63	-3.18-1.38
Avrelsus2	Corrected lnsups2	Computed: Lnsups2 – Avspan	.04	.05	-.37	.67	-2.56-1.80
Avrels1s2	Corrected s1s2	Computed: Lns1s2 – Avspan	-.45	.37	.14	.81	-3.54-2.45

[a] Refers to questionnaire part number/question number for final questionnaire, question order A (see Appendix N).

Table L-2

Names, Labels, Questionnaire Sources, and Frequencies for Non-transformed Variables

Variable Acronym	Conceptual Label	Source[a]	Frequencies		
Questhi	Hierarchy condition	Randomly Assigned	Explicit = 39%	Implicit = 45%	Control = 15%
Messtarg	Message target	Randomly Assigned	Superord = 28%	S1 = 28%	S2 = 29%
			Control = 15%		
Questpri	Priming condition	Randomly Assigned	Primed = 45%	Unprimed = 39%	Control = 15%
Questver	Question order	Randomly Assigned	Order A = 43%	Order B = 42%	Control = 15%
Course	Time of participation	Page 1	Course 1 = 48%	Course 2 = 23%	Course 3 = 9%
			Course 4 = 7%	Course 5 = 13%	
Gender	Participant sex	Page 1	Male = 30%	Female = 70%	
Mainpt	Most important point	1/1	Not circled = 75%	Circled = 10%	Control = 15%

[a] Refers to questionnaire part number/question number for final questionnaire, question order A (see Appendix N).

Variable Acronym	Conceptual Label	Source[a]	Frequencies		
Hiesusu1	Are super-sub1 in correct position?	4/1	Correct = 66%	Not correct = 34%	
Hiesusu2	Are super-sub2 in correct position?	4/1	Correct = 67%	Not correct = 33%	
Hierequ	Are sub-sub in correct position?	4/1	Correct = 86%	Not correct = 14%	
Hiersco	Overall hierarchy score	4/1	0 = 7%	1 = 1%	2 = 4%
			3 = 13%	4 = 7%	5 = 10%
			6 = 16%	7 = 42%	
Manipmem	Is the correct target circled?	4/2	Correct = 80%	Not correct = 5%	Control = 15%
Manipgoo	Is "X is good" written?	4/3	Written = 19%	Not written = 66%	Control = 15%
Manipest	Is "X increases self-esteem written?	4/3	Written = 58%	Not written = 27%	Control = 15%

[a] Refers to questionnaire part number/question number for final questionnaire, question order A (see Appendix N).

Variable Acronym	Conceptual Label	Source[a]	Frequencies		
Supervsub[b]		Recoded Messtarg	Super (1) = 33%	Sub (-.5) = 67%	
Subvsub[b]		Recoded Messtarg	Sub2 (-1) = 34%	Super (0) = 33%	Sub1 (1) = 33%

[a] Refers to questionnaire part number/question number for final questionnaire, question order A (see Appendix N).
[b] Only participants who received a message (i.e., non-control) are included in the frequencies for this variable.

Appendix M

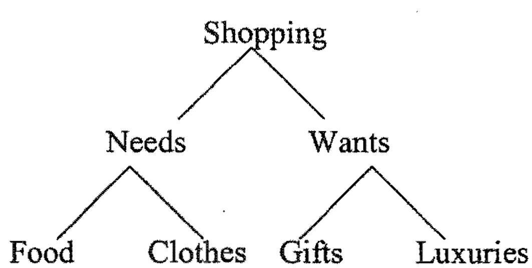
Rules for Determining Hierarchy Score

I. Rules for an uncomplicated hierarchy (i.e., a hierarchy that looks similar to the model hierarchy, with a clear superordinate concept(s), and clear divisions to lower levels; it can be compared directly to the ideal hierarchy):

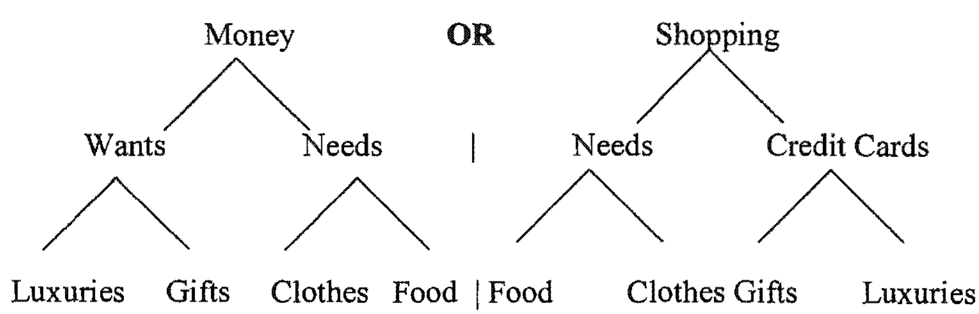
> A. One point for each term that is in the correct place, regardless of intervening or missing levels. The "correct" place is determined through comparison with the ideal hierarchy as defined by the experiment.

Here are some examples of how to calculate Hierarchy Score for an uncomplicated hierarchy, using the implicit hierarchy:

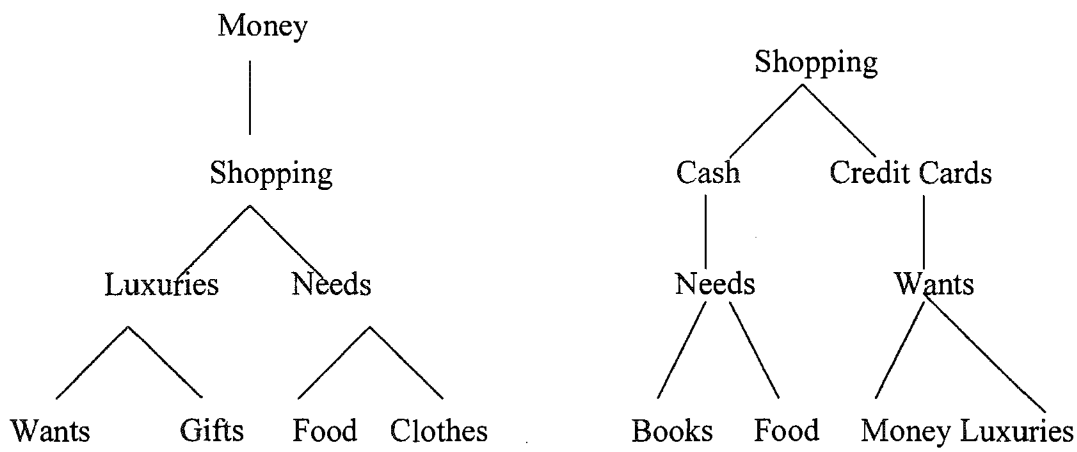
1. Ideal Hierarchy (i.e., Hierarchy Score of 7). Note that some relative positions could be interchanged without affecting the integrity of the hierarchy. For example, Wants-Gifts-Luxuries could be on the left of the hierarchy instead of the right. Similarly, Luxuries could be the left-hand concept under Wants.



2. Hierarchy Score of 6 (i.e., missing any 1 concept).



3. Hierarchy Score of 5 (i.e., missing any 2 concepts). In this example note the addition of intervening levels. This does not affect the integrity of the relative hierarchical relationships of the study concepts. Also note the transposition of a mid-level and subordinate concept. Neither of these concepts is in the correct position, so neither is scored. In the uncomplicated hierarchy, however, it is possible to determine that gifts is in a correct position under shopping and in the non-need branch of the hierarchy; therefore, gifts is coded as correct.



II. Rules for a complicated hierarchy (i.e., a hierarchy that does not look similar to the model hierarchy; it may have branches that spread out in a non-linear fashion):

A. Start the coding by locating the most superordinate concept, and code down from there, following the rules for an uncomplicated hierarchy. That is, what does the hierarchy look like below the designated superordinate concept?

B. If the most superordinate concept is not in the hierarchy, start the coding by locating the mid-level concept (e.g., needs/wants or mammals/reptiles) that appears to be highest in the hierarchy and code down from there, following the rules for an uncomplicated hierarchy.

If two mid-level concepts appear to be at the same height or level in the hierarchy, count the number of correct items below each mid-level concept. (E.g., if a complicated hierarchy contains both needs and wants at the same level, and food is under needs and gifts is under wants, all of these concepts would count toward the hierarchy score of 4.)

C. If neither the superordinate nor mid-level concepts appear in the hierarchy, the hierarchy score is 0.

D. If there are no correct concepts under the starting concept as determined by steps 1 and 2, the hierarchy score is 0.

Appendix N

Final Study Questionnaires

A STUDY OF CONCEPTS

Questionnaire EAPB

EXPLICIT

Thank you for agreeing to participate in "A Study of Concepts." In today's study, we are interested in how people think about concepts, or words. We are interested in how particular words might--or might not--be related in people's minds. Because we are looking at several different theories about how people think about words, some of the questions you will be asked today might seem unusual, or even amusing. We ask that you try to remain as focused as you can upon completing the questionnaire, and try to answer the questions to best represent what you are thinking as you complete the questionnaire. Also, we ask that at no time during the questionnaire do you turn back to look at previous questions or responses to help you decide your answers. This is not necessary because there are no right or wrong answers, and your identity will not be associated with your answers in any way.

Also, please note that there are up to 24 different versions of this questionnaire being administered today. So, we are asking that you refrain from looking at your classmates' questionnaires to compare answers because the people sitting around you probably are completing a slightly different questionnaire than you are. Thanks again for your help.

Before we being, please complete the following information:

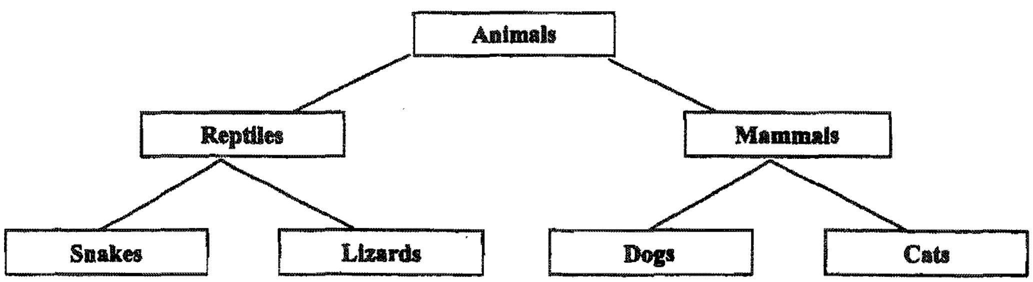
Course: ________ **Section:** ________ **Starting Time:** ________ **Gender:** _________

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED.

BACKGROUND INFORMATION

Below is a hierarchy that researchers have found many people use to organize this particular set of concepts. A **hierarchy** is a group of words, that are ranked, with some words above the others, usually from the most general word to the most specific. At the very top of the hierarchy is one overall word under which all of the other words of the hierarchy fall. Underneath the overall, or most abstract, word are two or more major words into which the overall word can be logically divided based on some principle. Each of these major words are then further divided into more specific words, and so on.

Study this hierarchy closely until you feel confident that you know it very well, and could write it down exactly as it is if asked to draw a hierarchy of these concepts.



PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

NOTE: THIS IS THE PAGE 2 THAT APPEARS IN THE QUESTIONNAIRES FOR PARTICIPANTS IN THE EXPLICIT, UNPRIMED CONDITION

BACKGROUND INFORMATION

Below is a hierarchy that researchers have found many people use to organize this particular set of concepts. A **hierarchy** is a group of words, that are ranked, with some words above the others, usually from the most general word to the most specific. At the very top of the hierarchy is one overall word under which all of the other words of the hierarchy fall. Underneath the overall, or most abstract, word are two or more major words into which the overall word can be logically divided based on some principle. Each of these major words are then further divided into more specific words, and so on.

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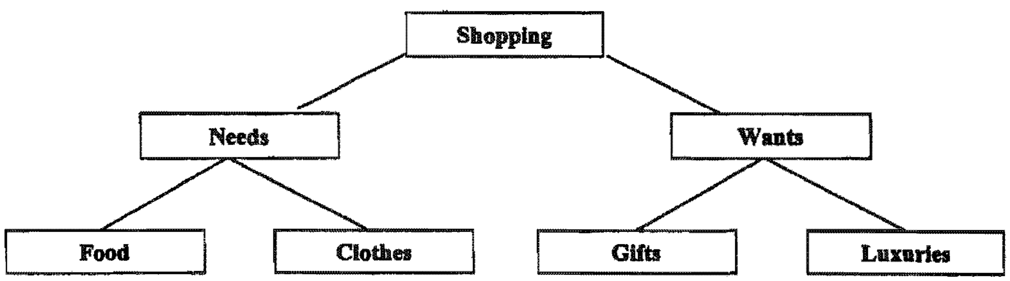

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

PART ONE

Instructions: Please read the following research passage very carefully, and do the following: 1.) While you are reading, please underline the author's main points. 2.) After you are done reading, CIRCLE the single most important point of the passage. Finally, 3.) At the end of the research passage, please answer the question that follows. This portion of the questionnaire is timed, so when you are done with your tasks on the passage, please try to think about and write an answer to the question below for the entire time that is allotted. Stop writing when time is called. Please do not return to this response after you have turned the page.

RESEARCH PASSAGE

From "Indicators of Self-Esteem in College-Aged Young Adults: Ethnographical Revelations," in the *Journal of Contemporary Personality*, vol. 65, no. 2, pp. 1132 - 1146.

Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have examined the mental health of college students and found that as many as half of all students suffer from low levels of self-esteem. This is a critical finding because decreased levels of self-esteem can negatively affect academic performance, and can contribute to campus problems such as alcohol misuse and abuse. Conversely, increased levels of self-esteem are related to improved academic performance and better health. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of students, and studied some of the many methods that students have reported using to improve the way they feel about themselves. Interestingly, a number of students have reported that animals can represent an excellent source of a type of pleasure that has been shown to directly increase self-esteem. According to Zimmer et al., "*Animals are good;* in fact they are better than most people would think they are. Animals provide a number of individuals with some comfort that they use to support their overall sense of well-being" (p. 199).

* * *

After you have underlined and circled in the passage above, think again about what you just read. The researchers stated that *animals are good* because they provide individuals with some comfort that they use to support their overall sense of well-being. Please formulate **your own argument** why animals are good. Even if you don't think animals are good, **what would you say if you were going to argue that animals are good**, or at least much better than most people think they are? Write your response below. Try to think about your argument, and write, for the entire allotment of time.

Animals are good because ____

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

PART TWO

People differ in how they link together different concepts. In this section, for each question, think for a moment about the capitalized word, and about how many other **related or associated** words that you might know. You probably know a lot of words that are associated with COMMUNICATION, for example, but probably not as many that are associated with QUANTUM PHYSICS. Answer each question with the best estimate that you can give.

1. Of every 100 words that you use, about how many do you think are associated in some way with the idea of SHOPPING? __________

2. Of every 100 words that you use, about how many do you think are associated in some way with the idea of ANIMALS? __________

3. Of every 100 words that you use, about how many do you think are associated in some way with the idea of COLLEGE? __________

4 Of every 100 words that you use, about how many do you think are associated in some way with the idea of SELF-ESTEEM? __________

5. Of every 100 words that you use, about how many do you think are associated in some way with the idea of GOODNESS? __________

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

PART THREE

Instructions: For the questions that follow on the next two pages, you are going to be asked to compare two words, and indicate how similar (or dissimilar) the words are TO YOU, and only to you. You will be asked to assign a number to the degree of similarity between the words. The more ***similar*** the concepts seem to be, the ***smaller*** the number will be. The more ***different*** the concepts seem to be, the ***larger*** the number will be.

To help you know what your numbers mean, use the following comparison as a reference for the amount of mental difference your numbers represent:

> Think about how similar you find the concepts "Snakes" and "Lizards."
>
> We're going to say that "Snakes" and "Lizards" are a moderate distance apart, and we'll call this distance 100 units apart.

So, two words (or phrases) that are about **half as close** as you consider "Snakes" and "Lizards" to be, those words would be about **50** units apart--perhaps even 55 or 61 units apart; it depends on what YOU think. Or, two words that are about **twice as far** as "Snakes" and "Lizards" are, those words would be about **200** units apart--perhaps even 212 or 234, it depends on what YOU think. If two words are **not different at all**, you would write **0**. You can use *any* number equal to or greater than zero.

This example might help you:

> Q: How far apart are breakfast and omelets?

To answer this question, you might first consider how much breakfast and omelets are the same or different *WITH RESPECT TO YOU*, not to anyone else. Then, to determine a numerical value for the difference between breakfast and omelets, you should think about the "100 unit ruler," that was discussed above, which represents the moderate difference that "Snakes" and "Lizards" are from each other. Remember, there is no right answer.

Are breakfast and omelets *more different* from each other than Snakes and Lizards, *or less different* from each other, and by what degree?

One individual in a previous study has indicated that if the difference between Snakes and Lizards is 100, then the difference between breakfast and omelets is about *one-tenth as much*, and this person answered "12" to this question . . . but your value would depend completely on your own views. If you never eat omelets for breakfast, for example, you might not consider these two concepts to be that close.

Please answer all of the questions, even though they may seem unusual or amusing.

Please try to maintain your focus, even if you begin to feel fatigued.

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

Comparison Ruler: Snakes and Lizards are 100 units apart.

More Similar => Smaller Number **More Different => Larger Number**

HOW FAR APART ARE . . .

1. **Animals** and **Good?** __________
2. **Dogs** and **Good?** __________
3. **Cats** and **Good?** __________
4. **Dogs** and **Animals?** __________
5. **Mammals** and **Lizards?** __________
6. **Lizards** and **Good?** __________
7. **Dogs** and **Things I Like?** __________
8. **Animals** and **Cats?** __________
9. **Snakes** and **Good?** __________
10. **Things I Like** and **Lizards?** __________
11. **Snakes** and **Animals?** __________
12. **Mammals** and **Cats?** __________
13. **Snakes** and **Things I Like?** __________
14. **Reptiles** and **Dogs?** __________
15. **Lizards** and **Cats?** __________
16. **Animals** and **Things I Like?** __________
17. **Reptiles** and **Good?** __________
18. **Dogs** and **Snakes?** __________
19. **Cats** and **Things I Like?** __________

PLEASE TURN THE PAGE. **PLEASE TURN THE PAGE.**

<u>Comparison Ruler: Snakes and Lizards are 100 units apart.</u>

More Similar => Smaller Number **More Different => Larger Number**

HOW FAR APART ARE . . .

20. **Animals** and **Mammals?** ________
21. **Snakes** and **Lizards?** ________
22. **Cats** and **Reptiles?** ________
23. **Mammals** and **Snakes?** ________
24. **Things I Like** and **Good?** ________
25. **Lizards** and **Dogs?** ________
26. **Reptiles** and **Animals?** ________
27. **Lizards** and **Reptiles?** ________
28. **Things I Like** and **Mammals?** ________
29. **Snakes** and **Cats?** ________
30. **Dogs** and **Mammals?** ________
31. **Animals** and **Lizards?** ________
32. **Dogs** and **Cats?** ________
33. **Reptiles** and **Mammals?** ________
34. **Reptiles** and **Things I Like?** ________
35. **Mammals** and **Good?** ________
36. **Snakes** and **Reptiles?** ________

WHEN YOU ARE DONE, PLEASE GO ON TO THE NEXT SECTION.
<u>DO NOT</u> RETURN TO THIS SECTION AT ANY TIME.

PLEASE TURN THE PAGE. **PLEASE TURN THE PAGE.**

PART FOUR

1. Using some or all of the words below, draw **<u>ONE</u> hierarchy**. You may see several hierarchies in this group of words; please draw the one that comes to your mind first. *<u>You may use any or all of the words, but **YOU DO NOT HAVE TO USE ALL OF THE WORDS**.</u>* Please **<u>do not look back</u>** at any of the previous pages.

Remember, a <u>hierarchy</u> is a group of words that are ranked some above others, usually from the most general word to the most specific. At the very top of the hierarchy is one overall word under which all of the other words of the hierarchy fall. Underneath the overall, or most abstract, word are two or more major words into which the overall word can be logically divided based on some criterion. Each of these major words are then further divided into more specific words, and so on.

*<u>You may use any or all of the words, but **YOU DO NOT HAVE TO USE ALL OF THE WORDS**</u>*

dogs fish snakes zoo farm reptiles aquarium
animals frogs mammals insects cats lizards

PLEASE TURN THE PAGE. **PLEASE TURN THE PAGE.**

2. In the list below, circle every word that was mentioned in the research passage that you read at the beginning of the questionnaire. As a reminder, it was titled, "Indicators of Self-Esteem in College-Aged Young Adults: Ethnographical Revelations." Please **do not look back** at any of the previous pages.

Alcohol	Culture	Food	Spending
Dogs	Money	Clothes	Pets
Students	Professors	Animals	University
Experiment	Shopping	Counseling	Testing
Academic	Self-esteem	Cats	Adults

3. Recalling the research passage that you read at the beginning of the questionnaire, what would you say were the author's three main points? Please list the most important point first. Please **do not look back** at any of the previous pages.

Most Important Point:

1.____

Second Most Important Point:

2. ____

Third Most Important Point:

3. ____

THIS CONCLUDES THE QUESTIONNAIRE. THANK YOU FOR YOUR PARTICIPATION.

PLEASE TURN THE QUESTIONNAIRE PACKET UPSIDE DOWN ON YOUR DESK AND REMAIN QUIETLY SEATED UNTIL EVERYONE HAS FINISHED.

A STUDY OF CONCEPTS

Questionnaire ISPA

IMPLICIT

Thank you for agreeing to participate in "A Study of Concepts." In today's study, we are interested in how people think about concepts, or words. We are interested in how particular words might--or might not--be related in people's minds. Because we are looking at several different theories about how people think about words, some of the questions you will be asked today might seem unusual, or even amusing. We ask that you try to remain as focused as you can upon completing the questionnaire, and try to answer the questions to best represent what you are thinking as you complete the questionnaire. Also, we ask that at no time during the questionnaire do you turn back to look at previous questions or responses to help you decide your answers. This is not necessary because there are no right or wrong answers, and your identity will not be associated with your answers in any way.

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Course: ________ **Section:** ________ **Starting Time:** ________ **Gender:** _________

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Below is a hierarchy that researchers have found many people use to organize this particular set of concepts. A **hierarchy** is a group of words, that are ranked, with some words above the others, usually from the most general word to the most specific. At the very top of the hierarchy is one overall word under which all of the other words of the hierarchy fall. Underneath the overall, or most abstract, word are two or more major words into which the overall word can be logically divided based on some principle. Each of these major words are then further divided into more specific words, and so on.

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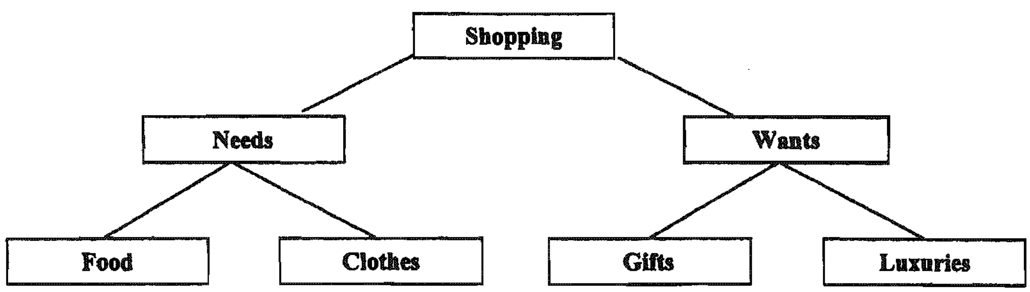

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NOTE: THIS IS THE PAGE 2 THAT APPEARS IN THE QUESIONNAIRES FOR PARTICIPANTS IN THE IMPLICIT, UNPRIMED CONDITION

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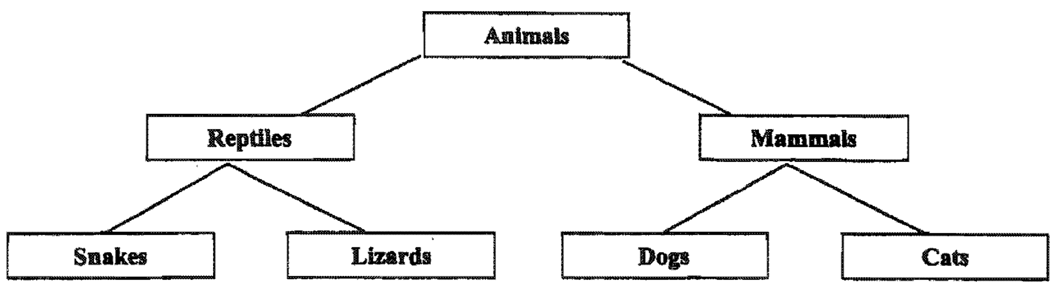

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* * *

After you have underlined and circled in the passage above, think again about what you just read. The researchers stated that *shopping is good* because it provides individuals with some comfort that they use to support their overall sense of well-being. Please formulate **your own argument** why shopping is good. Even if you don't think shopping is good, **what would you say if you were going to argue that shopping is good**, or at least much better than most people think it is? Write your response below. Try to think about your argument, and write, for the entire allotment of time.

Shopping is good because ____

____

____

____

____

____

____

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

PART TWO

People differ in how they link together different concepts. In this section, for each question, think for a moment about the capitalized word, and about how many other **related or associated** words that you might know. You probably know a lot of words that are associated with COMMUNICATION, for example, but probably not as many that are associated with QUANTUM PHYSICS. Answer each question with the best estimate that you can give.

1. Of every 100 words that you use, about how many do you think are associated in some way with the idea of SHOPPING? __________

2. Of every 100 words that you use, about how many do you think are associated in some way with the idea of ANIMALS? __________

3. Of every 100 words that you use, about how many do you think are associated in some way with the idea of COLLEGE? __________

4 Of every 100 words that you use, about how many do you think are associated in some way with the idea of SELF-ESTEEM? __________

5. Of every 100 words that you use, about how many do you think are associated in some way with the idea of GOODNESS? __________

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

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Instructions: For the questions that follow on the next two pages, you are going to be asked to compare two words, and indicate how similar (or dissimilar) the words are TO YOU, and only to you. You will be asked to assign a number to the degree of similarity between the words. The more ***similar*** the concepts seem to be, the ***smaller*** the number will be. The more ***different*** the concepts seem to be, the ***larger*** the number will be.

To help you know what your numbers mean, use the following comparison as a reference for the amount of mental difference your numbers represent:

Think about how similar you find the concepts "Wants" (i.e., things that you want) and "Gifts."

We're going to say that "Wants" and "Gifts" are a moderate distance apart, and we'll call this distance 100 units apart.

So, two words (or phrases) that are about **half as close** as you consider "Wants" and "Gifts" to be, those words would be about **50** units apart--perhaps even 55 or 61 units apart; it depends on what YOU think. Or, two words that are about **twice as far** as "Wants" and "Gifts" are, those words would be about **200** units apart--perhaps even 212 or 234, it depends on what YOU think. If two words are **not different at all**, you would write **0**. You can use *any* number equal to or greater than zero.

This example might help you:

Q: How far apart are breakfast and omelets?

To answer this question, you might first consider how much breakfast and omelets are the same or different *WITH RESPECT TO YOU*, not to anyone else. Then, to determine a numerical value for the difference between breakfast and omelets, you should think about the "100 unit ruler," that was discussed above, which represents the moderate difference that "Wants" and "Gifts" are from each other. Remember, there is no right answer.

Are breakfast and omelets *more different* from each other than Wants and Gifts, *or less different* from each other, and by what degree?

One individual in a previous study has indicated that if the difference between Wants and Gifts is 100, then the difference between breakfast and omelets is about *one-tenth as much*, and this person answered "12" to this question . . . but your value would depend completely on your own views. If you never eat omelets for breakfast, for example, you might not consider these two concepts to be that close.

Please answer all of the questions, even though they may seem unusual or amusing.

Please try to maintain your focus, even if you begin to feel fatigued.

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

Comparison Ruler: Wants and Gifts are 100 units apart.

More Similar => Smaller Number **More Different => Larger Number**

HOW FAR APART ARE . . .

1. **Shopping** and **Good?** __________
2. **Clothes** and **Good?** __________
3. **Food** and **Good?** __________
4. **Needs** and **Wants?** __________
5. **Gifts** and **Luxuries?** __________
6. **Food** and **Things I Like?** __________
7. **Clothes** and **Food?** __________
8. **Wants** and **Shopping?** __________
9. **Luxuries** and **Good?** __________
10. **Gifts** and **Shopping?** __________
11. **Needs** and **Food?** __________
12. **Things I Like** and **Good?** __________
13. **Clothes** and **Gifts?** __________
14. **Wants** and **Luxuries?** __________
15. **Needs** and **Good?** __________
16. **Shopping** and **Things I Like?** __________
17. **Food** and **Luxuries?** __________
18. **Wants** and **Gifts?** __________
19. **Things I Like** and **Needs?** __________

PLEASE TURN THE PAGE. **PLEASE TURN THE PAGE.**

Comparison Ruler: Wants and Gifts are 100 units apart.

More Similar => Smaller Number **More Different => Larger Number**

HOW FAR APART ARE . . .

20. **Clothes** and **Wants?** ________
21. **Needs** and **Shopping?** ________
22. **Food** and **Gifts?** ________
23. **Luxuries** and **Things I Like?** ________
24. **Wants** and **Food?** ________
25. **Good** and **Gifts?** ________
26. **Luxuries** and **Shopping?** ________
27. **Gifts** and **Needs?** ________
28. **Food** and **Shopping?** ________
29. **Things I Like** and **Clothes?** ________
30. **Good** and **Wants?** ________
31. **Luxuries** and **Needs?** ________
32. **Gifts** and **Things I Like?** ________
33. **Shopping** and **Clothes?** ________
34. **Needs** and **Clothes?** ________
35. **Things I Like** and **Wants?** ________
36. **Clothes** and **Luxuries?** ________

WHEN YOU ARE DONE, PLEASE GO ON TO THE NEXT SECTION.
DO NOT RETURN TO THIS SECTION AT ANY TIME.

PLEASE TURN THE PAGE. **PLEASE TURN THE PAGE.**

PART FOUR

1. Using some or all of the words below, draw **ONE hierarchy**. You may see several hierarchies in this group of words; please draw the one that comes to your mind first. *You may use any or all of the words, but* ***YOU DO NOT HAVE TO USE ALL OF THE WORDS.*** Please **do not look back** at any of the previous pages.

Remember, a hierarchy is a group of words that are ranked some above others, usually from the most general word to the most specific. At the very top of the hierarchy is one overall word under which all of the other words of the hierarchy fall. Underneath the overall, or most abstract, word are two or more major words into which the overall word can be logically divided based on some criterion. Each of these major words are then further divided into more specific words, and so on.

You may use any or all of the words, but ***YOU DO NOT HAVE TO USE ALL OF THE WORDS***

food money luxuries buying spending wants credit cards
shopping bills needs cash clothes gifts

PLEASE TURN THE PAGE. **PLEASE TURN THE PAGE.**

2. In the list below, circle every word that was mentioned in the research passage that you read at the beginning of the questionnaire. As a reminder, it was titled, "Indicators of Self-Esteem in College-Aged Young Adults: Ethnographical Revelations." Please **do not look back** at any of the previous pages.

Alcohol	Culture	Food	Spending
Dogs	Money	Clothes	Pets
Students	Professors	Animals	University
Experiment	Shopping	Counseling	Testing
Academic	Self-esteem	Cats	Adults

3. Recalling the research passage that you read at the beginning of the questionnaire, what would you say were the author's three main points? Please list the most important point first. Please **do not look back** at any of the previous pages.

Most Important Point:

1.____

Second Most Important Point:

2. ____

Third Most Important Point:

3. ____

THIS CONCLUDES THE QUESTIONNAIRE. THANK YOU FOR YOUR PARTICIPATION.

PLEASE TURN THE QUESTIONNAIRE PACKET UPSIDE DOWN ON YOUR DESK AND REMAIN QUIETLY SEATED UNTIL EVERYONE HAS FINISHED.

A STUDY OF CONCEPTS

Questionnaire CA1

CONTROL (With explicit concept questions)

Thank you for agreeing to participate in "A Study of Concepts." In today's study, we are interested in how people think about concepts, or words. We are interested in how particular words might--or might not--be related in people's minds. Because we are looking at several different theories about how people think about words, some of the questions you will be asked today might seem unusual, or even amusing. We ask that you try to remain as focused as you can upon completing the questionnaire, and try to answer the questions to best represent what you are thinking as you complete the questionnaire. Also, we ask that at no time during the questionnaire do you turn back to look at previous questions or responses to help you decide your answers. This is not necessary because there are no right or wrong answers, and your identity will not be associated with your answers in any way.

Also, please note that there are up to 24 different versions of this questionnaire being administered today. So, we are asking that you refrain from looking at your classmates' questionnaires to compare answers because the people sitting around you probably are completing a slightly different questionnaire than you are. Thanks again for your help.

Before we being, please complete the following information:

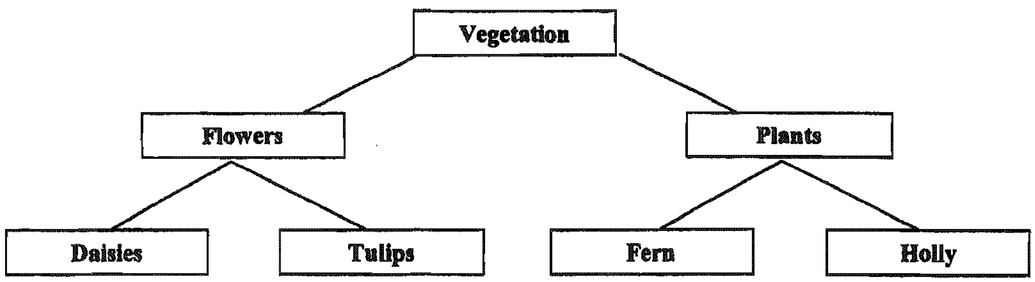
Course: ________ **Section:** ________ **Starting Time:** ________ **Gender:** ________

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED.

BACKGROUND INFORMATION

Below is a hierarchy that researchers have found many people use to organize this particular set of concepts. A **hierarchy** is a group of words, that are ranked, with some words above the others, usually from the most general word to the most specific. At the very top of the hierarchy is one overall word under which all of the other words of the hierarchy fall. Underneath the overall, or most abstract, word are two or more major words into which the overall word can be logically divided based on some principle. Each of these major words are then further divided into more specific words, and so on.

Study this hierarchy closely until you feel confident that you know it very well, and could write it down exactly as it is if asked to draw a hierarchy of these concepts.



PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

PART ONE

Instructions: Please read the following research passage very carefully, and do the following: 1.) While you are reading, please underline the author's main points. 2.) After you are done reading, CIRCLE the single most important point of the passage. Finally, 3.) At the end of the research passage, please answer the question that follows. This portion of the questionnaire is timed, so when you are done with your tasks on the passage, please try to think about and write an answer to the question below for the entire time that is allotted. Stop writing when time is called. Please do not return to this response after you have turned the page.

RESEARCH PASSAGE

From "Indicators of Self-Esteem in College-Aged Young Adults: Ethnographical Revelations," in the *Journal of Contemporary Personality*, vol. 65, no. 2, pp. 1132 - 1146.

> Several recent studies (e.g., Marcus & James, 1999; Zimmer, Frank, & Walton, 2000) have examined the mental health of college students and found that as many as half of all students suffer from low levels of self-esteem. This is a critical finding because decreased levels of self-esteem can negatively affect academic performance, and can contribute to campus problems such as alcohol misuse and abuse. Conversely, increased levels of self-esteem are related to improved academic performance and better health. In an innovative series of studies, Zimmer et al. (2000) have interviewed thousands of students, and studied some of the many methods that students have reported using to improve the way they feel about themselves. Interestingly, a number of students have reported that mediation can represent an excellent source of a type of pleasure that has been shown to directly increase self-esteem.

* * *

After you have underlined and circled in the passage above, think again about what you just read. The researchers stated that as many as half of all students suffer from low levels of self-esteem. Why do you think this is, and what solutions do you have to offer? Try to think about your argument, and write for the entire allotment of time.

Students suffer from low levels of self-esteem because ______________________________

____

____

____

Some possible solutions to this problem are ______________________________________

____

____

____

____

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

PART TWO

People differ in how they link together different concepts. In this section, for each question, think for a moment about the capitalized word, and about how many other **related or associated** words that you might know. You probably know a lot of words that are associated with COMMUNICATION, for example, but probably not as many that are associated with QUANTUM PHYSICS. Answer each question with the best estimate that you can give.

1. Of every 100 words that you use, about how many do you think are associated in some way with the idea of SHOPPING? __________

2. Of every 100 words that you use, about how many do you think are associated in some way with the idea of ANIMALS? __________

3. Of every 100 words that you use, about how many do you think are associated in some way with the idea of COLLEGE? __________

4 Of every 100 words that you use, about how many do you think are associated in some way with the idea of SELF-ESTEEM? __________

5. Of every 100 words that you use, about how many do you think are associated in some way with the idea of GOODNESS? __________

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

PART THREE

Instructions: For the questions that follow on the next two pages, you are going to be asked to compare two words, and indicate how similar (or dissimilar) the words are TO YOU, and only to you. You will be asked to assign a number to the degree of similarity between the words. The more ***similar*** the concepts seem to be, the ***smaller*** the number will be. The more ***different*** the concepts seem to be, the ***larger*** the number will be.

To help you know what your numbers mean, use the following comparison as a reference for the amount of mental difference your numbers represent:

> Think about how similar you find the concepts "Snakes" and "Lizards."
>
> We're going to say that "Snakes" and "Lizards" are a moderate distance apart, and we'll call this distance 100 units apart.

So, two words (or phrases) that are about **half as close** as you consider "Snakes" and "Lizards" to be, those words would be about **50** units apart--perhaps even 55 or 61 units apart; it depends on what YOU think. Or, two words that are about **twice as far** as "Snakes" and "Lizards" are, those words would be about **200** units apart--perhaps even 212 or 234, it depends on what YOU think. If two words are **not different at all**, you would write **0**. You can use *any* number equal to or greater than zero.

This example might help you:

> Q: How far apart are breakfast and omelets?

To answer this question, you might first consider how much breakfast and omelets are the same or different *WITH RESPECT TO YOU*, not to anyone else. Then, to determine a numerical value for the difference between breakfast and omelets, you should think about the "100 unit ruler," that was discussed above, which represents the moderate difference that "Snakes" and "Lizards" are from each other. Remember, there is no right answer.

Are breakfast and omelets *more different* from each other than Snakes and Lizards, *or less different* from each other, and by what degree?

One individual in a previous study has indicated that if the difference between Snakes and Lizards is 100, then the difference between breakfast and omelets is about *one-tenth as much*, and this person answered "12" to this question . . . but your value would depend completely on your own views. If you never eat omelets for breakfast, for example, you might not consider these two concepts to be that close.

Please answer all of the questions, even though they may seem unusual or amusing.

Please try to maintain your focus, even if you begin to feel fatigued.

PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.

Comparison Ruler: Snakes and Lizards are 100 units apart.

More Similar => Smaller Number **More Different => Larger Number**

HOW FAR APART ARE . . .

1. **Animals** and **Good?** __________
2. **Dogs** and **Good?** __________
3. **Cats** and **Good?** __________
4. **Dogs** and **Animals?** __________
5. **Mammals** and **Lizards?** __________
6. **Lizards** and **Good?** __________
7. **Dogs** and **Things I Like?** __________
8. **Animals** and **Cats?** __________
9. **Snakes** and **Good?** __________
10. **Things I Like** and **Lizards?** __________
11. **Snakes** and **Animals?** __________
12. **Mammals** and **Cats?** __________
13. **Snakes** and **Things I Like?** __________
14. **Reptiles** and **Dogs?** __________
15. **Lizards** and **Cats?** __________
16. **Animals** and **Things I Like?** __________
17. **Reptiles** and **Good?** __________
18. **Dogs** and **Snakes?** __________
19. **Cats** and **Things I Like?** __________

PLEASE TURN THE PAGE. **PLEASE TURN THE PAGE.**

Comparison Ruler: Snakes and Lizards are 100 units apart.

More Similar => Smaller Number **More Different => Larger Number**

HOW FAR APART ARE . . .

20. **Animals** and **Mammals?** ________
21. **Snakes** and **Lizards?** ________
22. **Cats** and **Reptiles?** ________
23. **Mammals** and **Snakes?** ________
24. **Things I Like** and **Good?** ________
25. **Lizards** and **Dogs?** ________
26. **Reptiles** and **Animals?** ________
27. **Lizards** and **Reptiles?** ________
28. **Things I Like** and **Mammals?** ________
29. **Snakes** and **Cats?** ________
30. **Dogs** and **Mammals?** ________
31. **Animals** and **Lizards?** ________
32. **Dogs** and **Cats?** ________
33. **Reptiles** and **Mammals?** ________
34. **Reptiles** and **Things I Like?** ________
35. **Mammals** and **Good?** ________
36. **Snakes** and **Reptiles?** ________

WHEN YOU ARE DONE, PLEASE GO ON TO THE NEXT SECTION.
DO NOT RETURN TO THIS SECTION AT ANY TIME.

PLEASE TURN THE PAGE. **PLEASE TURN THE PAGE.**

PART FOUR

1. Using some or all of the words below, draw **ONE hierarchy**. You may see several hierarchies in this group of words; please draw the one that comes to your mind first. *You may use any or all of the words, but* ***YOU DO NOT HAVE TO USE ALL OF THE WORDS.*** Please **do not look back** at any of the previous pages.

Remember, a hierarchy is a group of words that are ranked some above others, usually from the most general word to the most specific. At the very top of the hierarchy is one overall word under which all of the other words of the hierarchy fall. Underneath the overall, or most abstract, word are two or more major words into which the overall word can be logically divided based on some criterion. Each of these major words are then further divided into more specific words, and so on.

You may use any or all of the words, but ***YOU DO NOT HAVE TO USE ALL OF THE WORDS***

dogs fish snakes zoo farm reptiles aquarium
animals frogs mammals insects cats lizards

PLEASE TURN THE PAGE. **PLEASE TURN THE PAGE.**

2. In the list below, circle every word that was mentioned in the research passage that you read at the beginning of the questionnaire. As a reminder, it was titled, "Indicators of Self-Esteem in College-Aged Young Adults: Ethnographical Revelations." Please **do not look back** at any of the previous pages.

Alcohol	Culture	Food	Spending
Dogs	Money	Clothes	Pets
Students	Professors	Animals	University
Experiment	Shopping	Counseling	Testing
Academic	Self-esteem	Cats	Adults

3. Recalling the research passage that you read at the beginning of the questionnaire, what would you say were the author's three main points? Please list the most important point first. Please **do not look back** at any of the previous pages.

Most Important Point:

1.____

Second Most Important Point:

2. ____

Third Most Important Point:

3. ____

THIS CONCLUDES THE QUESTIONNAIRE. THANK YOU FOR YOUR PARTICIPATION.

PLEASE TURN THE QUESTIONNAIRE PACKET UPSIDE DOWN ON YOUR DESK AND REMAIN QUIETLY SEATED UNTIL EVERYONE HAS FINISHED.

Appendix O

Scattergram Overlays of the Galileo Aggregate Space Plots

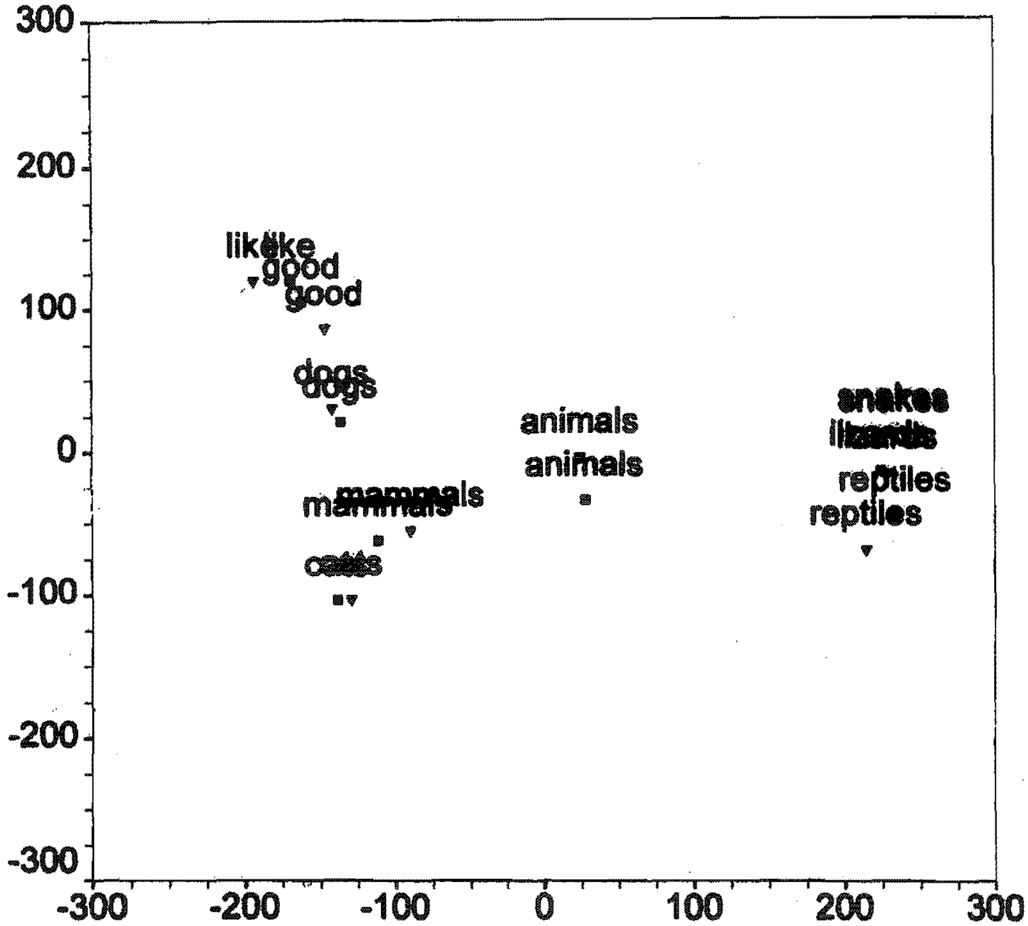


Figure O-1. A scattergram overlay of the first two real dimensions of two Galileo aggregate space plots: Explicit, primed, message directed toward the superordinate concept (▲) and Explicit control (■).

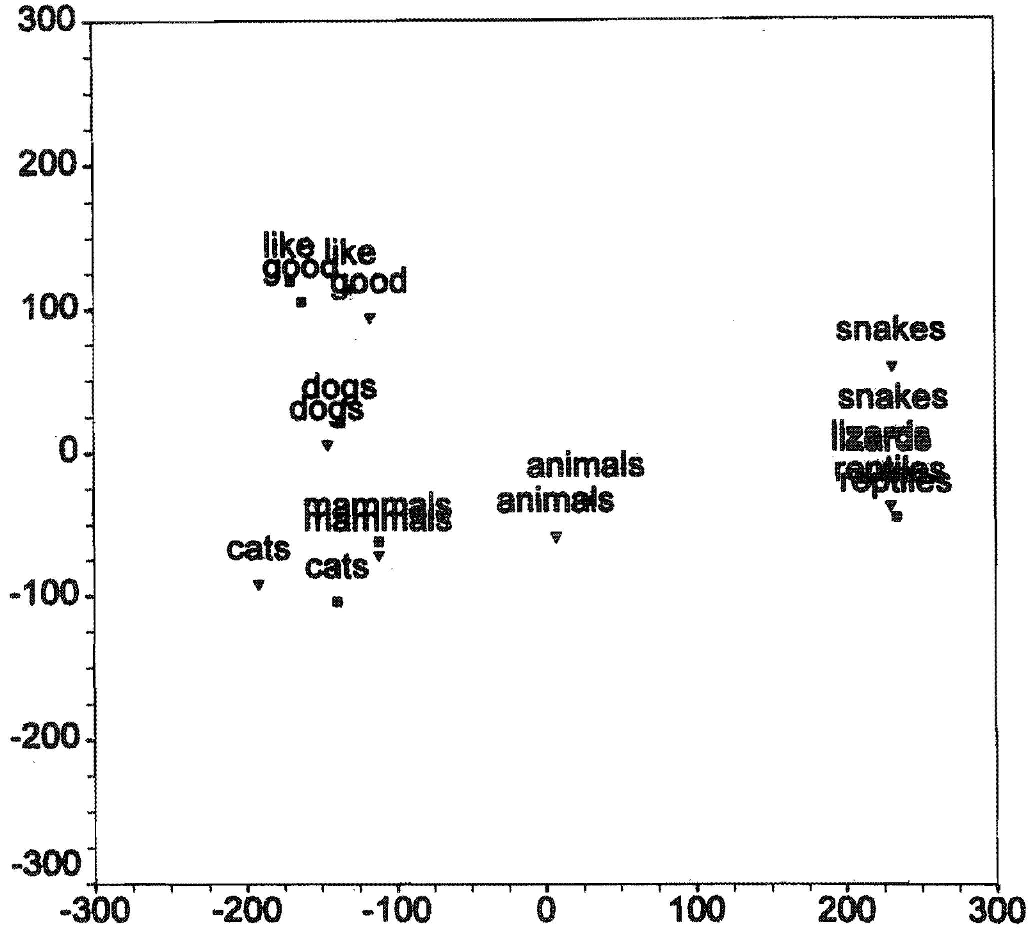


Figure O-2. A scattergram overlay of the first two real dimensions of two Galileo aggregate space plots: Explicit, primed, message directed toward the subordinate 1 concept (▲) and Explicit control (■).

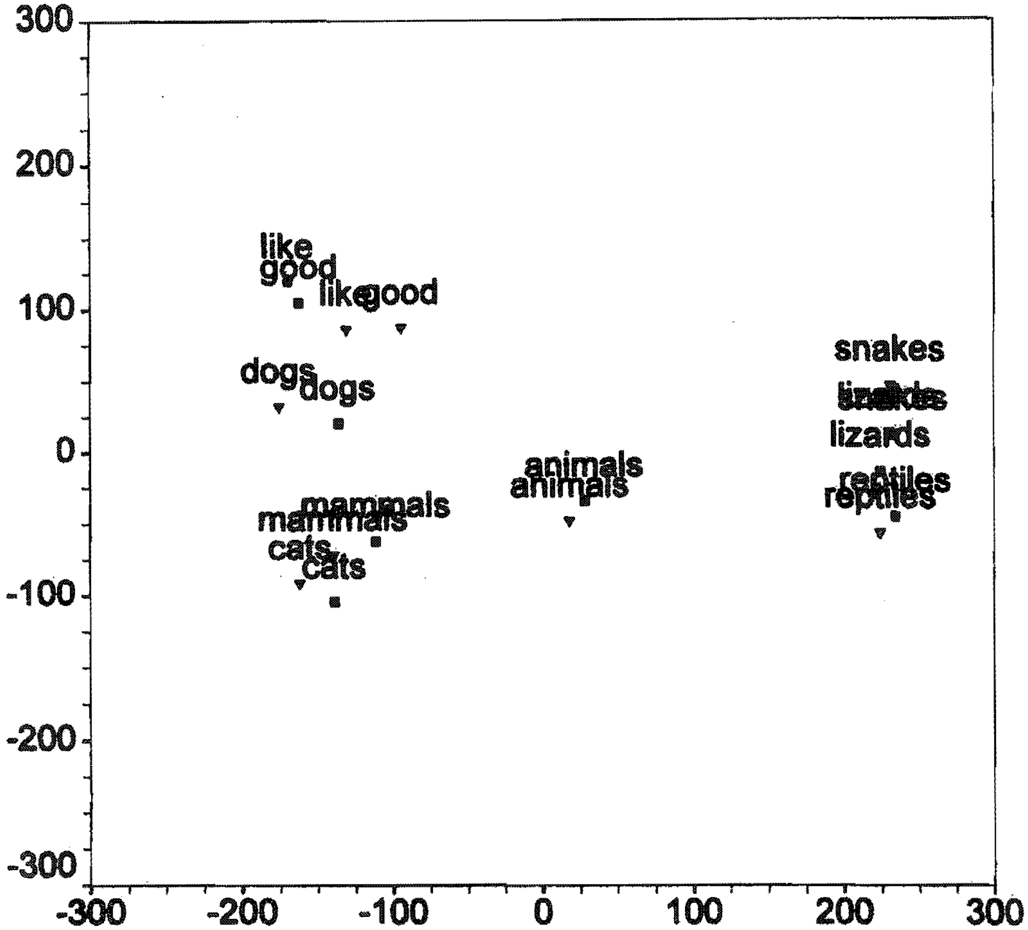


Figure O-3. A scattergram overlay of the first two real dimensions of two Galileo aggregate space plots: Explicit, primed, message directed toward the subordinate 2 concept (▲) and Explicit control (■).

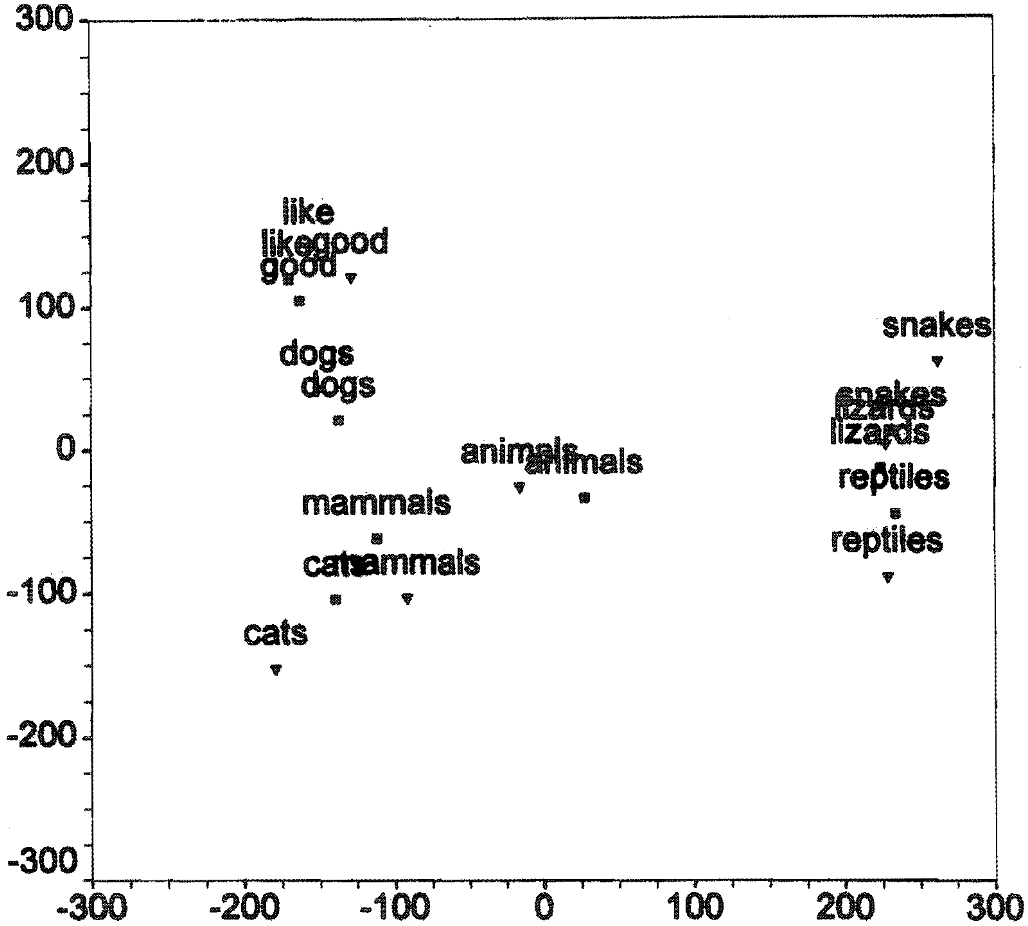


Figure O-4. A scattergram overlay of the first two real dimensions of two Galileo aggregate space plots: Explicit, unprimed, message directed toward the superordinate concept (▲) and Explicit control (■).

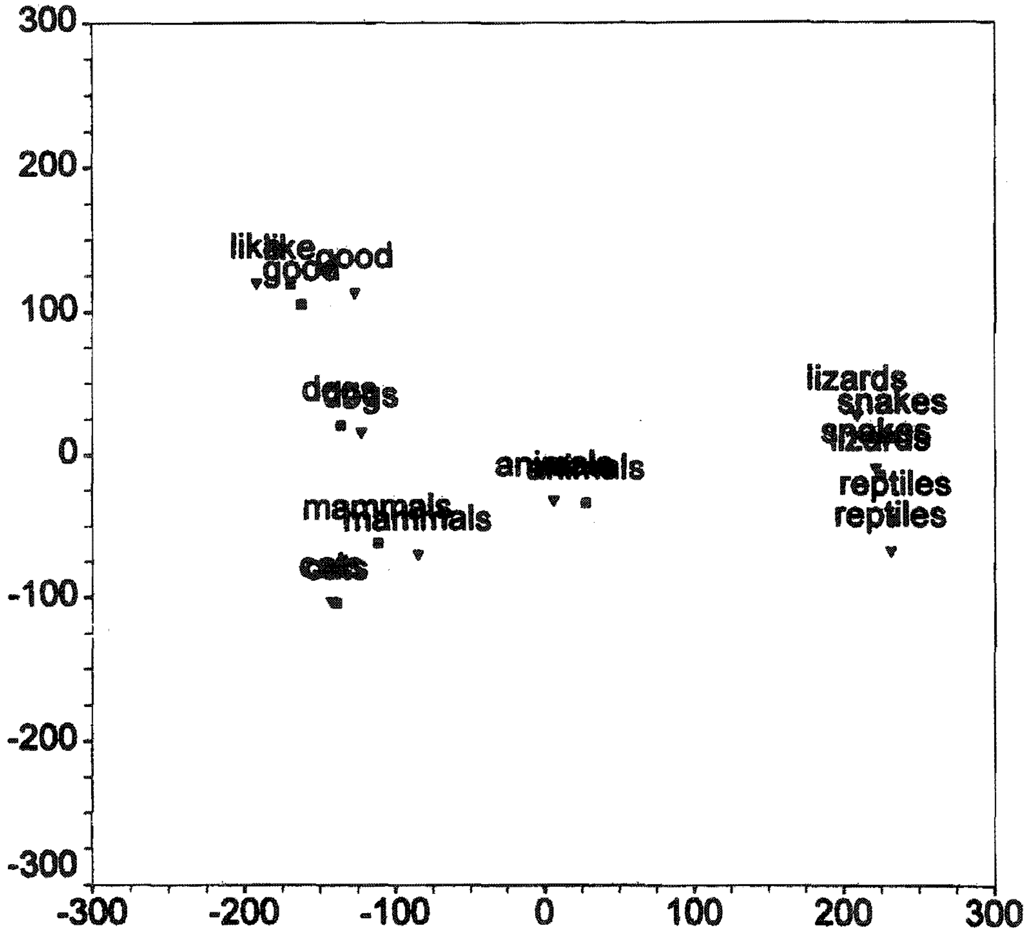


Figure O-5. A scattergram overlay of the first two real dimensions of two Galileo aggregate space plots: Explicit, unprimed, message directed toward the subordinate 1 concept (▲) and Explicit control (■).

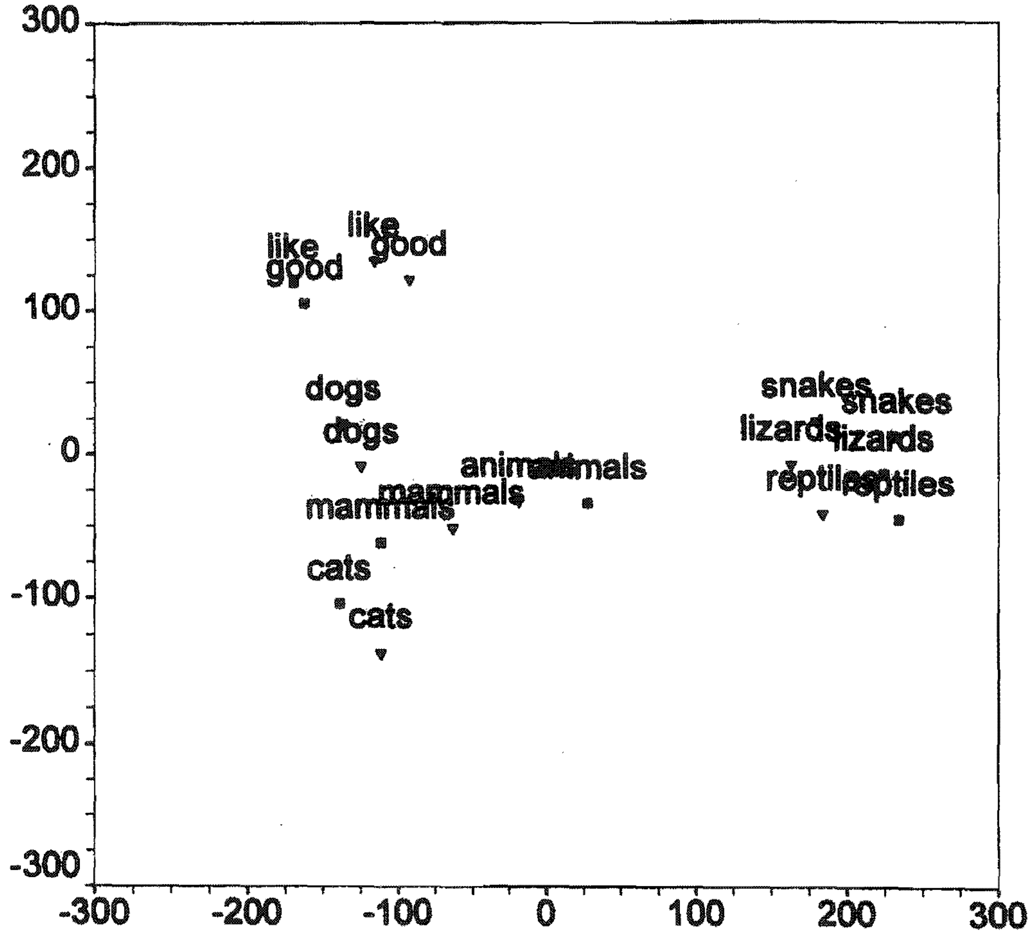


Figure O-6. A scattergram overlay of the first two real dimensions of two Galileo aggregate space plots: Explicit, unprimed, message directed toward the subordinate 2 concept (▲) and Explicit control (■).

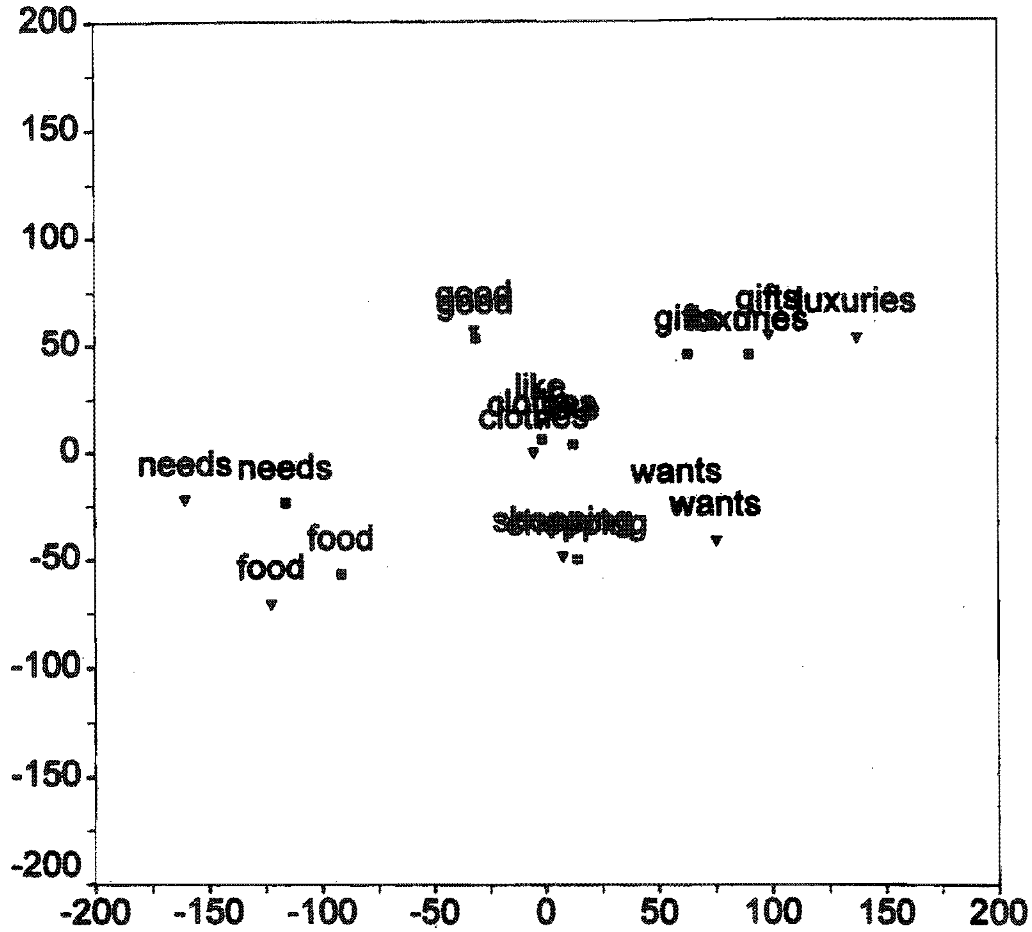


Figure O-7. A scattergram overlay of the first two real dimensions of two Galileo aggregate space plots: Implicit, primed, message directed toward the superordinate concept (▲) and Implicit control (■).

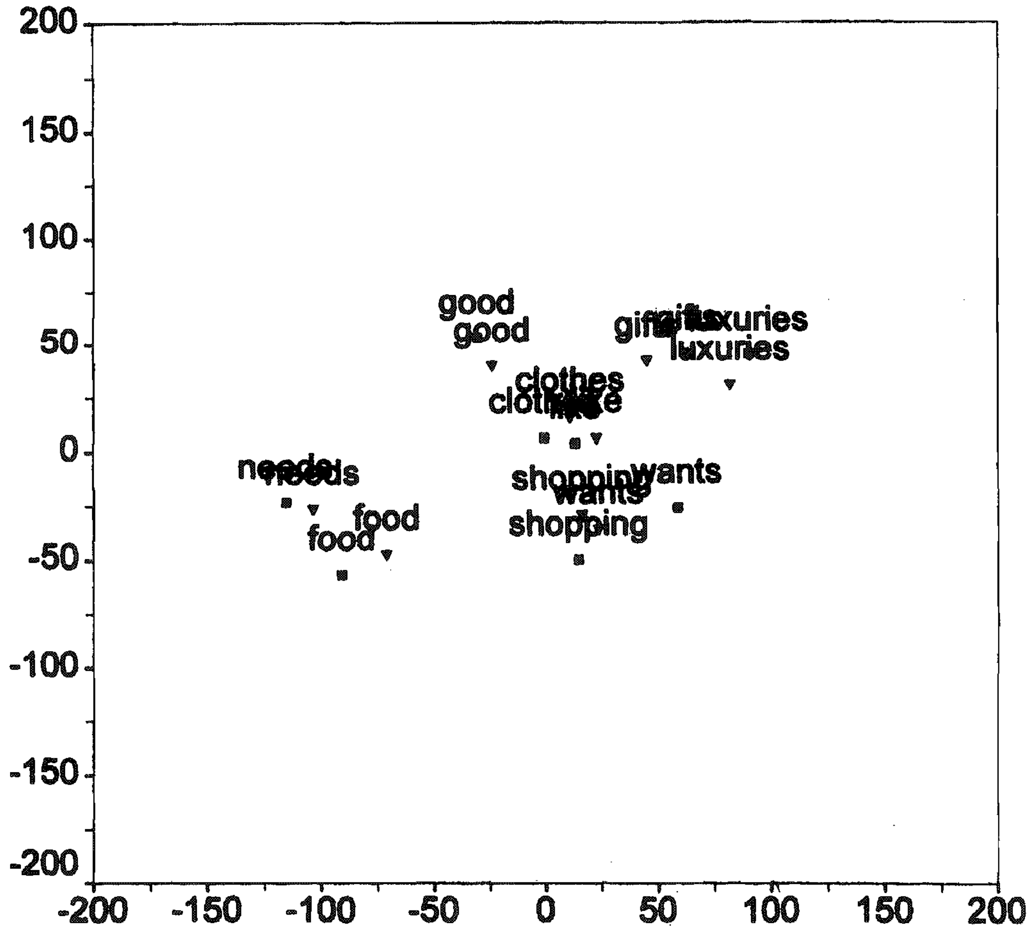


Figure O-8. A scattergram overlay of the first two real dimensions of two Galileo aggregate space plots: Implicit, primed, message directed toward the subordinate 1 concept (▲) and Implicit control (■).

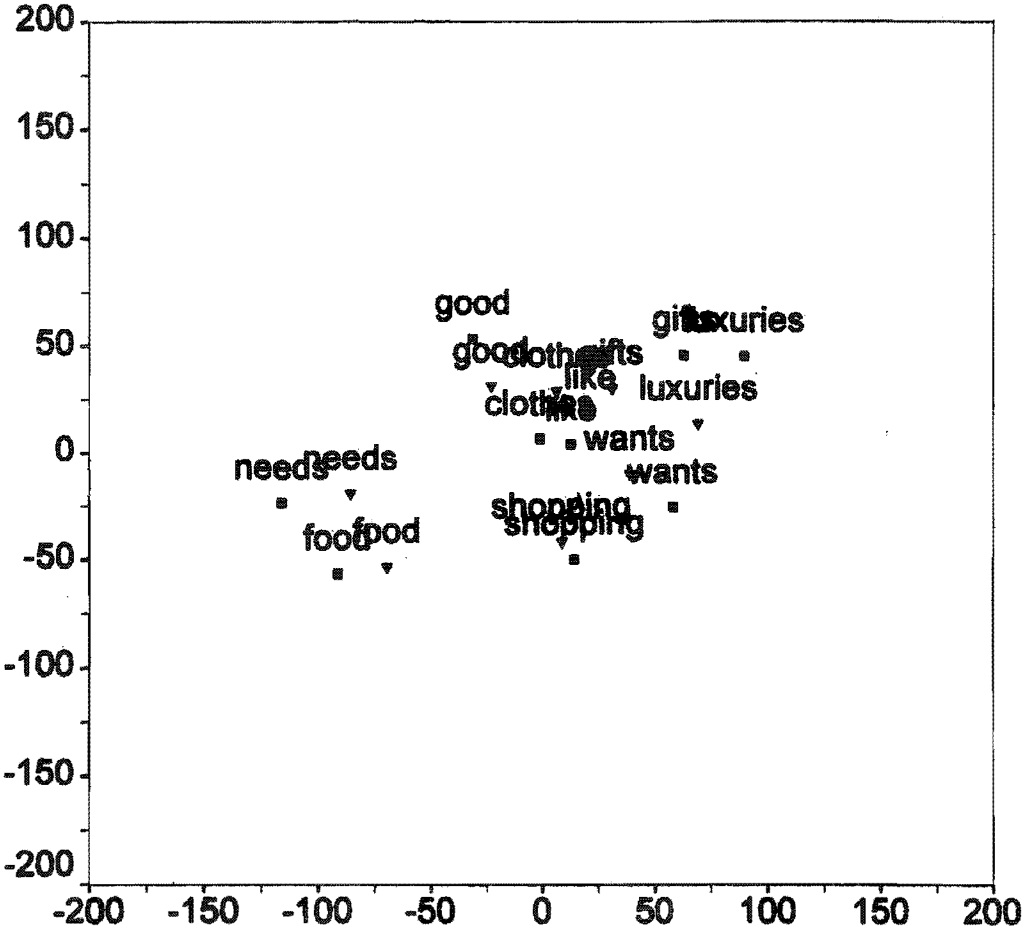


Figure O-9. A scattergram overlay of the first two real dimensions of two Galileo aggregate space plots: Implicit, primed, message directed toward the subordinate 2 concept (▲) and Implicit control (■).

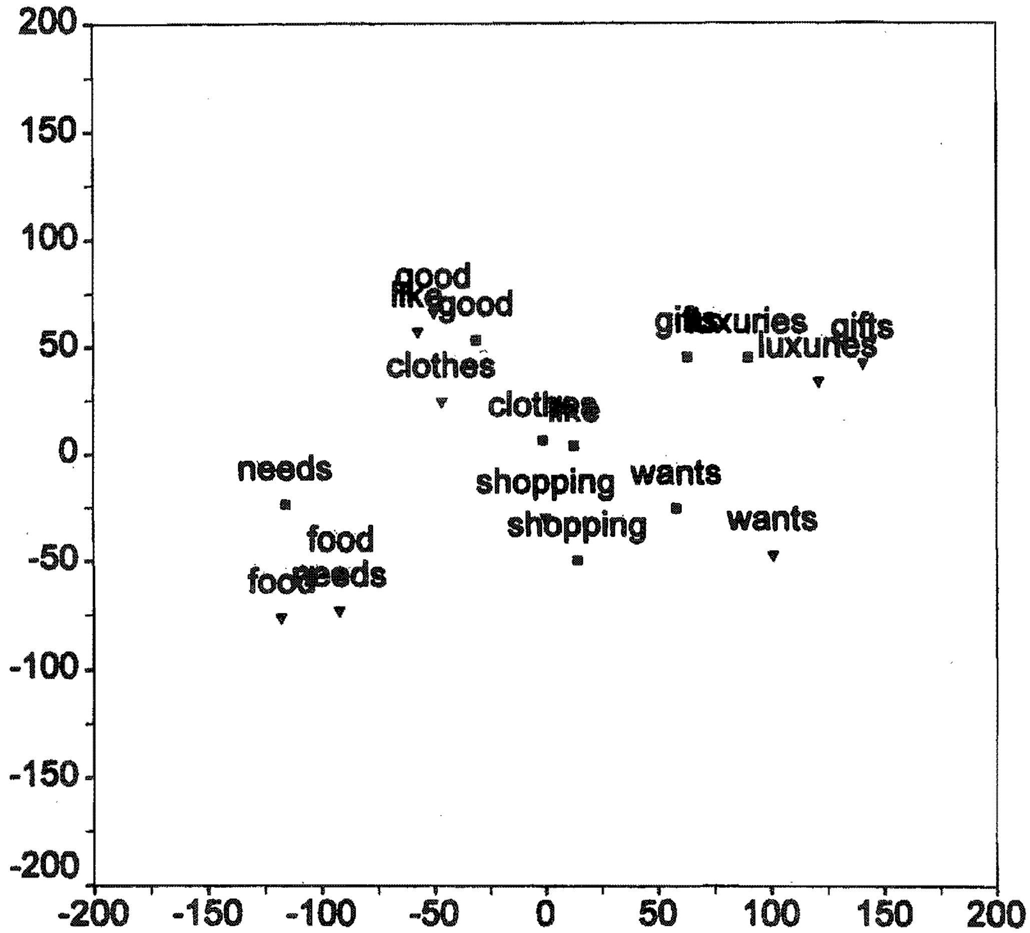


Figure O-10. A scattergram overlay of the first two real dimensions of two Galileo aggregate space plots: Implicit, unprimed, message directed toward the superordinate concept (▲) and Implicit control (■).

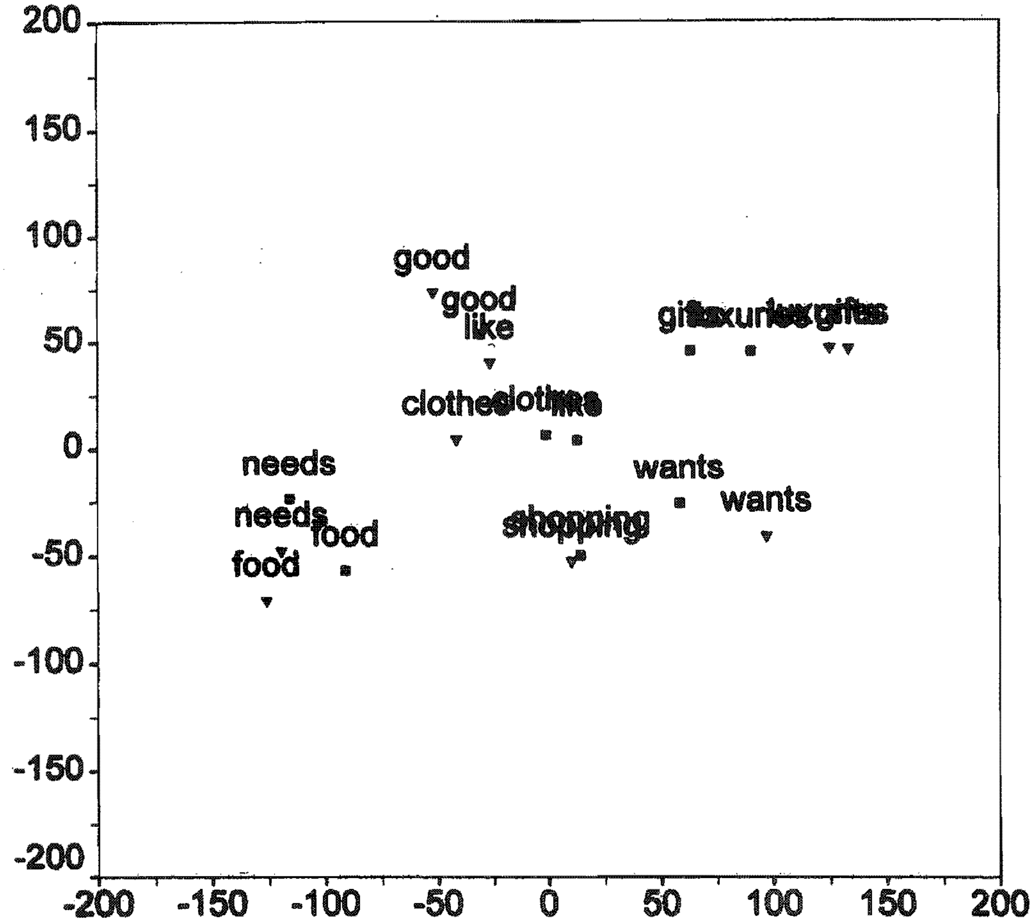


Figure O-11. A scattergram overlay of the first two real dimensions of two Galileo aggregate space plots: Implicit, unprimed, message directed toward the subordinate 1 concept (▲) and Implicit control (■).

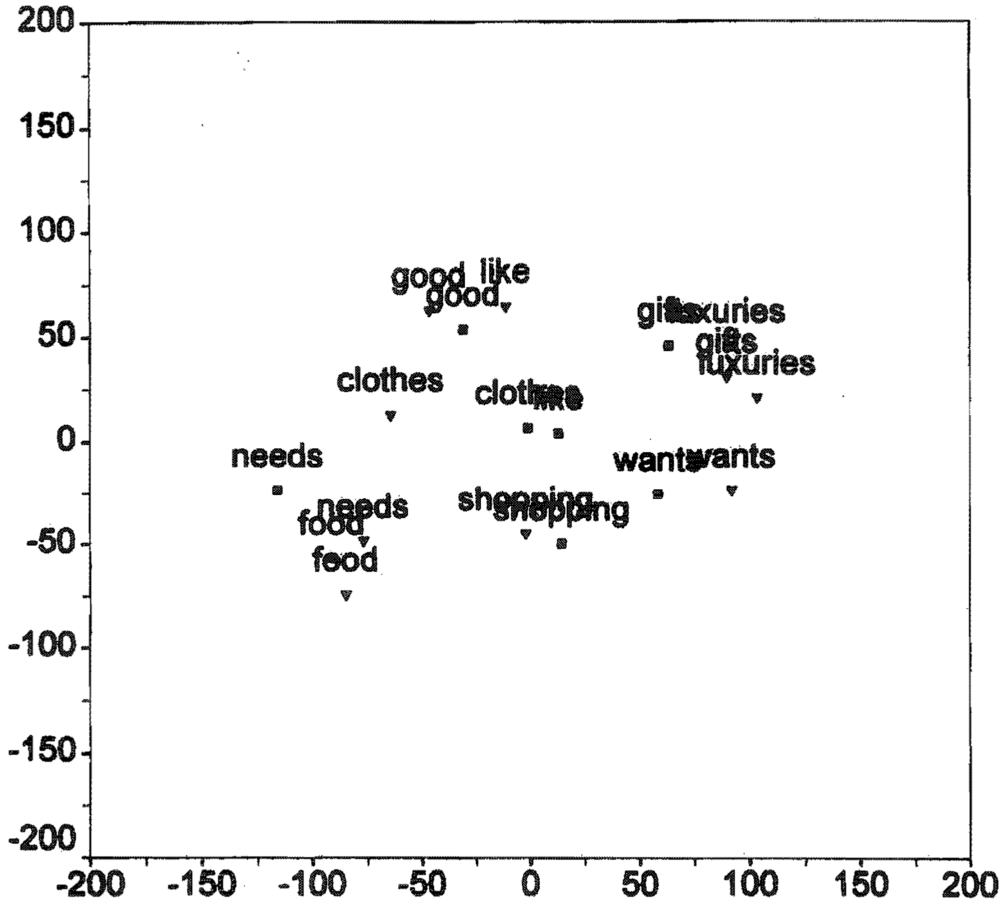


Figure O-12. A scattergram overlay of the first two real dimensions of two Galileo aggregate space plots: Implicit, unprimed, message directed toward the subordinate 2 concept (▲) and Implicit control (■).

Appendix P

ANOVA Results: 2 (Hierarchy: explicit vs. implicit) x 2 (Priming: primed vs. unprimed) x2 (Gender: male vs. female) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2) on Individual Attitudes and Beliefs

Table P-1

Analysis of Variance of Attitude Toward the Superordinate Concept (Animals or Shopping)

Tests of Between-Subjects Effects

Dependent Variable: LNSUPLIK

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	176.882[b]	24	7.370	17.715	.000	.591	425.157	1.000
Intercept	.153	1	.153	.368	.544	.001	.368	.093
AVSPAN	101.717	1	101.717	244.490	.000	.454	244.490	1.000
QUESTHI	4.989	1	4.989	11.992	.001	.039	11.992	.932
QUESTPRI	9.854E-02	1	9.854E-02	.237	.627	.001	.237	.077
GENDER	2.199	1	2.199	5.286	.022	.018	5.286	.630
NEWTARG	.533	2	.266	.640	.528	.004	1.281	.157
QUESTHI * QUESTPRI	1.969E-02	1	1.969E-02	.047	.828	.000	.047	.055
QUESTHI * GENDER	.214	1	.214	.514	.474	.002	.514	.110
QUESTPRI * GENDER	6.585E-02	1	6.585E-02	.158	.691	.001	.158	.068
QUESTHI * QUESTPRI * GENDER	1.203E-02	1	1.203E-02	.029	.865	.000	.029	.053
QUESTHI * NEWTARG	.551	2	.275	.662	.517	.004	1.324	.161
QUESTPRI * NEWTARG	2.124	2	1.062	2.552	.080	.017	5.105	.508
QUESTHI * QUESTPRI * NEWTARG	.578	2	.289	.695	.500	.005	1.390	.167
GENDER * NEWTARG	.348	2	.174	.418	.659	.003	.837	.118
QUESTHI * GENDER * NEWTARG	.401	2	.201	.482	.618	.003	.964	.129
QUESTPRI * GENDER * NEWTARG	1.556	2	.778	1.869	.156	.013	3.739	.388
QUESTHI * QUESTPRI * GENDER * NEWTARG	.842	2	.421	1.012	.365	.007	2.025	.226
Error	122.315	294	.416					
Total	7627.845	319						
Corrected Total	299.197	318						

a. Computed using alpha = .05

b. R Squared = .591 (Adjusted R Squared = .558)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Table P-2

Analysis of Variance of Attitude Toward the Subordinate 1 Concept (Dogs or Clothes)

Tests of Between-Subjects Effects

Dependent Variable: LNS1LIK

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	124.981[b]	24	5.208	10.526	.000	.466	252.625	1.000
Intercept	1.141E-02	1	1.141E-02	.023	.879	.000	.023	.053
AVSPAN	81.709	1	81.709	165.159	.000	.364	165.159	1.000
QUESTHI	1.498	1	1.498	3.028	.083	.010	3.028	.411
QUESTPRI	.704	1	.704	1.423	.234	.005	1.423	.221
GENDER	5.399	1	5.399	10.912	.001	.036	10.912	.909
NEWTARG	.347	2	.174	.351	.704	.002	.702	.106
QUESTHI * QUESTPRI	2.325	1	2.325	4.700	.031	.016	4.700	.580
QUESTHI * GENDER	2.240	1	2.240	4.527	.034	.015	4.527	.564
QUESTPRI * GENDER	.522	1	.522	1.056	.305	.004	1.056	.176
QUESTHI * QUESTPRI * GENDER	.187	1	.187	.379	.539	.001	.379	.094
QUESTHI * NEWTARG	1.099	2	.550	1.111	.331	.008	2.222	.245
QUESTPRI * NEWTARG	.722	2	.361	.730	.483	.005	1.459	.173
QUESTHI * QUESTPRI * NEWTARG	.209	2	.104	.211	.810	.001	.422	.083
GENDER * NEWTARG	.579	2	.289	.585	.558	.004	1.170	.147
QUESTHI * GENDER * NEWTARG	.993	2	.496	1.003	.368	.007	2.007	.224
QUESTPRI * GENDER * NEWTARG	1.677	2	.839	1.695	.185	.012	3.391	.355
QUESTHI * QUESTPRI * GENDER * NEWTARG	.439	2	.220	.444	.642	.003	.888	.122
Error	142.977	289	.495					
Total	6908.077	314						
Corrected Total	267.958	313						

a. Computed using alpha = .05

b. R Squared = .466 (Adjusted R Squared = .422)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Table P-3

Analysis of Variance of Attitude Toward the Subordinate 2 Concept (Cats or Food)

Tests of Between-Subjects Effects

Dependent Variable: LNS2LIK

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	201.886[b]	24	8.412	13.741	.000	.529	329.774	1.000
Intercept	.549	1	.549	.897	.344	.003	.897	.157
AVSPAN	116.285	1	116.285	189.948	.000	.392	189.948	1.000
QUESTHI	10.768	1	10.768	17.590	.000	.056	17.590	.987
QUESTPRI	2.265	1	2.265	3.699	.055	.012	3.699	.483
GENDER	8.968E-02	1	8.968E-02	.146	.702	.000	.146	.067
NEWTARG	1.707	2	.853	1.394	.250	.009	2.788	.299
QUESTHI * QUESTPRI	3.502E-03	1	3.502E-03	.006	.940	.000	.006	.051
QUESTHI * GENDER	2.912	1	2.912	4.757	.030	.016	4.757	.585
QUESTPRI * GENDER	6.734E-02	1	6.734E-02	.110	.740	.000	.110	.063
QUESTHI * QUESTPRI * GENDER	.207	1	.207	.338	.561	.001	.338	.089
QUESTHI * NEWTARG	.942	2	.471	.769	.464	.005	1.539	.181
QUESTPRI * NEWTARG	1.273	2	.637	1.040	.355	.007	2.079	.231
QUESTHI * QUESTPRI * NEWTARG	1.972	2	.986	1.610	.202	.011	3.220	.339
GENDER * NEWTARG	2.936	2	1.468	2.398	.093	.016	4.796	.482
QUESTHI * GENDER * NEWTARG	2.103	2	1.051	1.718	.181	.012	3.435	.360
QUESTPRI * GENDER * NEWTARG	.824	2	.412	.673	.511	.005	1.346	.163
QUESTHI * QUESTPRI * GENDER * NEWTARG	.869	2	.434	.709	.493	.005	1.419	.169
Error	179.985	294	.612					
Total	8412.849	319						
Corrected Total	381.871	318						

a. Computed using alpha = .05

b. R Squared = .529 (Adjusted R Squared = .490)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Table P-4

Analysis of Variance of Evaluative Belief Toward the Superordinate Concept (Animals or Shopping)

Tests of Between-Subjects Effects

Dependent Variable: LNSUGO

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	180.958[b]	24	7.540	19.454	.000	.614	466.900	1.000
Intercept	3.282	1	3.282	8.468	.004	.028	8.468	.827
AVSPAN	147.626	1	147.626	380.898	.000	.564	380.898	1.000
QUESTHI	1.892	1	1.892	4.882	.028	.016	4.882	.596
QUESTPRI	1.786E-03	1	1.786E-03	.005	.946	.000	.005	.051
GENDER	.688	1	.688	1.775	.184	.006	1.775	.264
NEWTARG	.948	2	.474	1.223	.296	.008	2.447	.266
QUESTHI * QUESTPRI	6.504E-02	1	6.504E-02	.168	.682	.001	.168	.069
QUESTHI * GENDER	2.646	1	2.646	6.827	.009	.023	6.827	.740
QUESTPRI * GENDER	7.769E-03	1	7.769E-03	.020	.888	.000	.020	.052
QUESTHI * QUESTPRI * GENDER	.112	1	.112	.289	.591	.001	.289	.084
QUESTHI * NEWTARG	.171	2	8.570E-02	.221	.802	.002	.442	.084
QUESTPRI * NEWTARG	.268	2	.134	.346	.708	.002	.692	.105
QUESTHI * QUESTPRI * NEWTARG	.585	2	.293	.755	.471	.005	1.510	.178
GENDER * NEWTARG	1.066	2	.533	1.376	.254	.009	2.751	.295
QUESTHI * GENDER * NEWTARG	.105	2	5.241E-02	.135	.874	.001	.270	.071
QUESTPRI * GENDER * NEWTARG	.800	2	.400	1.032	.358	.007	2.064	.230
QUESTHI * QUESTPRI * GENDER * NEWTARG	.149	2	7.435E-02	.192	.826	.001	.384	.080
Error	113.946	294	.388					
Total	8692.914	319						
Corrected Total	294.904	318						

a. Computed using alpha = .05

b. R Squared = .614 (Adjusted R Squared = .582)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Table P-5

Analysis of Variance of Evaluative Belief Toward the Subordinate 1 Concept (Dogs or Clothes)

Tests of Between-Subjects Effects

Dependent Variable: LNS1GO

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	156.640[b]	24	6.527	15.441	.000	.558	370.580	1.000
Intercept	1.891	1	1.891	4.475	.035	.015	4.475	.559
AVSPAN	126.692	1	126.692	299.729	.000	.505	299.729	1.000
QUESTHI	3.059	1	3.059	7.236	.008	.024	7.236	.765
QUESTPRI	1.004	1	1.004	2.375	.124	.008	2.375	.336
GENDER	.243	1	.243	.575	.449	.002	.575	.118
NEWTARG	.339	2	.169	.401	.670	.003	.802	.115
QUESTHI * QUESTPRI	.667	1	.667	1.578	.210	.005	1.578	.240
QUESTHI * GENDER	.130	1	.130	.308	.579	.001	.308	.086
QUESTPRI * GENDER	2.364E-02	1	2.364E-02	.056	.813	.000	.056	.056
QUESTHI * QUESTPRI * GENDER	7.574E-04	1	7.574E-04	.002	.966	.000	.002	.050
QUESTHI * NEWTARG	1.844	2	.922	2.181	.115	.015	4.362	.444
QUESTPRI * NEWTARG	.446	2	.223	.527	.591	.004	1.054	.137
QUESTHI * QUESTPRI * NEWTARG	2.040	2	1.020	2.413	.091	.016	4.826	.485
GENDER * NEWTARG	.712	2	.356	.843	.432	.006	1.686	.194
QUESTHI * GENDER * NEWTARG	.939	2	.469	1.111	.331	.007	2.221	.245
QUESTPRI * GENDER * NEWTARG	.418	2	.209	.495	.610	.003	.990	.131
QUESTHI * QUESTPRI * GENDER * NEWTARG	.590	2	.295	.698	.498	.005	1.397	.167
Error	124.270	294	.423					
Total	7923.119	319						
Corrected Total	280.910	318						

a. Computed using alpha = .05

b. R Squared = .558 (Adjusted R Squared = .522)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Table P-6

Analysis of Variance of Evaluative Belief Toward the Subordinate 2 Concept (Cats or Food)

Tests of Between-Subjects Effects

Dependent Variable: LNS2GO

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	223.951[b]	24	9.331	19.648	.000	.616	471.562	1.000
Intercept	.539	1	.539	1.135	.288	.004	1.135	.186
AVSPAN	114.152	1	114.152	240.364	.000	.450	240.364	1.000
QUESTHI	17.547	1	17.547	36.948	.000	.112	36.948	1.000
QUESTPRI	2.128	1	2.128	4.482	.035	.015	4.482	.560
GENDER	1.094E-02	1	1.094E-02	.023	.879	.000	.023	.053
NEWTARG	.581	2	.290	.611	.543	.004	1.222	.152
QUESTHI * QUESTPRI	2.331E-03	1	2.331E-03	.005	.944	.000	.005	.051
QUESTHI * GENDER	.547	1	.547	1.153	.284	.004	1.153	.188
QUESTPRI * GENDER	1.175E-02	1	1.175E-02	.025	.875	.000	.025	.053
QUESTHI * QUESTPRI * GENDER	3.679E-04	1	3.679E-04	.001	.978	.000	.001	.050
QUESTHI * NEWTARG	2.347	2	1.174	2.471	.086	.017	4.943	.495
QUESTPRI * NEWTARG	.609	2	.305	.641	.527	.004	1.283	.157
QUESTHI * QUESTPRI * NEWTARG	.521	2	.260	.548	.579	.004	1.097	.140
GENDER * NEWTARG	2.439	2	1.219	2.568	.078	.017	5.136	.511
QUESTHI * GENDER * NEWTARG	.863	2	.431	.909	.404	.006	1.817	.206
QUESTPRI * GENDER * NEWTARG	.699	2	.350	.736	.480	.005	1.472	.174
QUESTHI * QUESTPRI * GENDER * NEWTARG	1.449	2	.725	1.526	.219	.010	3.052	.324
Error	139.624	294	.475					
Total	8181.280	319						
Corrected Total	363.575	318						

a. Computed using alpha = .05

b. R Squared = .616 (Adjusted R Squared = .585)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Table P-7

Analysis of Variance of Non-Evaluative Belief About the Superordinate (Animals or Shopping) and Subordinate 1 Concepts (Dogs or Clothes)

Tests of Between-Subjects Effects

Dependent Variable: LNS1SUP

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	109.162[b]	24	4.548	11.345	.000	.485	272.286	1.000
Intercept	7.284E-03	1	7.284E-03	.018	.893	.000	.018	.052
AVSPAN	77.123	1	77.123	192.371	.000	.400	192.371	1.000
QUESTHI	.477	1	.477	1.189	.276	.004	1.189	.192
QUESTPRI	.203	1	.203	.507	.477	.002	.507	.109
GENDER	1.338	1	1.338	3.339	.069	.011	3.339	.445
NEWTARG	.367	2	.184	.458	.633	.003	.917	.124
QUESTHI * QUESTPRI	1.377E-02	1	1.377E-02	.034	.853	.000	.034	.054
QUESTHI * GENDER	1.145	1	1.145	2.855	.092	.010	2.855	.391
QUESTPRI * GENDER	5.940E-02	1	5.940E-02	.148	.701	.001	.148	.067
QUESTHI * QUESTPRI * GENDER	7.051E-02	1	7.051E-02	.176	.675	.001	.176	.070
QUESTHI * NEWTARG	8.965E-02	2	4.483E-02	.112	.894	.001	.224	.067
QUESTPRI * NEWTARG	.638	2	.319	.795	.452	.005	1.590	.185
QUESTHI * QUESTPRI * NEWTARG	.164	2	8.222E-02	.205	.815	.001	.410	.082
GENDER * NEWTARG	1.245	2	.623	1.553	.213	.011	3.106	.329
QUESTHI * GENDER * NEWTARG	.103	2	5.130E-02	.128	.880	.001	.256	.070
QUESTPRI * GENDER * NEWTARG	.566	2	.283	.706	.494	.005	1.413	.169
QUESTHI * QUESTPRI * GENDER * NEWTARG	.563	2	.282	.702	.496	.005	1.405	.168
Error	115.862	289	.401					
Total	6299.061	314						
Corrected Total	225.024	313						

a. Computed using alpha = .05

b. R Squared = .485 (Adjusted R Squared = .442)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Table P-8

Analysis of Variance of Non-Evaluative Belief About the Superordinate (Animals or Shopping) and Subordinate 2 Concepts (Cats or Food)

Tests of Between-Subjects Effects

Dependent Variable: LNSUPS2

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	140.862[b]	24	5.869	14.460	.000	.546	347.049	1.000
Intercept	2.119	1	2.119	5.221	.023	.018	5.221	.625
AVSPAN	113.991	1	113.991	280.846	.000	.493	280.846	1.000
QUESTHI	5.781	1	5.781	14.242	.000	.047	14.242	.964
QUESTPRI	.329	1	.329	.811	.369	.003	.811	.146
GENDER	1.421E-03	1	1.421E-03	.004	.953	.000	.004	.050
NEWTARG	1.592	2	.796	1.961	.143	.013	3.922	.405
QUESTHI * QUESTPRI	.211	1	.211	.519	.472	.002	.519	.111
QUESTHI * GENDER	.289	1	.289	.713	.399	.002	.713	.134
QUESTPRI * GENDER	.246	1	.246	.606	.437	.002	.606	.121
QUESTHI * QUESTPRI * GENDER	.846	1	.846	2.086	.150	.007	2.086	.302
QUESTHI * NEWTARG	.714	2	.357	.880	.416	.006	1.760	.201
QUESTPRI * NEWTARG	.662	2	.331	.815	.444	.006	1.630	.189
QUESTHI * QUESTPRI * NEWTARG	.388	2	.194	.478	.620	.003	.956	.128
GENDER * NEWTARG	.178	2	8.896E-02	.219	.803	.002	.438	.084
QUESTHI * GENDER * NEWTARG	3.980	2	1.990	4.903	.008	.033	9.806	.803
QUESTPRI * GENDER * NEWTARG	5.524E-02	2	2.762E-02	.068	.934	.000	.136	.060
QUESTHI * QUESTPRI * GENDER * NEWTARG	1.277	2	.639	1.574	.209	.011	3.147	.332
Error	117.300	289	.406					
Total	7224.590	314						
Corrected Total	258.162	313						

a. Computed using alpha = .05

b. R Squared = .546 (Adjusted R Squared = .508)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Table P-9

Analysis of Variance of Non-Evaluative Belief About the Subordinate 1 (Dogs and Clothes) and Subordinate 2 Concepts (Cats or Food)

Tests of Between-Subjects Effects

Dependent Variable: LNS1S2

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	90.949[b]	24	3.790	7.187	.000	.370	172.487	1.000
Intercept	3.691	1	3.691	7.000	.009	.023	7.000	.751
AVSPAN	72.160	1	72.160	136.853	.000	.318	136.853	1.000
QUESTHI	20.300	1	20.300	38.499	.000	.116	38.499	1.000
QUESTPRI	.202	1	.202	.383	.537	.001	.383	.095
GENDER	6.151E-02	1	6.151E-02	.117	.733	.000	.117	.063
NEWTARG	1.279	2	.639	1.212	.299	.008	2.425	.264
QUESTHI * QUESTPRI	3.864E-02	1	3.864E-02	.073	.787	.000	.073	.058
QUESTHI * GENDER	.239	1	.239	.454	.501	.002	.454	.103
QUESTPRI * GENDER	1.911E-02	1	1.911E-02	.036	.849	.000	.036	.054
QUESTHI * QUESTPRI * GENDER	.236	1	.236	.447	.504	.002	.447	.102
QUESTHI * NEWTARG	2.863	2	1.431	2.715	.068	.018	5.429	.535
QUESTPRI * NEWTARG	.839	2	.419	.795	.452	.005	1.591	.185
QUESTHI * QUESTPRI * NEWTARG	1.575	2	.787	1.493	.226	.010	2.987	.317
GENDER * NEWTARG	.641	2	.321	.608	.545	.004	1.216	.151
QUESTHI * GENDER * NEWTARG	2.608	2	1.304	2.473	.086	.017	4.945	.495
QUESTPRI * GENDER * NEWTARG	.924	2	.462	.876	.418	.006	1.752	.200
QUESTHI * QUESTPRI * GENDER * NEWTARG	3.250	2	1.625	3.082	.047	.021	6.164	.592
Error	155.020	294	.527					
Total	8965.458	319						
Corrected Total	245.969	318						

a. Computed using alpha = .05

b. R Squared = .370 (Adjusted R Squared = .318)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Appendix Q

ANOVA Results: 2 (Hierarchy: explicit vs. implicit) x 2 (Priming: primed vs. unprimed) x2 (Gender: male vs. female) x 3 (Message Target: superordinate vs. subordinate 1 vs. subordinate 2) on Aggregate Attitudes and Beliefs

Table Q-1

Analysis of Variance of Attitude Toward the Non-targeted Concepts (Midlike), with Avspan as a Covariate

Tests of Between-Subjects Effects

Dependent Variable: MIDLIKE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	6160.528[b]	24	256.689	29.161	.000	.697	699.865	1.000
Intercept	1.656	1	1.656	.188	.665	.001	.188	.072
AVSPAN	1773.299	1	1773.299	201.455	.000	.399	201.455	1.000
QUESTHI	967.121	1	967.121	109.869	.000	.265	109.869	1.000
QUESTPRI	134.958	1	134.958	15.332	.000	.048	15.332	.974
GENDER	7.258E-02	1	7.258E-02	.008	.928	.000	.008	.051
NEWTARG	64.466	2	32.233	3.662	.027	.024	7.324	.672
QUESTHI * QUESTPRI	111.708	1	111.708	12.691	.000	.040	12.691	.944
QUESTHI * GENDER	1.184	1	1.184	.135	.714	.000	.135	.065
QUESTPRI * GENDER	.216	1	.216	.025	.876	.000	.025	.053
QUESTHI * QUESTPRI GENDER	1.232	1	1.232	.140	.709	.000	.140	.066
QUESTHI * NEWTARG	57.841	2	28.921	3.286	.039	.021	6.571	.621
QUESTPRI * NEWTARG	77.845	2	38.923	4.422	.013	.028	8.844	.759
QUESTHI * QUESTPRI NEWTARG	50.607	2	25.304	2.875	.058	.019	5.749	.560
GENDER * NEWTARG	20.450	2	10.225	1.162	.314	.008	2.323	.254
QUESTHI * GENDER * NEWTARG	3.808	2	1.904	.216	.806	.001	.433	.084
QUESTPRI * GENDER NEWTARG	29.461	2	14.731	1.673	.189	.011	3.347	.351
QUESTHI * QUESTPRI GENDER * NEWTARG	7.841	2	3.920	.445	.641	.003	.891	.122
Error	2675.946	304	8.802					
Total	140831.380	329						
Corrected Total	8836.475	328						

a. Computed using alpha = .05

b. R Squared = .697 (Adjusted R Squared = .673)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Table Q-2

Analysis of Variance of Attitude Toward the Non-targeted Concepts (Midlike), with Avspan as a Covariate

Tests of Between-Subjects Effects

Dependent Variable: MIDGOOD

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	5714.746[b]	24	238.114	36.673	.000	.743	880.153	1.000
Intercept	9.965	1	9.965	1.535	.216	.005	1.535	.235
AVSPAN	1970.140	1	1970.140	303.430	.000	.500	303.430	1.000
QUESTHI	681.000	1	681.000	104.884	.000	.257	104.884	1.000
QUESTPRI	102.898	1	102.898	15.848	.000	.050	15.848	.978
GENDER	.635	1	.635	.098	.755	.000	.098	.061
NEWTARG	80.676	2	40.338	6.213	.002	.039	12.425	.891
QUESTHI * QUESTPRI	91.831	1	91.831	14.143	.000	.044	14.143	.963
QUESTHI * GENDER	.237	1	.237	.036	.849	.000	.036	.054
QUESTPRI * GENDER	.485	1	.485	.075	.785	.000	.075	.059
QUESTHI * QUESTPRI GENDER	8.547E-05	1	8.547E-05	.000	.997	.000	.000	.050
QUESTHI * NEWTARG	44.342	2	22.171	3.415	.034	.022	6.829	.639
QUESTPRI * NEWTARG	90.273	2	45.137	6.952	.001	.044	13.903	.924
QUESTHI * QUESTPRI NEWTARG	89.552	2	44.776	6.896	.001	.043	13.792	.922
GENDER * NEWTARG	17.890	2	8.945	1.378	.254	.009	2.755	.295
QUESTHI * GENDER * NEWTARG	2.930	2	1.465	.226	.798	.001	.451	.085
QUESTPRI * GENDER * NEWTARG	.989	2	.494	.076	.927	.001	.152	.062
QUESTHI * QUESTPRI GENDER * NEWTARG	29.684	2	14.842	2.286	.103	.015	4.572	.463
Error	1973.842	304	6.493					
Total	142313.988	329						
Corrected Total	7688.588	328						

a. Computed using alpha = .05

b. R Squared = .743 (Adjusted R Squared = .723)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Table Q-3

Analysis of Variance of Non-evaluative Belief Toward the Non-targeted Concepts (Midsize), with Avspan as a Covariate

Tests of Between-Subjects Effects

Dependent Variable: MIDSIZE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	4881.710[b]	24	203.405	21.227	.000	.626	509.460	1.000
Intercept	161.275	1	161.275	16.831	.000	.052	16.831	.983
AVSPAN	2252.000	1	2252.000	235.021	.000	.435	235.021	1.000
QUESTHI	18.223	1	18.223	1.902	.169	.006	1.902	.280
QUESTPRI	314.214	1	314.214	32.792	.000	.097	32.792	1.000
GENDER	1.825	1	1.825	.190	.663	.001	.190	.072
NEWTARG	112.326	2	56.163	5.861	.003	.037	11.722	.872
QUESTHI * QUESTPRI	250.696	1	250.696	26.163	.000	.079	26.163	.999
QUESTHI * GENDER	1.533	1	1.533	.160	.689	.001	.160	.068
QUESTPRI * GENDER	.133	1	.133	.014	.906	.000	.014	.052
QUESTHI * QUESTPRI GENDER	4.226E-02	1	4.226E-02	.004	.947	.000	.004	.051
QUESTHI * NEWTARG	122.367	2	61.184	6.385	.002	.040	12.770	.900
QUESTPRI * NEWTARG	188.157	2	94.079	9.818	.000	.060	19.636	.983
QUESTHI * QUESTPRI NEWTARG	126.598	2	63.299	6.606	.002	.042	13.212	.910
GENDER * NEWTARG	5.881	2	2.940	.307	.736	.002	.614	.099
QUESTHI * GENDER * NEWTARG	19.378	2	9.689	1.011	.365	.007	2.022	.226
QUESTPRI * GENDER * NEWTARG	11.706	2	5.853	.611	.544	.004	1.222	.152
QUESTHI * QUESTPRI GENDER * NEWTARG	27.114	2	13.557	1.415	.245	.009	2.830	.303
Error	2922.549	305	9.582					
Total	300594.974	330						
Corrected Total	7804.259	329						

a. Computed using alpha = .05

b. R Squared = .626 (Adjusted R Squared = .596)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Table Q-4

Analysis of Variance of Attitude Toward the Avspan-Corrected Non-targeted Concepts (Newmidli)

Tests of Between-Subjects Effects

Dependent Variable: NEWMIDLI

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	670.495[b]	23	29.152	11.250	.000	.480	258.748	1.000
Intercept	77.318	1	77.318	29.837	.000	.096	29.837	1.000
QUESTHI	458.957	1	458.957	177.114	.000	.387	177.114	1.000
QUESTPRI	2.700E-02	1	2.700E-02	.010	.919	.000	.010	.051
GENDER	.696	1	.696	.269	.605	.001	.269	.081
NEWTARG	8.222	2	4.111	1.586	.206	.011	3.173	.335
QUESTHI * QUESTPRI	.610	1	.610	.235	.628	.001	.235	.077
QUESTHI * GENDER	3.000E-02	1	3.000E-02	.012	.914	.000	.012	.051
QUESTPRI * GENDER	.487	1	.487	.188	.665	.001	.188	.072
QUESTHI * QUESTPRI * GENDER	9.140E-03	1	9.140E-03	.004	.953	.000	.004	.050
QUESTHI * NEWTARG	2.340	2	1.170	.452	.637	.003	.903	.123
QUESTPRI * NEWTARG	.691	2	.345	.133	.875	.001	.267	.070
QUESTHI * QUESTPRI * NEWTARG	1.744	2	.872	.336	.715	.002	.673	.104
GENDER * NEWTARG	5.884	2	2.942	1.135	.323	.008	2.271	.249
QUESTHI * GENDER * NEWTARG	4.634	2	2.317	.894	.410	.006	1.788	.204
QUESTPRI * GENDER * NEWTARG	13.253	2	6.627	2.557	.079	.018	5.115	.509
QUESTHI * QUESTPRI * GENDER * NEWTARG	13.904	2	6.952	2.683	.070	.019	5.366	.529
Error	725.564	280	2.591					
Total	1510.790	304						
Corrected Total	1396.059	303						

a. Computed using alpha = .05

b. R Squared = .480 (Adjusted R Squared = .438)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Table Q-5

Analysis of Variance of Evaluative Belief Toward the Avspan-Corrected Non-targeted Concepts (Newmidgo)

Tests of Between-Subjects Effects

Dependent Variable: NEWMIDGO

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	494.263[b]	23	21.490	7.233	.000	.373	166.358	1.000
Intercept	117.684	1	117.684	39.610	.000	.124	39.610	1.000
QUESTHI	330.937	1	330.937	111.386	.000	.285	111.386	1.000
QUESTPRI	2.209E-02	1	2.209E-02	.007	.931	.000	.007	.051
GENDER	.356	1	.356	.120	.729	.000	.120	.064
NEWTARG	2.955	2	1.477	.497	.609	.004	.995	.131
QUESTHI * QUESTPRI	.365	1	.365	.123	.726	.000	.123	.064
QUESTHI * GENDER	2.097E-04	1	2.097E-04	.000	.993	.000	.000	.050
QUESTPRI * GENDER	.129	1	.129	.044	.835	.000	.044	.055
QUESTHI * QUESTPRI * GENDER	7.259E-02	1	7.259E-02	.024	.876	.000	.024	.053
QUESTHI * NEWTARG	5.262	2	2.631	.886	.414	.006	1.771	.202
QUESTPRI * NEWTARG	3.332	2	1.666	.561	.571	.004	1.121	.143
QUESTHI * QUESTPRI * NEWTARG	3.716	2	1.858	.625	.536	.004	1.251	.154
GENDER * NEWTARG	3.009	2	1.504	.506	.603	.004	1.013	.133
QUESTHI * GENDER * NEWTARG	12.763	2	6.382	2.148	.119	.015	4.296	.438
QUESTPRI * GENDER * NEWTARG	3.043	2	1.521	.512	.600	.004	1.024	.134
QUESTHI * QUESTPRI * GENDER * NEWTARG	24.607	2	12.304	4.141	.017	.029	8.282	.729
Error	831.904	280	2.971					
Total	1483.854	304						
Corrected Total	1326.168	303						

a. Computed using alpha = .05

b. R Squared = .373 (Adjusted R Squared = .321)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Table Q-6

Analysis of Variance of Non-evaluative Belief Toward the Avspan-Corrected Non-targeted (Newmidsi)

Tests of Between-Subjects Effects

Dependent Variable: NEWMIDS1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	351.188[b]	23	15.269	6.384	.000	.345	146.823	1.000
Intercept	20.261	1	20.261	8.471	.004	.029	8.471	.827
QUESTHI	236.565	1	236.565	98.902	.000	.262	98.902	1.000
QUESTPRI	3.093	1	3.093	1.293	.256	.005	1.293	.205
GENDER	1.018	1	1.018	.426	.515	.002	.426	.100
NEWTARG	3.726	2	1.863	.779	.460	.006	1.558	.182
QUESTHI * QUESTPRI	1.316	1	1.316	.550	.459	.002	.550	.115
QUESTHI * GENDER	.216	1	.216	.090	.764	.000	.090	.060
QUESTPRI * GENDER	6.481E-02	1	6.481E-02	.027	.869	.000	.027	.053
QUESTHI * QUESTPRI * GENDER	.386	1	.386	.161	.688	.001	.161	.069
QUESTHI * NEWTARG	.811	2	.405	.169	.844	.001	.339	.076
QUESTPRI * NEWTARG	1.238	2	.619	.259	.772	.002	.518	.091
QUESTHI * QUESTPRI * NEWTARG	.174	2	8.700E-02	.036	.964	.000	.073	.055
GENDER * NEWTARG	5.572	2	2.786	1.165	.313	.008	2.330	.255
QUESTHI * GENDER * NEWTARG	8.117	2	4.058	1.697	.185	.012	3.393	.356
QUESTPRI * GENDER * NEWTARG	4.259	2	2.129	.890	.412	.006	1.781	.203
QUESTHI * QUESTPRI * GENDER * NEWTARG	2.012	2	1.006	.421	.657	.003	.841	.118
Error	667.346	279	2.392					
Total	1045.740	303						
Corrected Total	1018.534	302						

a. Computed using alpha = .05

b. R Squared = .345 (Adjusted R Squared = .291)

Note: QUESTHI = Hierarchy: explicit vs. implicit. QUESTPRI = Priming: primed vs. unprimed. GENDER = Gender: male vs. female. NEWTARG = Message Target: superordinate vs. subordinate 1 vs. subordinate 2.

Appendix R

Covariance Matrices for 12 Structural Equation Models

Table R-1

Covariance Matrix for Attitude Dependent Variables with Avspan as an Additional Variable: Explicit Hierarchy Condition

	Midlike	Lnsuplik	Lns1lik	Lns2lik	Avspan	Priming	Gender	Supervsub	Subvsub
Midlike	13.8743								
Lnsuplik	2.8334	0.9312							
Lns1lik	1.7876	0.6295	1.0166						
Lns2lik	2.9010	0.8206	0.5240	1.3319					
Avspan	2.1863	0.4921	0.3924	0.4759	0.4540				
Priming	0.0299	0.0076	0.0722	0.0649	0.0118	0.2465			
Gender	-0.1105	-0.0540	-0.0452	-0.0688	-0.0321	-0.0065	0.2184		
Supervsub	0.1768	-0.0052	-0.0340	0.0556	0.0045	-0.0042	-0.0009	0.4966	
Subvsub	0.1841	0.0458	-0.0103	0.0069	0.0395	-0.0009	-0.0107	0.0064	0.6796

Note. n = 154. Abbreviations are in Appendix L.

Table R-2

Covariance Matrix for Attitude Dependent Variables with Avspan as an Additional Variable: Implicit Hierarchy Condition

	Midlike	Lnsuplik	Lns1lik	Lns2lik	Avspan	Priming	Gender	Supervsub
Midlike	4.7586							
Lnsuplik	0.7529	0.5743						
Lns1lik	1.0313	0.3305	0.6596					
Lns2lik	0.9252	0.1589	0.2894	0.6562				
Avspan	0.8957	0.1899	0.2742	0.2592	0.2481			
Priming	-0.1625	-0.0708	-0.0810	-0.0154	-0.0478	0.2441		
Gender	0.0066	-0.0546	-0.1003	0.0492	-0.0033	0.0242	0.2114	
Supervsub	0.1581	0.0472	0.0357	0.0136	0.0240	-0.0203	-0.0322	0.4816
Subvsub	0.1072	-0.0724	0.0561	0.0604	0.0325	0.0563	0.0322	-0.0494

Note. n = 150. Abbreviations are in Appendix L.

Table R-3

Covariance Matrix for Evaluative Belief Dependent Variables with Avspan as an Additional Variable: Explicit Hierarchy Condition

	Midlike	Lnsuplik	Lns1lik	Lns2lik	Avspan	Questpri	Gender	Supervsub	Subvsub
Midlike	15.2510								
Lnsuplik	3.0966	0.8997							
Lns1lik	2.6721	0.8162	0.9693						
Lns2lik	3.1725	0.7415	0.7395	1.0244					
Avspan	2.3337	0.5140	0.4730	0.5086	0.4540				
Questpri	0.0342	0.0173	0.0672	0.0631	0.0118	0.2465			
Gender	-0.1365	-0.0114	-0.0359	-0.0490	-0.0321	-0.0065	0.2184		
Supervsub	0.1248	-0.0415	-0.0769	0.0425	0.0045	-0.0042	-0.0009	0.4966	
Subvsub	0.2288	0.0226	0.0096	-0.0378	0.0395	-0.0009	-0.0107	0.0064	0.6796

Note. n = 154. Abbreviations are in Appendix L.

Table R-4

Covariance Matrix for Evaluative Belief Dependent Variables with Avspan as an Additional Variable: Implicit Hierarchy Condition

	Midlike	Lnsuplik	Lns1lik	Lns2lik	Avspan	Questpri	Gender	Supervsub
Midlike	11.5420							
Lnsuplik	1.3983	0.8333						
Lns1lik	1.2397	0.6610	0.7463					
Lns2lik	1.1214	0.4016	0.4299	0.7082				
Avspan	0.8636	0.3170	0.3122	0.2366	0.2595			
Questpri	-0.6284	-0.0708	-0.0622	-0.0093	-0.0491	0.2504		
Gender	-0.0150	-0.0684	-0.0189	0.0259	0.0001	0.0203	0.2125	
Supervsub	0.4399	0.0204	0.0430	-0.0027	0.0262	-0.0409	-0.0280	0.4552
Subvsub	0.9706	0.0474	0.0847	0.0729	0.0402	-0.0028	0.0323	-0.0025

Note. $n = 150$. Abbreviations are in Appendix L.

Table R-5

Covariance Matrix for Non-evaluative Belief Dependent Variables with Avspan as an Additional Variable: Explicit Hierarchy Condition

	Midsize	Lns1sup	Lnsup2	Lns1s2	Avspan	Priming	Gender	Supervsub	Subvsub
Midsize	11.0991								
Lns1sup	1.6000	0.8212							
Lnsup2	1.8308	0.7236	0.8838						
Lns1s2	1.4260	0.1074	0.1645	0.6900					
Avspan	2.0674	0.4011	0.4603	0.2864	0.4540				
Priming	-0.0161	0.0244	0.0405	0.0238	0.0118	0.2456			
Gender	-0.1457	-0.0318	-0.0449	-0.0066	-0.0321	-0.0065	0.2184		
Supervsub	0.0709	-0.0257	-0.0346	0.0799	0.0045	-0.0042	-0.0009	0.4966	
Subvsub	0.2263	0.0434	0.0422	0.0648	0.0395	-0.0009	-0.0107	0.0064	0.6796

Note. n = 154. Abbreviations are in Appendix L.

Table R-6

Covariance Matrix for Non-evaluative Belief Dependent Variables with Avspan as an Additional Variable: Implicit Hierarchy Condition

	Midsize	Lns1sup	Lnsup2	Lns1s2	Avspan	Priming	Gender	Supervsub
Midsize	7.2261							
Lns1sup	0.8163	0.5470						
Lnsup2	1.0938	0.2550	0.7701					
Lns1s2	1.1773	0.2328	0.3875	0.8783				
Avspan	1.1486	0.2281	0.2893	0.2939	0.2481			
Priming	-0.3111	-0.0360	-0.0130	-0.0214	-0.0478	0.2441		
Gender	0.0181	-0.0606	0.0214	0.0059	-0.0033	0.0242	0.2114	
Supervsub	0.1707	0.0228	-0.0459	-0.0195	0.0240	-0.0203	-0.0322	0.4816
Subvsub	0.0047	0.0102	0.1360	0.1221	0.0325	0.0563	0.0322	-0.0494

Note. *n* = 150. Abbreviations are in Appendix L.

Table R-7

Covariance Matrix for Attitude Dependent Variables with Avspan Subtracted: Explicit Hierarchy Condition

	Newmidli	Avrelsul	Avrelsl1	Averls2l	Questpri	Gender	Supervsub	Subvsub
Newmidli	3.6471							
Avrelsul	0.4944	0.4009						
Avrelsl1	-0.1526	0.1989	0.6857					
Averls2l	0.6270	0.3065	0.1096	0.8341				
Questpri	-0.0172	-0.0042	0.0605	0.0531	0.2465			
Gender	0.0177	-0.0219	-0.0131	-0.0368	-0.0065	0.2184		
Supervsub	0.1589	-0.0096	-0.0385	0.0512	-0.0042	-0.0009	0.4966	
Subvsub	0.0262	0.0063	-0.0498	-0.0325	-0.0009	-0.0107	0.0064	0.6796

Note. *n* = 154. Abbreviations are in Appendix L.

Table R-8

Covariance Matrix for Attitude Dependent Variables with Avspan Subtracted: Implicit Hierarchy Condition

	Newmidli	Avrelsul	Avrelsl1	Averls2l	Questpri	Gender	Supervsub	Subvsub
Newmidli	1.5623							
Avrelsul	0.0902	0.4427						
Avrelsl1	0.0313	0.1145	0.3593					
Averls2l	-0.0147	-0.0420	0.0042	0.3860				
Questpri	0.0286	-0.0230	-0.0333	0.0324	0.2441			
Gender	0.0198	-0.0513	-0.0970	0.0525	0.0242	0.2114		
Supervsub	0.0622	0.0232	0.0117	-0.0104	-0.0203	-0.0322	0.4816	
Subvsub	-0.0228	-0.1049	0.0236	0.0279	0.0563	0.0322	-0.0494	0.6865

Note. n = 150. Abbreviations are in Appendix L.

Table R-9

Covariance Matrix for Evaluative Belief Dependent Variables with Avspan Subtracted: Explicit Hierarchy Condition

	Newmidgood	Avrelsug	Avrels1go	Avrels2go	Priming	Gender	Supervsub	Subvsub
Newmidgood	2.0849							
Avrelsug	0.0941	0.4273						
Avrels1go	-0.0062	0.2837	0.3883					
Avrels2go	0.2254	0.1293	0.1371	0.4732				
Priming	0.0034	-0.0125	-0.0045	0.0517	0.2441			
Gender	-0.0338	-0.0624	-0.0153	0.0158	0.0242	0.2114		
Supervsub	-0.0068	-0.0154	0.0107	-0.0381	-0.0203	-0.0322	0.4816	
Subvsub	-0.0121	-0.0137	0.0302	0.0209	0.0563	0.0322	-0.0494	0.6865

Note. $n = 154$. Abbreviations are in Appendix L.

Table R-10

Covariance Matrix for Evaluative Belief Dependent Variables with Avspan Subtracted: Implicit Hierarchy Condition

	Newmidgood	Avrelsug	Avrels1go	Avrels2go	Priming	Gender	Supervsub	Subvsub
Newmidgood	3.8450							
Avrelsug	0.5228	0.3257						
Avrels1go	0.2623	0.2832	0.4772					
Avrels2go	0.6202	0.1729	0.2118	0.4612				
Priming	-0.0129	0.0055	0.0554	0.0513	0.2465			
Gender	-0.0083	0.0207	-0.0039	-0.0170	-0.0065	0.2184		
Supervsub	0.1069	-0.0459	-0.0814	0.0380	-0.0042	-0.0009	0.4966	
Subvsub	0.0710	-0.0169	-0.0299	-0.0772	-0.0009	-0.0107	0.0064	0.6796

Note. n = *150. Abbreviations are in Appendix L.*

Table R-11

Covariance Matrix for Non-evaluative Belief Dependent Variable with Avspan Subtracted: Explicit Hierarchy Condition

	Newmidsi	Avresus1	Avresus2	Avres1s2	Questpri	Gender	Supervsub	Subvsub
Newmidsi	2.3510							
Avresus1	-0.1357	0.4751						
Avresus2	-0.2293	0.3157	0.4123					
Avres1s2	0.3441	-0.1259	-0.1257	0.5732				
Questpri	-0.1064	0.0138	0.0320	0.0107	0.2469			
Gender	0.0166	0.0019	-0.0081	0.0233	-0.0085	0.2167		
Supervsub	0.0227	-0.0292	-0.0359	0.0743	-0.0056	-0.0031	0.4983	
Subvsub	0.0346	0.0015	-0.0043	0.0289	0.0019	-0.0062	0.0097	0.6772

Note. n = 153. Abbreviations are in Appendix L.

Table R-12

Covariance Matrix for Non-evaluative Belief Dependent Variable with Avspan Subtracted: Implicit Hierarchy Condition

	Newmidsi	Avresus1	Avresus2	Avres1s2	Questpri	Gender	Supervsub	Subvsub
Newmidsi	2.3747							
Avresus1	-0.2120	0.3390						
Avresus2	-0.3022	-0.0143	0.4395					
Avres1s2	-0.2458	-0.0411	0.0524	0.5387				
Questpri	-0.0244	0.0118	0.0348	0.0264	0.2441			
Gender	0.0380	-0.0572	0.0247	0.0092	0.0242	0.2114		
Supervsub	0.0268	-0.0012	-0.0699	-0.0435	-0.0203	-0.0322	0.4816	
Subvsub	-0.1903	-0.0223	0.1035	0.0896	0.0563	0.0322	-0.0494	0.6865

Note. n = 150. Abbreviations are in Appendix L.

Path Estimates, Standard Errors, and t-Values for the Final Structural Equation Models

Table S-1

Parameter Estimates, Standards Errors, and t-Values, for free βs and γs for the Attitude Structural Equation Models[a]

Explicit				Implicit			
Path	Parameter Estimate	*SE*	*t*-value	Path	Parameter Estimate	*SE*	*t*-value
γ_{21}	-.09	.10	-.96	γ_{21}	-.04	.11	-.36
γ_{31}	.24	.13	1.83	γ_{31}	-.10	.09	-1.08
γ_{41}	.23	.12	1.84	γ_{41}	.10	.10	1.02
γ_{22}	-.08	.10	-.83	γ_{22}	-.21	.12	-1.84
γ_{32}	-.06	.14	-.40	γ_{32}	-.41	.10	-4.17
γ_{42}	-.09	.13	-.66	γ_{42}	.23	.11	2.13
γ_{23}	.00	.07	.04	γ_{23}	.02	.08	.23
γ_{33}	-.07	.09	-.08	γ_{33}	-.01	.06	-.13
γ_{43}	.12	.09	1.38	γ_{43}	.00	.07	.01
γ_{24}	.03	.06	-.52	γ_{24}	-.14	.06	-2.14
γ_{34}	-.07	.08	-.92	γ_{34}	.10	.05	1.76
γ_{44}	-.06	.07	-.77	γ_{44}	.02	.06	.35
β_{12}	1.27	.26	4.89	β_{12}	.20	.16	1.23
β_{13}	-.65	.17	-3.76	β_{13}	.02	.18	.14
β_{14}	.37	.17	2.16	β_{14}	-.02	.16	-.10
β_{23}[b,c]	.30	.06	5.17	β_{23}[b,c]	.31	.09	3.37
β_{32}[b,c]	.50	.10	5.17	β_{32}[b,c]	.23	.07	3.37
β_{24}[b,c]	.38	.05	7.88	—			
β_{42}[b,c]	.77	.10	7.88	—			

[a]Definitions of the path abbreviations can be found in Table S-4.
[b]Significant path added as a result of automatic modification.
[c]Ambiguous path. Note that the model contains either β_{23} or β_{32} (and, for the explicit, either β_{24} or β_{42}) but not both.

Table S-2

Parameter Estimates, Standards Errors, and t-Values, for free βs and γs for the Evaluative Belief Structural Equation Models[a]

	Explicit				Implicit		
Path	Parameter Estimate	*SE*	*t*-value	Path	Parameter Estimate	*SE*	*t*-value
γ_{21}	-.07	.06	-1.14	γ_{21}	-.01	.08	-.12
γ_{31}	.23	.11	2.18	γ_{31}	-.02	.10	-.20
γ_{41}	.20	.09	2.21	γ_{41}	.21	.11	1.96
γ_{22}	.10	.07	1.52	γ_{22}	-.25	.08	-3.05
γ_{32}	-.01	.11	-.07	γ_{32}	-.07	.11	-.67
γ_{42}	-.12	.10	-1.25	γ_{42}	.07	.11	.59
γ_{23}	-.025	.05	-.48	γ_{23}	-.07	.05	-1.31
γ_{33}	-.20	.08	-2.65	γ_{33}	.02	.07	.30
γ_{43}	.12	.06	1.91	γ_{43}	-.07	.08	-1.00
γ_{24}	.00	.04	-.11	γ_{24}	-.04	.04	-1.00
γ_{34}	-.06	.06	-.97	γ_{34}	.05	.06	.83
γ_{44}	-.11	.05	-1.96	γ_{44}	-.01	.06	-.17
β_{12}	2.38	.47	5.04	β_{12}	.38	.24	1.59
β_{13}	-2.44	.60	-4.07	β_{13}	-.47	.26	-1.83
β_{14}	1.38	.24	5.75	β_{14}	.51	.17	2.96
β_{21}[b]	.19	.07	2.92	β_{23}[b,c]	.73	.06	12.34
β_{23}[b]	.43	.08	5.26	β_{32}[b,c]	.69	.06	12.34
β_{42}	.45	.08	5.40	β_{43}[b]	.36	.08	4.33

[a]Definitions of the path abbreviations can be found in Table S-4.
[b]Significant path added as a result of automatic modification.
[c]Ambiguous path. Note that the model contains either β_{23} or β_{32} but not both.

Table S-3

Parameter Estimates, Standards Errors, and t-Values, for free βs and γs for the Non-evaluative Belief Structural Equation Models[a]

	Explicit				Implicit		
Path	Parameter Estimate	*SE*	*t*-value	Path	Parameter Estimate	*SE*	*t*-value
γ_{21}	.05	.11	.49	γ_{21}	.08	.10	.84
γ_{31}	.09	.07	1.24	γ_{31}	.10	.11	.88
γ_{41}	.09	.12	.74	γ_{41}	.07	.12	.61
γ_{22}	.01	.12	.08	γ_{22}	-.28	.10	-2.73
γ_{32}	-.04	.08	-.52	γ_{32}	.07	.12	.58
γ_{42}	.10	.13	.82	γ_{42}	.01	.13	.04
γ_{23}	-.06	.08	-.73	γ_{23}	-.02	.07	-.30
γ_{33}	-.03	.05	-.63	γ_{33}	-.12	.08	-1.61
γ_{43}	.13	.08	1.54	γ_{43}	-.07	.09	-.87
γ_{24}	.00	.07	.04	γ_{24}	-.03	.06	-.48
γ_{34}	-.01	.04	-.18	γ_{34}	.13	.06	2.03
γ_{44}	.04	.07	.56	γ_{44}	.12	.07	1.64
β_{12}	.24	.24	.98	β_{12}	-.71	.19	-3.63
β_{13}	-.58	.26	-2.19	β_{13}	-.66	.17	-3.84
β_{14}	.53	.16	3.30	β_{14}	-.45	.15	-2.89
β_{32}[b,c]	.66	.05	12.53	—			
β_{23}[b,c]	.77	.06	12.53	—			
β_{43}	-.30	.09	-3.24	—			
β_{34}	-.22	.07	-3.24	—			

[a]Definitions of the path abbreviations can be found in Table S-4.
[b]Significant path added as a result of automatic modification.
[c]Ambiguous path. Note that the model contains either β_{23} or β_{32} but not both.

Table S-4

Structural Equation Model Path Abbreviations

Path	From Variable	To Variable
γ_{21}	Priming	Superord Att/Bel
γ_{31}	Priming	Subord 1 Att/Bel
γ_{41}	Priming	Subord 2 Att/Bel
γ_{22}	Gender	Superord Att/Bel
γ_{32}	Gender	Subord 1 Att/Bel
γ_{42}	Gender	Subord 2 Att/Bel
γ_{23}	Supervsub	Superord Att/Bel
γ_{33}	Supervsub	Subord 1 Att/Bel
γ_{43}	Supervsub	Subord 2 Att/Bel
γ_{24}	Subvsub	Superord Att/Bel
γ_{34}	Subvsub	Subord 1 Att/Bel
γ_{44}	Subvsub	Subord 2 Att/Bel
β_{12}	Superord Att/Bel	Non-targ Att/Bel
β_{32}	Superord Att/Bel	Supord 1 Att/Bel
β_{42}	Superord Att/Bel	Subord 2 Att/Bel
β_{13}	Subord 1 Att/Bel	Non-targ Att/Bel
β_{23}	Subord 1 Att/Bel	Superord Att/Bel
β_{43}	Subord 1 Att/Bel	Subord 2 Att/Bel
β_{14}	Subord 2 Att/Bel	Non-targ Att/Bel
β_{24}	Subord 2 Att/Bel	Superord Att/Bel
β_{34}	Subord 2 Att/Bel	Subord 1 Att/Bel

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