A Theory of Goal Systems

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The theory outlined in the present chapter adopts a cognitive approach to motivation. In the pages that follow we describe a research program premised on the notion that the cognitive treatment affords conceptual and methodological advantages enabling new insights into problems of motivated action, self-regulation and self-control. We begin by placing our work in the broader historical context of social psychological theorizing about motivation and cognition. We then present our theoretical notions and trace their implications for a variety of psychological issues including activity-experience, goal-commitment, choice, and substitution. The gist of the chapter that follows describes our empirical research concerning a broad range of phenomena informed by the goal-systemic analysis.

Motivation Versus Cognition, or Motivation as Cognition

Motivation versus cognition: the "separatist program." Social psychological theories have often treated motivation as separate from cognition, and have often approached it in a somewhat static manner. The separatism of the "motivation versus cognition" approach was manifest in several major formulations and debates. Thus, for example, the dissonance versus self-perception debate (Bem, 1972) pitted against each other motivational (i.e., dissonance) versus cognitive (i.e., self-perception) explanations of attitude change phenomena. A similar subsequent controversy pertained to the question of whether a motivational explanation of biased causal attributions in terms of ego-defensive tendencies (cf. Kelley, 1972) is valid, given the alternative possibility of a purely cognitive explanation (Miller & Ross, 1975).

The separatism of the "motivation versus cognition" approach assigned distinct functions to motivational and cognitive variables. This is apparent in major social psychological notions of persuasion, judgment or impression formation. For instance, in the popular dual-mode theories of persuasion (Petty & Cacioppo, 1986; Chaiken & Chen, 1999) the degree of processing

motivation acts as an important selector of persuasive mode: High processing motivation (operationalized, e.g., via high personal involvement in an issue) is associated with extensive processing of message arguments, whereas low processing motivation is associated with brief processing of "peripheral" or heuristic cues. In the alternative "unimodel" of persuasion too (Kruglanski & Thompson, 1999a, b; Kruglanski, Thompson, & Spiegel, 1999; Kruglanski, Erb, Spiegel, & Pierro, 2001) motivation determines the extent of processing any kind of information (i.e., one associated with message-arguments or with peripheral/heuristic cues).

The "static" approach. Beyond its separation from cognition, motivation has been often treated statically in social psychological research. Social psychologists typically assumed that due to chronic or momentary causes individuals have either high or low degree of some motivation (such as the need for closure (Kruglanski & Webster, 1996; Webster & Kruglanski (1998), the need for cognition (Cacioppo & Petty, 1982), or "learning" or "performance" goals (Dweck, 1999) that systematically impacts various relevant phenomena. Whereas the change instigated by a given motivational state could be considered dynamic, the motivational state itself was treated statically, that is, as fixed at a given magnitude. To say that it was static is not to imply that social psychologists' traditional approach to motivation was inappropriate or. Quite the contrary, it yielded a rich crop of important findings about the effects of motivational variables on judgment, action and performance (see e.g., Kruglanski, 1996a for a review).

Motivation as cognition: depicting dynamism. Nonetheless, a static depiction does miss something important about motivation, namely its malleability and dynamism: Our wishes, interests and desires are rarely so steadfast or constant. Often, they fluctuate from one moment to the next as we succumb to an assortment of distractions, temptations, and digressions. Rather than relentlessly keeping to the task at hand we often day-dream, ruminate, run to the fridge or

check our e-mail, and our shifting moods and emotional states often track our changing motivational conditions. An insight into such motivational dynamics may be gained if we abandon the separateness assumption of the "motivation versus cognition" program, and adopt the "motivation as cognition" approach instead. The "motivation as cognition" paradigm is naturally fitted to handle dynamism because in cognitive systems dynamism is the "name of the game". Our cognitive activity hardly ever stops, not even in our sleep. Our associations are in a constant flux, and our thoughts "ignite" each other in rapid succession. Many of these thoughts are motivational in nature; they represent our goals, the means to pursue them or discrepancies from goal-attainment.

The present story belongs, therefore, in the "motivation as cognition" paradigm. Its topic is the behavior of goal-systems, defined as the mental representations of motivational networks composed of inter-connected goals and means. Different goal-systems may be activated at the same time through environmental priming (cf. Bargh & Barndollar, 1996) and they may compete with each other for mental resources. We assume that motivational phenomena are a joint function of cognitive principles (that goal-systems share with other cognitive systems) as they are applied to uniquely motivational contents, that is, to goals and to means. Put differently, the cognitive properties of goal-systems set the constraints within which the motivational properties may express themselves. In the sections below, we first discuss the cognitive and the motivational properties of goal-systems. We then describe empirical research on a wide array goal-systemic phenomena determined jointly by both sets of properties.

Cognitive Properties of Goal-Systems

Two categories of cognitive properties play a major role in the behavior of goal-systems, these are their structural and their allocational properties. The structural properties of goal-systems stems from their cognitive-interconnectedness, and the allocational properties-- from the attentional resource-limitation that characterizes all deliberative cognitive functioning.

Structural Properties of Goal Systems

Interconnectedness: Its Form and Its Strength. Goal-systems consist of mentally represented networks wherein goals may be cognitively associated to their corresponding means of attainment and to alternative goals as well. Beyond cognitive linkage to their corresponding goals, means may be associated with other means. Mental representations of motivational constructs (i.e., goals and means) may include facilitative as well as inhibitory links. Typically, facilitative links may exist between vertically connected elements, that is, between goals and their corresponding means. Inhibitory links may exist primarily between lateral elements, that is, between competing goals or competing means. A possible goal-system is depicted in Figure 1. As shown, a super-ordinate goal is cognitively connected to its various sub-goals or way-stations en route to that goal, in turn connected to their own means of attainment. Lateral interconnections within a goal-system also are represented, including interconnections between different sub-goals and between various attainment means to those particular sub-goals.

Insert Figure 1 here

Interconnections have two major aspects of interest, their form and their strength. Concerning form, interconnected goal-systems may exhibit different “architectures” or come in different configurations: the number of means attached to a given goal may vary and so may the number of goals attached to a given mean. The number of means linked to a given goal define

the equifinality set encapsulated in the slogan of "all roads leading to Rome" (see Figure 2). Size of the equifinality set determines the amount of available choice between the means and the range of substitutability of one means for another if pursuit of the latter was thwarted or resulted in failure.

Insert Figure 2 here

The number of goals linked to a given means define the multifinality set encapsulated in the notion of "many birds with one stone" (see Figure 3). As we shall see later, size of the multifinality set may partially affect the perceived value, or the motivational "bang for the buck," a given means may afford.

Insert Figure 3 here

The second structural aspect of goal systems refers to interconnection strength between the units. Strength is not independent of form because it is positively related to uniqueness of the interconnections. The presence of additional means associated with a goal and/or of additional goals associated with a means should dilute the strength of activating the goal by the means or vice-versa. Thus, the lower the number of means connected to a given goal (i.e., the smaller the equifinality set) or the lower the number of goals connected to a given means (i.e., the smaller the multifinality set) -the stronger the cognitive association-strength between a given means and the goal. This is analogous to the classic "fan effect" discussed to by John Anderson (1974, 1983) wherein the greater the number of specific facts linked to a general mental construct, the less likely it is that any particular fact will be retrieved or recalled upon the presentation of the construct. Relations between uniqueness and association strength are represented in Figures 4 and 5.

Uniqueness of association is only one among several determinants of association-strength. Another determinant is repeated pairing of elements with one another, i.e., a mean with a given goal, a goal with another goal, or of a means with another means. A mental representation of an association could derive also from pronouncements of a trusted "epistemic authority" (Kruglanski, 1989; Elis & Kruglanski, 1992). A mother could teach her child that the way to produce water is to turn the faucet, and this could establish an immediate association between the goal (of producing water) and the means (of faucet-turning), etc.

Transfer of properties within a goal system. Association strength is important because it affects the facility of traffic between the units. This affords the transfer of various motivational properties from one unit to another. The units may activate each other (Anderson, 1983; Neely, 1977; Rumelhart & Ortony ,1977) but activation is not the only property that spreads. Other properties too may flow along the links. Metaphorically then, these links resemble cognitive railroad tracks enabling the transportation of different psychological properties across the units. Besides spreading activation, one could have a transfer of commitment, or of specific affective qualities from goals to means (or vice versa) in proportion to the strength of their association.

Subconscious impact. Depending partly on their strength of activation, some cognitive elements may enter conscious awareness while others might not. Nonetheless, the latter too may impact subsequent activities and reactions (Draine & Greenwald, 1998). In goal systems theory, we distinguish between currently pursued focal goals of which goal-status one is explicitly aware and background goals whose presence need not be consciously registered. For example, one might assume that all one is doing is pursuing a casual conversation with a friend whereas in fact one is also (subconsciously) self-enhancing or impression-managing. Or, one may feel that one's choice of one's marital partner is driven by her/his intelligence and warmth unaware that she/he

also reminds one of one's mother or father and that this is an important cause of the partner's appeal.

An intriguing methodological implication of the notion of subconscious impact is that goals can be subliminally primed. Pioneering work of Bargh and his colleagues (e.g., Bargh & Barndollar, 1996) supports the existence of implicit goal-priming as does our own work reviewed subsequently (see also Draine & Greenwald, 1998).

Contextual dependence. We know that human cognitions are subject to contextual framing effects and goal-systems should be no exception. From that perspective, goal-systems are hardly invariant or fixed. All to the contrary, they are highly flexible and context-dependent, in that their shape and form may vary in accordance with situational framing effects. As noted earlier, a pronouncement by a trusted source or "epistemic authority" (cf. Kruglanski, 1989; Elis & Kruglanski, 1992) may set up, alter, or eliminate cognitive-connections between goal-systemic elements. Additionally, the activation of some such elements may occur in some contexts only but not others. This means for example that a different set of means to the same goal (i.e., a different equifinality set) may be envisaged by the same individual in different contexts; as a consequence she or he may select different means to the same goal in those varying circumstances. As shown in Figure 6, in context 1, mean x to goal A may be preferred over its alternatives s, t, and u, whereas in context 2 mean y to the same goal may be preferred over x, s, and t; consequently, x will be chosen in the first context but not in the second.

Insert Figure 6 here

Moreover, the substitutability relations between various means may be context-specific. In one context, means x and y may be seen as connected to the same goal A which would render them mutually substitutable, whereas in another context x and y may be seen as connected to

different goals which would render them non-substitutable. These relations are graphically depicted in Figure 7.

Insert Figure 7 here

The Allocational Properties of Goal Systems

The fundamental allocational property of goal systems rests on the assumption of limited mental resources. From that perspective, the allocation of cognitive resources constitutes a "constant-sum" game, so that the more resources are accorded to a given portion of one's mental field-the less mental resources are left for the remaining portions. We are assuming that, typically, goal-pursuit is resource-dependent. If so, the greater the investment of resources in pursuit of a given goal or in the implementation of a given mean the less resources should be available for alternative goals or means. One implication of this is that currently active goals may pull resources away from each other. This may interfere with progress toward each of these goals, and impede their attainment. Similarly, alternative means to the same goal may compete with each other for mental resources and imply the need to exercise choice among them (so that at least the mean chosen may receive the required resources). Finally, one might envisage a resource-competition between a goal and its associated mean as well. Excessive concentration on a goal while pursuing the means, that is a failure to effect a full transition from a mind-set of "deliberation" to that of "implementation" (cf. Gollwitzer, 1996) might represent a counterproductive rumination or an exaggerated "assessment" orientation that undermines effective "locomotion" towards one's goals (cf. Kruglanski, Thompson, Higgins, Shah, Atash, & Pierro, 2000). Thus, in addition to the structural properties of goal systems their allocational properties too may place important constraints on adaptive self-regulation.

Motivational Properties of Goal Systems

Neither the structural nor the allocational properties of goal-systems are unique: They characterize all cognitive-systems not just goal-systems. Cognitive psychologists have typically assumed, for example, that the organization of concepts in memory consists of inter-linked nodes which may vary in strength of association to one another (cf. Anderson, 1973; 1984). Similarly, the doctrine of limited mental resources is a mainstay in much cognitive theorizing (cf. Kahneman, 1973) and is hardly of special pertinence to goal-systems. What makes goal-systems unique is their composition of motivationally relevant entities, that is, of goals and of means. Both are endowed with special properties that do not pertain to alternative cognitive systems. In what follows we briefly discuss what some major such properties might consist of.

Goal-striving. To a considerable extent, human action is goal-driven (cf. Gollwitzer & Bargh, 1996). It represents the striving to attain specific desirable objectives. Goal-striving is typically exigent of resources, and it may result in success or in failure (to reach the desired end). Successful attainment of one's objective generally engenders positive affect of pleasure or satisfaction, whereas failure to attain one's goals engenders negative affect of displeasure and disappointment. Specific types of goals may lend unique shades of positive or negative affect as function of their attainment or non attainment. In this vein, Higgins (1997) distinguished between promotion goals whose attainment engenders feelings of happiness and pride-- and non attainment, feelings of sadness and dejection, and prevention goals whose attainment gives rise to feelings of calm and relaxation and non-attainment to ones of tension and agitation.

Goal commitment. By goal-commitment we mean the degree to which an individual is determined to pursue a goal. Goal commitment is assumed to vary as a function of subjective utility determined by a multiplicative function (c.f., Atkinson, 1954) of the value assigned to the

goal and its expectancy of attainment (S.U. = f (E x V). In other words, there will be no commitment to a goal (1) if its subjective expectancy of attainment was nil no matter how high its subjective value (e.g. one wouldn't commit to the goal of possessing the Mona Lisa painting, no matter how great its perceived artistic value); (2)if its value was nil, no matter how high the expectancy of attainment (e.g., one may refrain from committing to the goal of purchasing a new vacuum cleaner even if the expectancy of being able to do so was complete, simply because one's old vacuum cleaner was perfectly OK, and hence the value of the new acquisition was nil). Recent evidence implies that with respect to some goals at least, namely sacred duties and obligations, their high magnitude may dampen the weight of the expectancy factor in the multiplicative formula, such that the expectancy matters less and less the greater the magnitude of the duty or obligation (cf. Shah and Higgins, 1997). Also, some individuals, e.g. inveterate "locomotors" (Kruglanski et al., 2000) may be so inclined to engage in sheer movement toward goals that they may commit to goals primarily on the basis of attainment expectancy (assuring progress and movement) and give relatively little weight to value. Finally, in some domains, such as achievement, magnitude of the value component may depend on that of the expectancy component such that the lower the expectancy of attainment (the harder the task) the greater the value of success (cf. Atkinson, 1954). We assume then, that goal-commitment is a multiplicative function of value and expectancy but the way these are combined or weighted may depend on specific goals and/or individuals.

Goal commitment may express itself in persistence of goal-strivings, as well as in emotional reactivity to successful or unsuccessful strivings. Thus, a goal to which one is strongly (vs. less strongly) committed would elicit greater magnitude of positive affect upon attainment and greater magnitude of negative affect upon attainment failure.

Means choice and substitution. Subjective utility considerations may also drive the choice of appropriate means. All else being equal, at a given goal-value the mean most likely to be chosen is that which promises the greatest expectancy of attainment. However, all else need not be equal, at least not in all circumstances. Beside the focal goal the individual may be consciously pursuing, there may exist other, background goals that he or she strives to attain often without conscious awareness. For instance, the individual may be fatigued and because of that, opt for a mean that promises goal attainment with a minimal expenditure of effort. Alternatively, he or she may be in a hurry and hence opt for a means that may seem as the quickest way of reaching the goal. In yet other instances, she or he may wish to impress an audience, and hence opt for the most "impressive" or "dramatic" means that promises to attain such an effect. Such choices may sacrifice the expectancy of goal attainment for multifinality considerations, that is, for the potentiality of a given mean gratifying goals over and above the currently focal objective. The trading of expectancy for multifinality need not sacrifice subjective utility, however. For multifinality increases the value component of the equation and hence might often compensate for a potential loss of expectancy.

As noted earlier, a strong commitment to a goal may express itself in persistent efforts toward goal attainment. Such efforts may often include the coping with failure to attain the goal or to advance toward the goal. Coping, in turn, may include a "means-shift" (Kruglanski & Jaffe, 1988) that is, the substitution of a new mean for one that has failed to bring about the desired result. Substitution may involve a selection from a previously represented means-constellation, or it may require the generation of new means, and, hence the mental construction of novel goal-systemic relations.

Whereas the generation of appropriate means may advance goal-pursuit, rival alternative goals may undermine it by introducing goal conflict (cf. Lewin, 1935; Miller, 1944). Adaptive coping would require the management or resolution of such a conflict so that subjective utility is maximized and that a goal-pursuit most likely to accomplish it is carried out.

Joint Workings of Cognitive and Motivational Principles in Self Regulation

We are assuming that the various motivational phenomena just discussed (e.g., goal-commitment, means choice and substitution, the management of goal-conflict) function within the structural and allocational constraints inherent in goal-systems' cognitive nature. In other words, whereas motivational phenomena have their own endogenous determinants (related to considerations of expectancy and value described earlier) they are also determined by the (exogenous) cognitive conditions of a given goal-system that affect the nature and values of these endogenous factors. In that sense, self-regulation is enabled by a joint operation of cognitive and motivational principles that interactively impact goal-driven action. This general notion affords new insights into numerous self-regulatory phenomena addressed in the sections that follow.

Goal Systems Theory: A Summary

It is well to take stock at this point and to summarize the fundamental postulates of goal-systems theory. It assumes that:

(1) Goal-systems are characterized by two types of properties: Cognitive and motivational.

(2) Goal-systems' cognitive properties are (a) structural, and (b) allocational. A major structural property of goal-systems is interconnectedness, characterized by the form and strength of links between goals and means within a given system. A major allocational property of goal systems resides in the restricted nature of mental resources to be distributed in a "constant sum" fashion among various goal-systemic elements.

(3) Goal systems' motivational properties comprise the (1) principle of subjective-utility that determines goal-commitment and mean-choice. Furthermore, goal-striving (2) is accompanied by affective feedback engendered in response to success and failure outcomes, and (3) is characterized by persistence of pursuit including means substitution and the management of goal-conflict.

(4) The various motivational properties of goal-systems are constrained, hence partially determined, by their cognitive properties. The research described in the following sections illustrates this general notion with a wide variety of phenomena. In accordance with the theory's breadth, the goals we investigated ranged from narrow task-goals to life-long objectives. Our research methods too were correspondingly varied. We often used "micro-cognitive" priming techniques to tap the momentary activation potentials within goal-systems, but we also relied on structured questionnaires to explore the chronic representations of such systems and we used a

variety of cognitive, behavioral and outcome-related measures to investigate diverse goal-systemic effects.

Empirical Explorations of Goal Systems

The goal-systemic research described below falls into two broad categories, related respectively to (1) the strength as well as the type (facilitative and inhibitory) of associative links between goal-systemic elements, and (2) their configurational patterns. We discuss them in turn.

Associative Links Between Goal-Systemic Elements

(1) Associative connections between goals and means. Our empirical work often involved the application of cognitive methods (related to goal-systems' cognitive properties) to a variety of motivational phenomena (related to goal systems' motivational essence). Thus, in much of our research we assessed the degree of association between goal-systemic elements. Our methodology was based on priming one such element, say a goal or a mean, and measuring the extent to which this activates another element, e.g., another mean or goal. We used either supra-liminal or subliminal priming (our participants did not consciously realize that a prime has been presented) and we typically measured consequent construct activation via a lexical decision task. Using these methods we investigated first whether the degree to which related goals and means (that is, elements within the same goal system) are associated is stronger than the degree to which unrelated goals and means (that do not belong within the same goal system) are.

Participants responded to a computer program by listing three different attributes it was their goal to possess and one positive attribute they were not currently trying to possess. They also listed one activity they could perform to attain each of the four attributes. We regarded these as means to those particular goals. After completing the initial procedure, the computer prompted the participants to list all the activities they could think of that would help them attain

each of the attributes. Finally, participants completed a lexical decision procedure in which they were asked to determine whether a word was an attribute or an activity. The four attributes listed by the participant and the first attainment means listed for each attribute were randomly included in the presented set of prime and target words. The links between attributes and means could be assessed then, by examining reaction-times when the attribute or goal was the prime for the means. The reaction times to the means when primed with the corresponding goal participants were currently pursuing were significantly faster than when the prime was a non-goal control. The difference between the goal and control primes disappeared, however, when the goal was one participants were not currently pursuing. This latter finding argues against an alternative explanation of our results in terms of a mere semantic association between related goal and mean words in the general language. It appears, instead, that the dynamic interrelation of goals and means within the same goal-system contributes to their cognitive association over and above their possible semantic affinity. These findings are shown in Figure 8.

Insert Figure 8 here

(2) Uniqueness of linkage and associative strength. Data from the same study support the assumption that the strength of association between goal-systemic elements is positively related to their uniqueness. Recall that following the listing of a single activity that would help them attain the goal, participants listed all such activities they could think of. We found that the lower the number of activities participants listed, that is**,** the greater the uniqueness of the goal-means connections, the faster the lexical decision times to the first activity listed after being primed with the corresponding goal, that is, the stronger the degree to which the goal cognitively activated that particular mean. These data are displayed in Figure 9.

Insert Figure 9 here

(3) Transfer of commitment from goals to means. The fact that goals and means are cognitively associated, and that the strength of their association is positively related to its uniqueness is neither particularly surprising nor particularly "motivational" (cf. Anderson, 1974; 1983). These features, however, form the necessary basis for the transfer of motivational properties from the goal to the means, a much more interesting and motivationally relevant phenomenon. A means strongly associated with a goal may immediately bring the goal to mind, evoking feelings and attitudes associated with that goal while thinking about or engaging in the means. In an early study designed to investigate this issue, participants generated a goal and listed either one or two means i.e., activities designed to attain that goal. Participants were then asked to indicate how committed they were to engaging in the activity. We found that participants rated themselves as more committed to the activity when it was the only means listed (thus the strength of its association with the goal was high) versus when it was one of the two activities listed, which lowers uniqueness, hence, proportionately, association strength. Assuming that the degree of commitment to the goal is relatively high, this is consistent with the notion that the transfer of commitment from the goal to the means is greater the stronger their association (see Figure 10).

Insert Figure 10 here

Correspondence between commitment to goal and to means. The foregoing study assumed that participants' commitment to the goal was relatively high, but it did not assess it. Ideally, one would expect a direct correspondence between commitment to the goal and to the means. In our next study we collected data pertinent to this issue by explicitly assessing goal as well as means commitment. Participants, University of Maryland students, listed a goal they were striving to attain, and then 1, 2, or 6 activities they were engaged in toward attaining that

goal. (E.g., one participant listed “becoming a broadcaster” as a goal and “taking an editing class” as an activity). Goal commitment was assessed before the listing of means, through ratings of (1) goal importance, (2) likelihood of attainment, (3) amount of invested efforts, and (4) plans to attain the goal in the near future. Next, depending on the experimental condition, participants listed activities they may work on, or are already working on, in order to attain the goal. Finally, commitment to the first activity listed was assessed through ratings of (1) its perceived importance, (2) likelihood of its pursuit, (3) investment of efforts in it, (4) its pursuit in the present, (5) frequency of engagement in it, and (6) perceived interest in it. All ratings were made on 7-point scales. As predicted, we found that correlations between commitment to the goal and commitment to the first activity listed was highest ($r=.43$, $p<.05$) in the one-activity condition where the uniqueness (and hence presumably the strength) of the association was the highest, it was substantially lower ($r=.24$) in the two-activities condition and it was lowest in the six-activities condition ($r=.08$) where uniqueness also was lowest, consistent with the notion that commitment-transfer varies as function of the degree of association between the goal and its means (see Figure 11).

Insert Figure 11 here

Direct measurement of the degree of association. In the studies so far, we have inferred the degree of association-strength from the number of means to a goal participants listed. In our next study we used a direct measure of association-strength by assessing the degree to which the goal primes its corresponding means. Participants in this study provided two attributes it was their goal to possess, and listed one activity they believed could help them attain each attribute. They were then subliminally primed with the goals (or control words) and performed a lexical decision task with the activities (i.e. the means) as targets. Then they rated the emotions they felt

when thinking about possessing the attribute, and the emotions they felt when engaging in the activity. Specifically, participants were asked to indicate how agitated, dejected, happy and relaxed they felt regarding each goal and activity and provided their answers on a 5-point scale ranging from 0 not at all to 4 (a great deal). Separate emotion-totals for each goal and activity were created after first reverse scoring the negatively-valenced emotion items. As illustrated in Figure 12, our analyses indicated that the correlation between the emotional magnitude of a participant's goal (e.g., a goal of "becoming educated") and the emotional magnitude of a corresponding means (e.g., a means of "studying") depended on strength of the goal-means association. We found that the correlation between the emotional significance of a goal and the emotional significance of a means was significantly greater the stronger the degree to which the goal primed its corresponding means.

Insert Figure 12 here

Transfer of affective-quality from goals to social means. Beyond the magnitude of commitment and of affect, the degree of the goal-means association may determine the transfer of unique affective qualities between the two. In a study designed to investigate this possibility, participants listed either an "ought" goal defined by Higgins (1987) as a duty or an obligation, or an "ideal" goal defined as a hope or an aspiration. Higgins' (1987, 1997) research suggests that the attainment of "ought" goals gives rise to "prevention-type" affect, expressed in such emotions as relief, calm and relaxation. By contrast, the attainment of "ideal" goals gives rise to "promotion type" affect expressed in such emotions as happiness, pride or enjoyment.

Participants then listed three acquaintances who they believed were related to attainment of the goal (i.e., to constitute "social means" to the goal in question). We assumed that the order in which the acquaintances were listed reflected the strength of their association to the goal (for a

similar methodology see Higgins, King & Mavin, 1982). Participants then rated their expected emotions following goal-attainment using 3 items related to ideal-type affect (namely, happy, proud, enjoy) and 3 items related to ought-type affect (namely, relieved, calm, relaxed). Participants used the same items to rate their feelings toward each acquaintance. We found that the affective qualities associated with ideal or ought goals were transferred to individuals related to these goals' attainment and that the degree of transfer was proportionate to the order in which these persons were listed. Thus, for an ideal-type goal, ideal-type affect felt with respect to the first person listed was more pronounced than ideal-type affect felt with regard to the second person listed, which in turn was more pronounced than the ideal-type affect felt with respect to the third person listed. Similarly, for the ought-type goal, the corresponding (goal-type) affect was stronger with respect to the first two persons listed than with respect to the third person listed. No significant relation existed between the strength of ideal-type affect and the listing-order of acquaintances when the goal was of an ought type, nor between the strength of an ought-type affect and listing order when the goal was of an ideal type. This data-pattern, shown in Figure 13, supports the notion of transfer of specific affective qualities from the goal to the associated means as function of their degree of association.

Insert Figure 13 here

In summary, the degree of cognitive association between a goal and a mean seems to determine the degree of transfer between the two of (1) the degree of commitment, as well as of the (2) quantity and (3) quality of affect. These findings have intriguing implications for the topic of intrinsic motivation (for recent discussions see Shah & Kruglanski, 2000; Sansone & Harackiewicz 2000): When an activity is strongly associated with a goal (and its attainment), it might "mesh," or form a "unit-relation" with it (Heider, 1958); that is, be experienced as an end

in itself, or as intrinsically motivated. That is perhaps why various goal-properties (such as goal-commitment) “spill over,” and come to characterize such intrinsically motivated activities. This suggests, for example that (1) intrinsic motivation could be conceptualized as lying on a continuum (determined by the association strength of a goal and an activity), rather than representing a qualitative dichotomy as has been typically surmised (cf. Deci and Ryan, 1985; Kruglanski, 1975), (2) rather than reserving the notion of intrinsic motivation for specific types of goals, such as those of autonomy, competence or relatedness (cf. Deci and Ryan, 1985) any goal and any relevant activity could be structurally tied together (or associated) to produce intrinsic motivation, and (3) depending on the specific characteristics of the goal, different intrinsically motivated activities to whom those characteristics are transferred would be experienced differently. Thus, whereas all intrinsically motivated activities might give rise to positive affect, the specific type of positive affect might vary as function of the goal (e.g., whether it constitutes an “ideal” or an “ought”) to which the activity is intrinsic.

The present ‘transfer’ notion is reminiscent of the goal-gradient phenomenon enunciated by Clark Hull (1932). According to Hull’s goal-gradient hypothesis “..the goal reaction gets conditioned the most strongly to the stimuli preceding it, and other reactions of the behavior sequence get conditioned to their stimuli progressively weaker as they are more remote (in time or space) from the goal reaction” (Hull, 1932, pp. 25-26).

The animal-learning theorist that he was, Hull conceived of the goal-gradient principle in terms of time and space that separate the animal from the goal. The present transfer principle is broader in nature and linked to the strength cognitive associations between means and ends, that transcend temporal and spatial considerations. Thus, merely thinking of a strongly associated means (e.g., of studying, working out at the gym, or going out on a date) may call to mind the

respective goals of these activities (good grades, a fit body, the admiration of one's partner) and the attendant feelings and cognitions linked with their attainment.

(4) Goal-systemic phenomena and the determinants of subjective utility: goal-mean association and goal commitment. The structural property of association strength and the motivational property of attainment expectancy afford jointly the prediction that the degree to which a goal is associated with a mean-should be positively related to goal-commitment. The reason is that mean-accessibility may increase the perceived expectancy of goal-attainment and hence increase the subjective utility of the goal's pursuit determined by the expectancy and value formula. The foregoing hypothesis corresponds to common experience wherein the excitement about a goal-pursuit is augmented by the sense of "know how" regarding goal-accomplishment, and hence an expectancy of success that may cement goal commitment. Consider the difference between a goal such as 'shopping' to which the means (e.g. visiting the neighborhood mall) jumps immediately to mind, versus writing a theoretical paper to which the means (i.e. the relevant ideas) are not as readily discerned. As common experience attests, it is relatively easier to commit to shopping than to writing and the latter pursuit may require a considerably greater amount of self-discipline to stay on track.

In a study designed to investigate these notions, participants generated their goals and corresponding means. They then completed a subliminal priming task on a computer. In one condition designed to experimentally strengthen the goal-mean association participants completed repeated trials presenting goals as primes and means as targets. In another condition, participants completed trials wherein control words were the primes and means were the targets. We found that commitment to the goal was higher in the experimental (vs. the control) condition

where the association between goals and means was systematically strengthened. (See Figure 14).

Insert Figure 14 here

That commitment to a goal is increased when the mean to that goal is apparent is indirectly supported by the "mental contrasting" work of Oetingen (2000, Oetingen, Pak, & Schnetter, 2001). She finds that where focusing on a desired state is followed by contrasting it with the actual state (a comparison likely to instigate a means-generation activity) commitment to the goal is markedly more contingent on the expectancy of goal-attainment as compared to a situation where focussing on the actual state is followed by thinking about the desired state, or to a situation of focussing on the desired state exclusively. These results may indicate that the mental-contrasting procedure instigates a means-generation attempt that may or may not succeed. When it does succeed, the means is particularly accessible (having just been generated) hence increasing commitment. When it does not succeed, however, not only that the means accessibility is low, but one is meta-cognitively aware of the difficulty of altering this state of affairs which may additionally depress commitment.

Intergoal association undermines goal commitment. Whereas association between a goal and a mean may increase goal commitment, association between a goal and competing goals may undermine commitment because the latter may pull resources away from the focal goal, lowering attainment expectancy, subjective utility, and hence commitment. Suppose that John associates the goal of preparing for the exams with the goal of flirting with Ann, a fellow graduate student with whom he often studies. Such association between competing goals may undermine John's expectancy of doing well, and his overall commitment to studying.

Indeed, we found in several studies that the degree to which a goal primed other goals (either supraliminally or subliminally) was inversely correlated with various measures of commitment including direct ratings of commitment, reported progress toward the goal, and the magnitude of positive and negative affect proportionate to participants' perceived discrepancies from their goals (see Figure 15). We also found that this relation was moderated by the degree to which the alternative goals were seen as facilitatively related to the focal goal (i.e., the degree to which they partially served as means to the goal in question). This overall data-pattern is consistent with the notion that goal-commitment is related negatively to a goal's association with its rival alternatives and, is related positively to its association with its attainment means.

Insert Figure 15 here

Priming alternative goals undermines goal commitment. The correlational nature of the foregoing findings is mute as to the direction of causality. It is indeed possible that the activation of alternative goals may pull resources away from the focal goal, and hence undermine goal-commitment. It is also possible, however, that goals to which one is committed actively inhibit their alternatives. The notion that mental resources are limited, and that they are, therefore, allocated among the various goal-systemic elements, suggests that both causal directions may obtain in fact, and our data bear this out. Indeed, we found in several studies (Shah & Kruglanski, in press) that priming participants with an alternative goal undermines their commitment to the focal goal, hampers progress toward that goal, hinders the development of effective means for goal-pursuit, and dampens participants' emotional responses to positive and negative feedback about their striving efforts. As in our correlational research above, we found also that the apparent pulling-away of resources by a goal's rival alternatives is attenuated as

function of the degree to which these are perceived as facilitatively related to attainment of the focal goal.

In one of the studies designed to test these notions, participants expected to perform two consecutive tasks the first of which consisted of anagram solution. While working on the anagram task (constituting their "focal" goal at that point) participants were subliminally primed with the second task they expected to perform (that operationally defined the "alternative" goal) or, were primed with a control-phrase. We assessed commitment to the focal goal through persistence on the first task, performance success, and extent of affective reactivity to success and failure feedback. As shown in Figure 16, these measures of commitment showed substantial decline in the alternative goal-priming (versus control) condition. Consistent with our previous findings, such decline too was substantially attenuated where the alternative goal was seen as facilitatively related to the focal goal, that is, where it partially served as means to that goal's attainment.

Insert Figure 16 about here

In another series of studies (Shah, Friedman, & Kruglanski, in press) we found that activation of a given focal goal results in an inhibition of alternative goals as reflected in the slowing down of lexical decision times to such goals, and that the magnitude of such inhibition is positively related to participants' commitment to the focal goal. The magnitude of this inhibitory effect was reduced where the alternative goals were seen as facilitatively related to the focal goal. The data from one of the relevant studies are summarized in Figure 17. In that experiment, participants listed three attributes it was their goal to possess. They then engaged in a lexical decision task in which the goals (or control words) served as primes and on other trials, as targets. As can be seen, we found that when a goal (versus a control word) served as a prime

this increased the lexical decision times to the alternative goals (versus control words) attesting to their inhibition. This effect was proportionate to participants' commitment to the priming goal (or its perceived importance). Though not represented in the figure, we also found that the inhibition of alternative goals was significantly reduced as function of the degree to which the alternative goals were seen as related facilitatively to the focal goals.

Insert Figure 17 here

Thus, in conformance with the resource limitation aspect of goal systems, we find evidence both for the pulling away of resources by accessible goal-alternatives and for the shielding against such a pull by an active inhibition of those alternatives.

Inter-goal associations and self-control: the dynamics of overcoming temptations. The foregoing notion of goal-shielding has a distinctly functionalist flavor. It suggests that individuals tend to shield their commitment to important goals against a "goal-pull" by attractive alternatives. But what about focal goals that are momentarily alluring yet are relatively detrimental in the "grander" scheme of things, constituting "temptations" that undermine the accomplishment of higher priority goals. In the interest of effective self regulation, temptations might alert one to the danger by activating (rather than inhibiting) the high importance goals with which they are in conflict. We recently carried out several studies to investigate this possibility.

In one of our studies, participants, University of Maryland students, entered on a computer an important goal they were currently pursuing. They entered predominantly goals related to academic success, relationships, appearance and religion. Participants then entered a temptation with regard to the goal they listed which we defined for them as "something you would like to do but ought not to, if you want to attain the goal". For instance, for a goal of

"study" participants entered such temptation as to "party," or for a goal of "keeping one's girlfriend" a temptation such as to "watch porno films". Participants then entered 2 unrelated goals and 2 unrelated temptations to serve as controls. Then in a lexical decision task we subliminally primed them with the relevant (or irrelevant) temptation using the relevant goal as a target, or with the relevant (or irrelevant) goal using the relevant temptation as target. As shown in Figure 18, we found that temptations activated their overarching goals, whereas the overarching goals significantly inhibited temptations.

Insert Figure 18 here

The foregoing study suggests that the facilitative/inhibitory relations between temptations and goals can occur outside awareness exhibiting one of the properties of automaticity (Bargh, 1996): As the primes were presented subliminally and were not consciously recognized by participants, they were unlikely to evoke a deliberate cognitive process. In our next study, we proceeded to probe another aspect of automaticity, its efficiency or relative independence of attentional resources.

In that research we made use of the fact that a large proportion of University of Maryland students listed religious objectives among important life-goals (e.g., to "go to heaven" or "not to sin"). We, therefore, used "sin" related words such as "drugs", "temptation", "premarital" and "sex" as temptations and religion related words such as "prayer", "Bible", "religion" and "God" as goals. Both served as primes and alternatively as targets in a lexical decision task. We also used irrelevant goals and temptations as controls (in both the prime and the target roles). Approximately half the participants were placed under cognitive load implemented by instruction to memorize a 9 digit number and to reproduce it at the end of the study. The results, summarized in Figure 19, indicated that even though the load had an overall effect of slowing

down reaction times, it did not affect the inhibitory/facilitative relations between temptations and goals. Specifically, in replication of our previous study, temptation-words (such as “sin”) facilitated lexical-decision times to goal words (like “religion”) whereas goal-words slowed down the reaction times to temptations. It begins to appear then that effective self-control may entail the overlearning (to the point of automaticity) of activation and inhibition patterns wherein temptations alert one to higher priority life-goals with which they conflict, and the higher importance goals tend to banish temptations out of persons’ minds.

Insert Figure 19 here

Our next study went beyond ‘mere cognition’ in testing the behavioral implications of activating goals by temptations. We hypothesized that in the presence of a temptation people would tend to activate their higher priority goal that, in turn, will help them overcome the temptation. Participants in this study were women (University of Maryland undergraduates) known to have weight-loss as a goal. They were randomly assigned to one of three rooms. One room designed to directly prime the goal of “dieting” contained various “diet-related” magazines (namely about beauty, health and fitness) strewn around the table. The second room contained instead various objects designed to prime tasty, yet fattening, food-temptations such as chocolate-bars and cookies, as well as a copy of the “Chocolatier” magazine replete with appealing, and “mouth-watering” illustrations of highly caloric deserts. The third, control, room contained various geographic magazines about US natural attractions.

In each of the separate rooms, participants individually engaged in a lexical decision task including the word “diet” as the critical target. We found that both the “diet” prime, and the food temptation prime activated “diet” to an equal extent and significantly more so than did the control prime. Finally, participants were offered a choice between a Twix bar and an apple as an

ostensible gift for taking part in the experiment. We found that in both the "diet" and in the "food temptation" prime conditions, a majority of participants selected the apple as a gift whereas in the control prime condition a majority of the participants selected the Twix bar. It appears then, that for these dieting women, a tempting stimulus in the form of fattening delicacies was as effective as a direct dieting reminder not only in activating the dieting goal but actually in pursuing it behaviorally. Data relevant to these notions are summarized in Figures 20 and 21.

Insert Figures 20 and 21 here

Our temptation studies thus far are optimistic in their implications suggesting that temptations activate the "larger" goals they are in conflict with, which, in their turn, tend to inhibit temptations. But as we know too well, at least some of the people some of the time do succumb to temptations often with dire consequences for their mental and physical health, and with considerable costs to the society at large (e.g. in domains of substance-abuse, safe-sex, or domestic-violence). We thus proceeded to investigate whether people who are by and large unsuccessful self-regulators exhibit different cognitive relations between their goals and their temptations than do successful self-regulators. Our participants in this study were University of Maryland undergraduates who, by their own admission, were successful or unsuccessful in their academic pursuits. They performed a lexical decision task after first being exposed to a subliminal prime. On some of the trials, the primes were words related to the temptation to avoid studying such as "television," "procrastinate," "phone" and "internet," and target-words were related to the goal of studying, for example, "study," "grades," "homework," and "graduate". On other trials the foregoing, study words, were the primes and the temptation-words were the targets. As shown in Figure 22, we found that for successful students temptation words activated

study words to a much greater extent (the lexical decision times were faster) than for unsuccessful students, whereas for the unsuccessful students the study-words activated temptation words to a greater extent than for the successful students. These results imply the possibility that successful self-regulation involves the acquisition of “automatic” activation and inhibition patterns enhancing one’s ability to focus one’s attention on high-priority objectives and shift it away from low priority objectives, particularly if they conflict with the former and hinder their pursuit.

Insert Figure 22 here

This concludes our discussion of associative links of facilitative and inhibitory nature among goal-systemic units. We now turn to consider the configurational aspects of goal-systems and their implications for various self-regulatory phenomena.

Configurational Patterns of Goal-Systemic Linkages

Multifinality as a determinant of choice. As noted earlier, the equifinal configuration wherein several means are connected to the same goal poses the problem of choice among the means. How may such choice be accomplished? The notion of subjective utility suggests that the mean to be chosen might often be the one that promises to deliver the highest value or the utmost "bang" for the psychological "buck". Often, this could be a means that in addition to the focal goal promises to attain additional goals as well, that is, a means characterized by maximal multifinality. Indeed, several lines of recent evidence attest to the important role that multifinality plays in means' preference.

In one study we asked University of Maryland students to list two important attributes they could attain by studying. They listed, among others, such attributes as becoming "educated" "successful" or "powerful". Participants were also asked to assess the degree to which these attributes represented distinct goals. Controlling for their subjective value, we found that the degree to which of these attributes were judged to represent dissimilar goals was positively related to participants' commitment to studying suggesting that commitment was strongest when studying was linked to different goals, hence exhibiting the property of multifinality.

In a different study, we presented participants with the opportunity to play a hypothetical lottery in which they had a chance to win a pair of prize packages. As schematically represented in Figure 23, the total content of these packages was identical but in one condition the prizes were distributed in such a way so as to strongly invoke two separate goals. In that condition, one of the prize-packages consisted entirely of items related to fitness, and the other-- of items related entirely to entertainment. In another condition, each package contained a mix of fitness

and entertainment items, so that the separateness of the two goals was less salient. Instead, a general "better living" goal might have been invoked in this condition.

Insert Figure 23 here

We found that participants were significantly more interested in playing the lottery where two separate goals seemed clearly invoked, consistent with the notion that multifinality (the "two birds with one stone" notion) may be an important determinant of preferences (see figure 24).

Insert Figure 24 here

Multifinality in unconscious choice. A fascinating feature of human choice is that it may often be driven by unconscious considerations. Besides pursuit of the focal goal, the multifinal choice may often driven by a variety of "background" goals of which the chooser may not be consciously aware. In a classic study by Nisbett and Wilson (1977) passers by at a department store chose among four different nightgowns of a similar quality, or among four identical pairs of nylon stockings. A strong position-effect was found such that the rightmost object in the array was heavily over-chosen. The central highlight of this research was that the participants seemed entirely unaware of having exhibited the position-effect and in that sense their choices may have been unconsciously driven. Still, the question may be asked why did these choices exhibit a rightmost skew to begin with? A possible answer is implied by the present notion of multifinality. In these terms, participants in the Nisbett and Wilson (1977) studies may have had two goals in mind (see Figure25): (1) making a reasonable choice (this was their "focal" goal that would have been equally gratified by any object in the array), and (2) reaching quick closure after the entire array had been examined (this may have constituted a "background goal" of which participants have been consciously aware). Assuming that participants examined the array from left to right, both goals were satisfied by the rightmost object in the array, which was

therefore more multifinal than its alternatives. Indeed participants ended up overchoosing that particular object by a large margin as already noted.

Insert Figure 25 here

To test this analysis, we recently replicated the Nisbett and Wilson (1977) study with slight variations. In our experiment, the focal goal was kept constant, but the background goal was varied. Specifically, University of Maryland students, chose among four pairs of identical athletic socks the one that seemed to them of the best quality. In one condition, participants were placed under time-pressure to increase the need for closure (Kruglanski & Webster, 1996; Webster & Kruglanski, 1998). No time-pressure was applied in the second condition, where in addition participants were given accuracy instructions to reduce their need for closure. If our analysis is correct, we should replicate the rightmost preferences in the need for closure condition, but not in the need to avoid closure condition. As shown in Figure 26 that is exactly what happened. As in the Nisbett and Wilson (1977) experiments, participants seemed wholly unaware of being affected by time-pressure or accuracy instructions. Instead, they justified their choices entirely in terms of the socks' quality. Thus, some of the reasons they gave were that "stitching looked the best" in the pair chosen, that "the material was thicker in padding," that the "sock appeared more durable," etc. suggesting that the need for closure and the need to avoid closure constituted "background goals" in this situation, operating outside of participants' awareness.

Insert Figure 26 here

Of course, need for closure is merely one among many possible background goals a person can commit to. To test the generality of the multifinality principle in another study, we varied a different background goal: a desire to identify or disidentify with one's group. In this

research we took advantage of two recent events of considerable significance for the College Park campus, one positive-- the other negative. The positive event was inclusion of the UMD basketball team in the group of finalists (the “final four”) in an important inter-collegiate tournament (the NCAA tournament). The negative event was an outbreak of vandalism in College Park in the aftermath of the loss to Duke at that very tournament. The two events occurred in close temporal proximity, and our research took place a week after the latter of the two (i.e., the vandalism) took place. Our participants, all University of Maryland students, were asked to recall either one or the other event and to report their feelings about it. Not surprisingly, participants reported “feeling proud” in the “final four” condition suggesting a goal of identifying with their university. And they reported “feeling ashamed” in the vandalism condition, suggesting a goal of disidentifying with the university.

In an ostensibly separate “mini-experiment” participants chose which of two batches of material is more durable. In fact, both were batches of the same material, only one was colored red representing one of the UMD colors (which are red, black and yellow) whereas the other was colored purple, constituting a control color. As shown in Figure 27, in the “final four” condition participants rated the material with the UMD color (i.e., red) as more durable than the control color (purple). By contrast, in the “vandalism” condition, participants rated the purple colored (control) as more durable than the UMD color.

As in our prior study, participants exhibited no awareness that their choices might have anything to do with color of the swatches or their relation to their University. In a post experimental interview, the reasons they gave for their selection were based entirely on the perceived quality of the fabric, e.g., its "thickness," "apparent strength," or "stiffness" indicating that participants were not cognizant of the multifinal nature of their choice, nor of the background goals that might have affected it.

Insert Figure 27 here

Number of active goals and size of the equifinality set. Obviously, the greater the number of goals active at a given time, the greater the degree of multifinality a means could possibly attain. Granting the additional assumption that the difficulty of identifying a means is proportionate to its multifinality (it may be harder to locate a means that gratifies many goals versus only a few) it follows that the greater the number of currently active goals the more difficult it should be to find an appropriately multifinal means, and as a consequence the fewer such means to a given focal goal would be identified. For instance, if one's sole goal was to find something to eat there exists a virtually endless range of possibilities to choose from (including different fruits and vegetables, fish and meats, dairy products, a variety of sweets, etc). However, if in addition to the eating goal one also wished to maintain a slim figure, and look out for one's health, the range of possibilities should become much narrower, shrinking to a relatively limited list of "health" or "diet" foods.

More generally then, the presence of alternative goals should restrict the size of the equifinality set**,** or the number of substitutable means to a given focal goal. We investigated this notion in a number of studies. In the first of these, participants listed one goal they had for themselves. They did so either on a clean survey form or one that had been previously filled out

(presumably by another participant) and partially erased. In this "partially filled-out" survey, instead of one goal the fictitious participant listed five goals known (on the basis of a pilot study) to be quite common among university students. These were: "exercising," "health," "good grades," "love" and "taking care of Mom" goals. Participants were then asked to write down all the possible activities that could help them achieve the goal they themselves had listed. As shown in Figure 28, participants listed substantially more activities when no alternative goals were present supporting the hypothesized relation between one's mental awareness of alternative goals and the equifinality set of means one tends to generate with respect to the focal goal.

Insert Figure 28 here

To control for the competing hypothesis of mere distraction by alternative items, in the next study we asked participants to list one goal they were currently pursuing, and then list another 3 of their personal goals, or 3 presumed goals of the president of the United States. This study also compared the thinking about current versus future goals. In one condition, participants listed their (or the president's) current goal(s) and in another condition, goals they would likely have a year hence. We assumed that in thinking about a present goal participants would already have at the back of their mind alternative pressing objectives; this should constrain the number of activities listed with respect to the focal goal. However, when thinking about a future goal, alternative goals might be less likely to weigh in one's considerations. Thus, we expected that in the single-goal condition, participants would list more activities (or means) with respect to future versus current goals. This effect should be reduced in the three-goals condition because explicitly listing the alternative goals would allow them to exercise their constraints in both the future and the present condition. Our data, shown in Figure 29, are consistent with these assumptions. First off, in the current-goals condition alternative personal goals (but not the

president's goals) reduced significantly the equifinality set-size of means to the focal goal. Furthermore, in the single-goal condition more activities were listed in the future versus the present condition. This effect was significantly reduced in the alternative-goals condition.

Insert Figure 29 here

Whereas in our research so far we explicitly manipulated the presence of alternative goals-an interesting question is what "natural" condition may foster their appearance or disappearance, and hence affect the equifinality set-size to the focal goal. As the research described earlier indicates, commitment to a focal goal may represent one such condition. Commitment to a focal goal may effect the inhibition of the alternative goals especially if the latter were seen as less important in the overall scheme of things (thus, representing "temptations") than the focal goal. In terms of our initial example, under intense hunger, presumably increasing one's commitment to the goal of eating, the alternative goals of maintaining a slim figure, low cholesterol, or healthy diet, may be appreciably suppressed or inhibited. Under these conditions, the range of foods one might consider, i.e. the means to satisfy one's hunger, might be considerably larger than might be the case if one's hunger was only moderate.

In addition, the alternative goals may be momentarily primed within the context of a given goal-pursuit. This, in turn, should reduce the equifinality set-size with regard to the focal goal. These possibilities should be probed in future research. But for now let us consider an

important possible consequence of equifinality-set size: The possibility of substituting one means for another following a failure to advance toward one's chosen goal.

Substitution phenomena. In a remark attributed to Thomas Edison, he alluded to the substitution issue by stating that he had never failed, only found 10,000 ways that didn't work! Generally speaking, substitution (of tasks, medications, diets, exercise-regimens or symptoms, for example) constitutes a response to thwarting one's progress toward a goal by choosing an alternate route to the same objective. Such thwarting may result from failure of an original attempt, its interruption, or elimination of the routine-means of moving toward a given end. The problem of substitution is fundamental to social and personality psychology as witnessed by the attention it received from classic motivational theorists such as Freud (1923/1961) and Lewin (1935).

From a goal-systemic perspective, substitutability of means depends on an equifinality configuration linking them to the same objective. Both choice and substitution relate to equifinality, yet they address opposite aspects of this configuration: The problem of choice refers to how the means differ (e.g., which is more multifinal, or promises to deliver a greater value than the others) so that a satisfactory choice among them would be possible. By contrast, substitution refers to how the activities are the same, so that they could replace one another. An interesting aspect of this analysis is that, as noted earlier, goal-systemic configurations are malleable and subject to contextual framing effects; accordingly, substitutability too should be context-dependent.

In a study designed to investigate this issue, we framed two instances of the same activity (of anagram solution) as relating either to the same promotion or prevention goal or to different goals wherein one instance of the activity was linked to a "prevention," and the other, to a

"promotion" goal (Higgins, 1998) in a counter-balanced fashion. Following the procedure devised by Shah, Higgins, and Friedman (1998) participants were led to believe that, in order to motivate them to try their hardest they would receive either 1 or 2 extra credit-points depending on whether they found 80% of all the possible solutions to the anagrams or not. This contingency, however, was framed to either represent the opportunity for a reward (a promotion concern) or the opportunity to avoid punishment (a prevention concern). In the promotion-frame condition participants were told that they would receive 1 extra credit point for their participation but that if they found 80% of all the possible words, they would get an additional point. In the prevention-frame condition, participants were told they would receive 2 extra credit points for their participation but if they failed to find 80% of all the possible solutions they would lose one of their extra credit points. Participants then completed two different anagram tasks (each with its own promotion or prevention contingency).

As shown in Figure 30, we found that failure at the first task increased performance on the second task if both had the same regulatory focus framing but not if they had a different regulatory focus framing. Assuming that successful performance reflects an investment of efforts in an activity, these results suggest that when two tasks are framed as connected to the same goal, failure on one increases efforts invested in the other-- attesting to substitution. We also found that success at the first task decreased performance on the second when it had the same (vs. different) regulatory focus framing, attesting that substitution was no longer pertinent when the objective was attained via the first attempted route.

Insert Figure 30 here

Substitutability in modes of self-esteem enhancement. A goal-systemic analysis helps shed light on some seemingly incompatible findings about the substitutability issue in modes of

self-esteem enhancement. Specifically, work of Steele and Lui (1983) and of Tesser, Martin and Cornell (1996) suggested that various psychological phenomena such as dissonance reduction, self-affirmation, and self-esteem maintenance are mutually substitutable. Presumably, that is so because the high-level goal of self-esteem restoration is of paramount importance for the participants, and dissonance-reduction, self-affirmation and esteem-maintenance activities constitute functionally equivalent means to reaching that particular goal.

However, Stone, Wiegand, Cooper, and Aronson (1997) demonstrated that when dissonance is aroused by a hypocrisy manipulation, participants prefer to reduce dissonance directly despite a ready availability of a self-affirmatory activity, suggesting that the direct and indirect modes of self-esteem restoration aren't, after all, fully substitutable for each other, contrary to former claims.

Goal-systems theory offers a resolution to this seeming dilemma. Specifically, we assume that a dissonance manipulation implemented by inducing the individual to behave in a hypocritical manner- activates not only the abstract goal of self-esteem restoration but also the sub-goal of proving one is not a hypocrite. Our multifinality-notion suggests that the direct goal of dissonance-reduction should be preferred in this case (if one had ones "rathers") over self-affirmation, just as found by Stone et al. (1996). A graphic representation of these relations is shown in Figure 31.

Insert Figure 31 here

Note, however, that according to the goal-systemic analysis dissonance reduction or hypocrisy are non unique as far as multifinal choices are concerned. As shown in Figure 32, raising concerns about another cherished value, say, about one's courage should result in a preference for a direct affirmation of that value, i.e., affirmation of one's valor over alternative

ways of self-esteem restoration, say through the affirmation of sincerity, or the denial of hypocrisy.

Insert Figure 32 here

Finally, if one's self-esteem was undermined in a yet different way (e.g., via an athletic failure) hypocrisy-denial and self-affirmation might be fully substitutable with no particular preference between them being manifest (see Figure 33), simply because in this case neither is more multifinal than the other. In short, the answer to the question of whether hypocrisy denial and self-affirmation are fully substitutable is that it all depends. What it depends on is the context and more specifically, the goal-system that is mentally set-up for participants in a given situation.

Insert Figure 33 here

Social Psychological Implications of Goal-Systemic Effects

An essential property of goal-systems theory is its breadth and, content-free nature. It is that feature which renders the theory applicable to numerous domains of social psychological phenomena. More specifically, other persons may figure in our goal-systemic framework in three possible roles: (1) They may serve as primes that activate various goal-systemic elements (e.g. colleagues at a scientific convention may activate one's goals of productivity and achievement as well as one's perceived discrepancies from those objectives giving rise to feelings of anxiety or dejection (cf. Higgins, 1997)), (2) They may function as social means to goal-attainment in that their assistance, special skills, or services rendered may advance one toward one's chosen objectives (e.g., one's collaborators may serve as means to getting one's work done, one's family members may serve as means to goals of intimacy and affection, and so on). (3) They may function as ends in themselves, e.g. their love, affection and respect may represent goals that one

strives to attain via various means (hard work, impression management, reciprocal affection, etc.).

Interpersonal Implications of Goal Systems

Others as social primes. In a recent study relevant to the social priming notion, participants, University of Wisconsin students, were asked to name their mother and a close friend and to indicate a goal each of these significant others had for them. After completing a series of filler questionnaires, participants reported how committed they were to pursuing the goals they had listed previously during the upcoming week. While being asked these questions, participants were subliminally primed with the name of either their friend, their mother or a control word.

Insert Figure 34 here

As shown in Figure 34, participants were significantly more likely to express commitment to a goal when first primed with the specific person-construct to whom the goal was associated. Moreover, this effect varied as function of the importance of these goals to the specific others. Thus, the more strongly a participant's mother desired that the goal in question be pursued, the greater the extent to which her subliminal "presence" increased a participant's commitment to that goal.

A second study examined participants' actual pursuit of an anagram task-goal as a function of whether they were primed with the name of a significant other who would want them to do well on that goal, a significant other who would rather have them do something else instead, or a control prime irrelevant to the task. This experiment required participants to complete an alleged measure of "verbal fluency," which turned out to involve the finding of anagram solutions. Before completing the task, participants were told that they would perform a

lexical-decision task meant to assess how quickly they recognized words generally because this skill could affect their anagram performance and therefore needed to be controlled for. This lexical decision task was meant to assess whether priming participants with the name of a significant other who either wanted them to do well or wanted them to "do something else instead" affected the accessibility of the task goal relative to a control condition (as seen in speed of participants' responses to goal-related words). Indeed, subliminally priming participants with name of a significant other who wanted them to perform well increased the accessibility of goal-related items whereas priming participants with a significant other who wanted them to do something else instead seemed to inhibit the accessibility of goal-related items relative to the baseline-control condition, as seen in Figure 35.

Insert Figure 35 here

Do these changes in goal-accessibility actually influence how participants pursue a given task goal? As shown in Figure 36, participants persisted significantly longer and found significantly more solutions when they had been primed with the name of the significant other who had wanted them to do well. Moreover, participants primed with the name of a significant other who had wanted them to do something else instead persisted significantly less and found significantly fewer solutions than participants in the baseline condition. Additional analyses revealed that changes in task-persistence and performance were mediated by changes in goal accessibility. These results attest to the role of significant others as "primes" the mere thought of whom may activate the individual's appropriate goal-systems that, in turn, may affect subsequent actions and performances.

Insert Figure 36 here

Others as means. But beyond representing primes for various goals, other people may often constitute important means to goal attainment. For instance, they may constitute social mirrors that reflect one's various attributes, or provide comparison standards for assessing one's social standing and/or progress toward desired objectives. Other persons may also provide actual assistance in one's attempts to attain various goals such as "education," "wealth," "prestige," or "attractive appearance" the achievement of which is virtually unthinkable without someone's helping hand (e.g., a teacher's, a business partner's, a political ally's, or a cosmetician's). In the interpersonal realm, one's friends may be conceived of as "means" of gratifying sundry goals as those of "being loved," "receiving emotional support," "having a good time," "sharing one's experiences," expressing one's views," "receiving intellectual stimulation", etc.

Indeed, different individuals as well as entire cultures may differ in their "goal-systemic" conceptions of interpersonal relations. Consider the quintessential notion of "friendship," certainly a key term in the realm of human contacts. Some friendship-notions may be multifinal requiring of a friend to fulfill a large variety of functions in diverse domains (e.g., intellectual, instrumental, emotional, and social). Other friendship-notions may be "unifinal," a friend being defined as someone who gratifies any objective at all. A person subscribing to the latter conception might have separate friends for different realms of activity. Thus, one might have a "tennis friend," a "family friend," a "a conversational friend," "a friend for cultural pursuits," "a helpful friend," etc. It seems plausible that such divergent conceptions of friendship would have intriguing consequences for the way one's friendship relations may unfold. For instance, persons subscribing to a multifinal (versus a unifinal) definition of friendship may have fewer friends simply because multifinal means (that is, ones which satisfy multiple constraints) may be more difficult to procure than unifinal means. Such difficulty of procurement may have intriguing

additional consequences as well. Thus, individuals with a multifinal (vs. a unifinal) conception of friendship may be more committed to their friends, exert greater efforts in maintaining friendships, sustain their friendship for longer time periods, find it more difficult to replace one's friends (e.g., upon moving to a different location), and end up with friends that are more similar to each other (in so far as each friend has similar relevance to a wider range of dimensions). We recently carried out an investigation that looked into the consequences of subscribing to a multifinal versus a unifinal conception of friendship, and examined them both within and between two different cultures, namely the US and Germany. This particular comparison was prompted by Kurt Lewin's (1935) informal observation that these two cultures approach friendship very differently, and that the Americans have quicker "surface accessibility" than the Germans yet their friendship ends up being less "deep" in some sense than that of the Germans. As Lewin put it:

"Compared with Germans, Americans seem to make quicker progress toward friendly relations early in the acquaintance process and with many more persons. Yet this development often stops at a certain point and the quickly acquired friends will, after years of relatively close relations, say good bye as easily as after a few weeks of acquaintance" (Lewin, 1945, p. 20).

We wondered, therefore, if Lewin's insight might not reflect differences in the degree to which Germans subscribe to a more multifinal conception of friendship than do the Americans, and whether such cross-cultural differences, should they exist, may not be echoed by similar differences in friendship pattern within each culture. Our cultural samples consisted of university students. The German sample consisted of undergraduates at the University of Chemnitz (in Eastern Germany) and the US sample, of undergraduates at the University of Maryland. We

presented our participants with a multifinal and a unifinal definition of friendship and asked them to indicate the extent to which they subscribed to each. Specifically, participants read the following two definitions of friendship: "(A) Some people consider people as friends even though they are involved in few or only one aspect of their life. For example, they consider as friends people that make possible/facilitate one activity, interest, or need; (B) Some people consider as friends people that are involved in many aspects of their life. For example, they consider as friends people that make possible/facilitate many of their current activities, interests and needs." Participants were then asked to indicate to what extent their personal friendship-choices reflected definition A versus B by circling a number on a 7-point scale. Subsequently participants answered a series of questions related to their current close friendships, specifically: (a) how many close friends they have, (b) how similar to each other they perceived their friends to be, (c) how difficult would it be for them to find new friends should they need to relocate, (d) how much maintenance did their friendships require, (e) how long does it normally take them to acquire good friends. We also asked participants to rate (f) the importance to them of friendship as compared to other aspects of their lives, (g) the importance of having many friends, and (g) the frequency of having terminated past friendships due to a conflict in a relationship.

The results revealed strong associations between participants' adherence to a multifinal (vs. unifinal) definition of friendship and several significant aspects of their friendship-patterns. For both the German and the US samples, participants high on the multifinality dimension reported having significantly fewer friends, perceived it as more difficult to find new friends if they had to relocate, perceived their friends as being more similar to each other, presumably because of their relevance to the same set of multiple goals, perceived themselves as exerting greater efforts toward the maintenance of friendships, perceived themselves as more committed

to their friends, and as more likely to terminate their friendship due to conflicts, presumably owing to a greater number of potential areas of friction in a multifinal versus unifinal relation. (See Table 1).

Insert Table 1 here

Of particular interest, our findings confirmed Lewin's hunch as to the differences in of friendship-patterns between Germans and Americans, and were consistent with our hunch as to its relation to differences in friendship-multifinality. As shown in Figure 37, the Germans subscribed to a more multifinal definition of friendship on the average than did the Americans. They also reported having fewer friends, reported exerting greater efforts in friendship-maintenance, reported greater commitment to their friends (as indexed by perceived difficulty of replacing their friends), rated the overall importance of friendship as higher and the importance of having <u>many</u> friends as lower.

Insert Figure 37 here

<u>Others as ends in themselves.</u> Finally, specific others could constitute important social goals that is, significant social-ends of one's personal strivings. One may strive to attain the affection, love, or respect of a particular other (e.g. one's parent, a potential romantic partner, or one's boss). One may want to possess, control, or dominate a particular other, and so on. It seems plausible to assume then that one's relations with that other person could importantly depend on the specific goal which she or he may represent. As with other goals, the commitment to such social goals may be enhanced by the accessibility of their attainment-means, and undermined by the accessibility of alternative goals in the same environment. Finally, the goals that the other represents may enter into intriguing relations with the individual's alternative goals. For instance, the goal of intimacy and familial closeness may seem in conflict with one's

career goals. If the latter goals loomed larger and seemed more subjectively important in an overall scheme of things, affectionate relations with one's family members might come to be treated as a "temptation" to be overcome, rather than as a legitimate and independent concern to be addressed. If that were the case, the sight of one's wife or children, for example, might activate one's career concerns and the attendant tensions and anxieties these often instigate. This may consequently inhibit the goal of closeness and intimacy and undermine the quality of one's familial relations more generally. These intriguing possibilities are quite speculative at the moment, yet they seem worthy of a further, more thorough, examination.

Conclusion

Soren Kierkegaard (1986), the Danish existential philosopher argued in a celebrated work that "purity of heart is to will one thing." As common experience instructs us, however, willing "one thing only" is no simple matter. Instead, we typically experience numerous wants, obligations, and desires that impinge upon us if not exactly at the samemoment, at least very close together temporally speaking. One motivational thought leads to another, and soon we find ourselves in a swirl of musings about things we need to do, would like to do, or failed to do. Ironically, as in social psychology and the western culture more generally motivation is often juxtaposed to cognition (or "passion" to "reason"), our motivational states are so labile and dynamic precisely because they are carried by a stream of associations that incessantly flow through our minds and whether consciously or not-- affect our experiences, our feelings and our actions.

The theory in the preceding pages is meant to tap such dynamic complexity of motivational states. To that end we defined the concept of goal-systems as a mental representation of cognitively interwoven constructs whose contents consist of "goals" and

"means." We have assumed that the functioning of goal-systems is guided jointly by two classes of properties, cognitive and motivational. Understanding it may furnish important insights into a broad variety of phenomena of traditional interest to personality and social psychologists. Among others these are:

(1) Activity experience and intrinsic motivation both presently conceptualized in terms of the transfer of psychological properties (such as the degree of commitment, magnitude of emotional investment and the quality of affect) from goals to means as function of their degree of association.

(2) Effective self-regulation consisting in (a) the (over)learnt inhibition of rival alternative goals particularly to the extent that their attainment is deemed less important in an overall scheme of things than progress toward one's focal objective; (b) the (over)learnt activation of super-ordinate alternatives upon confrontation with conflicting, lower-order "temptations."

(3) Generation of equifinal means to a focal goal as inverse function of the activation-level of alternative goals, and the phenomena of choice (including subconscious choice) and substitution that the equifinality-constellation affords.

(4) A variety of social psychological phenomena with goal-systemic underpinnings including cases where other people constitute (a) primes that activate individuals' goal-systemic elements, (b) social means to a variety of goals, and (c) ends, or goals, in and off themselves.

The empirical data described above are consistent with numerous aspects of our goal-systems theory. Admittedly, however, this work constitutes merely a beginning. Additional conceptual and empirical efforts will be needed to fully explore the possibilities inherent in a

goal-systemic perspective on self-regulatory phenomena. To mention one example, on the conceptual level it should be important to address and elaborate the distinction between competing goals, versus negative means, that is, “hindrances” or “barriers” to goal attainment (Lewin, 1935; Oetingen, 2000). Both may interfere with pursuit of a given focal goal, yet they may do so via different mechanisms. On the empirical level, a wide variety of problems in the three-fold interface between cognition, motivation and action await a goal-systemic probing, which implications could cast novel light on numerous social psychological phenomena analyzable from the means-goals perspective. Finally, on the practical level, goal-systems analysis may enable important insights into a wide range of major problems in living. For instance, goal-commitment, one of our central variables, is pertinent to the ability to form close relationships, or to succeed in one's chosen profession. Understanding the dynamics of commitment may improve our ability to foster commitment to realistic goals, and to reduce (or inhibit) commitment to unattainable or unrealistic pursuits. A clearer understanding of activity-experience may enhance our ability to improve people's life-quality and increase our attempts to foster adaptive patterns of coping with stress or psychological trauma (e.g. bereavement, or major illness). Understanding the cognitive dynamics of overcoming-temptations may increase our ability to promote adaptive self control, and hence improve overall life-satisfaction. Goal-systemic insights into the processes of choice may increase our ability to promote adaptive choices in the social and the professional realms, etc.

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Authors Note:

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Table 1
Zero Order Correlations Between Friendship Multifinality
and Aspects of the Friendship Relation
(Combined German and US Samples)

	Number of Friends	Friends Perceived Similarity	Difficulty of Making Friends	Efforts to Maintain Friendship	Commitment to Friends	Friendship Termination
Friendship Multifinality	-20**	.13*	.26***	.15*	.31***	.25***

* p < .05
** p < .01
*** p < .001

Figure 1

A System of Goals and Means

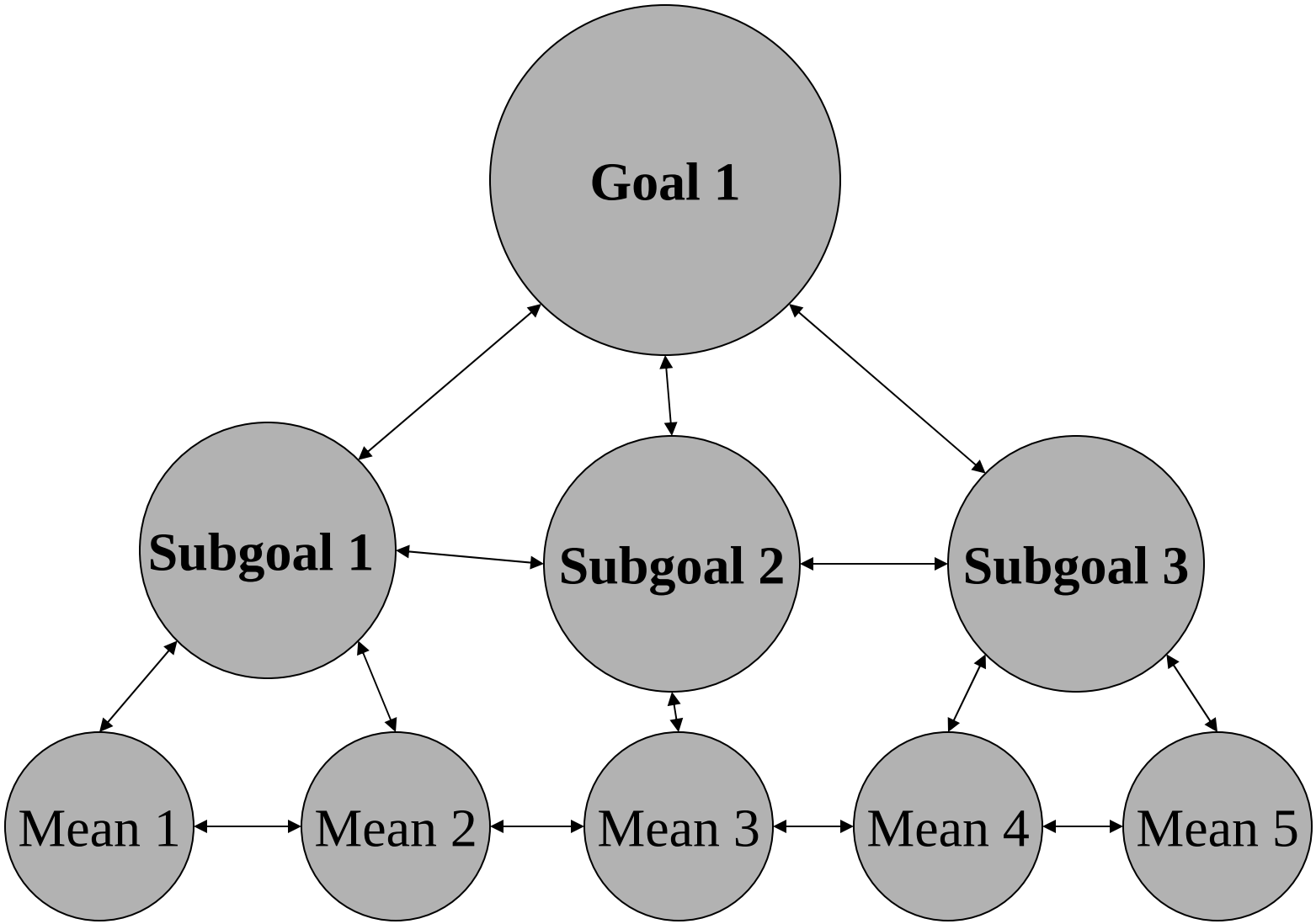


Figure 2

Equifinality Configuration

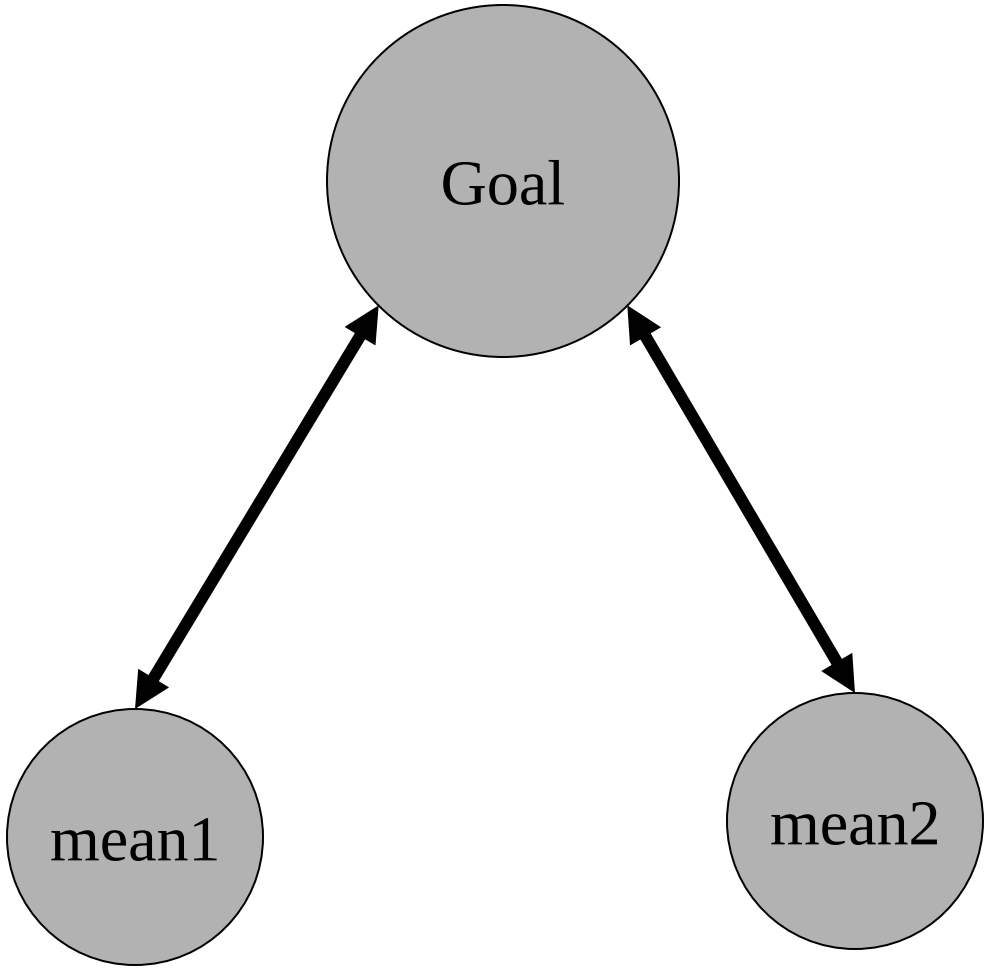


Figure 3

Multifinality Configuration

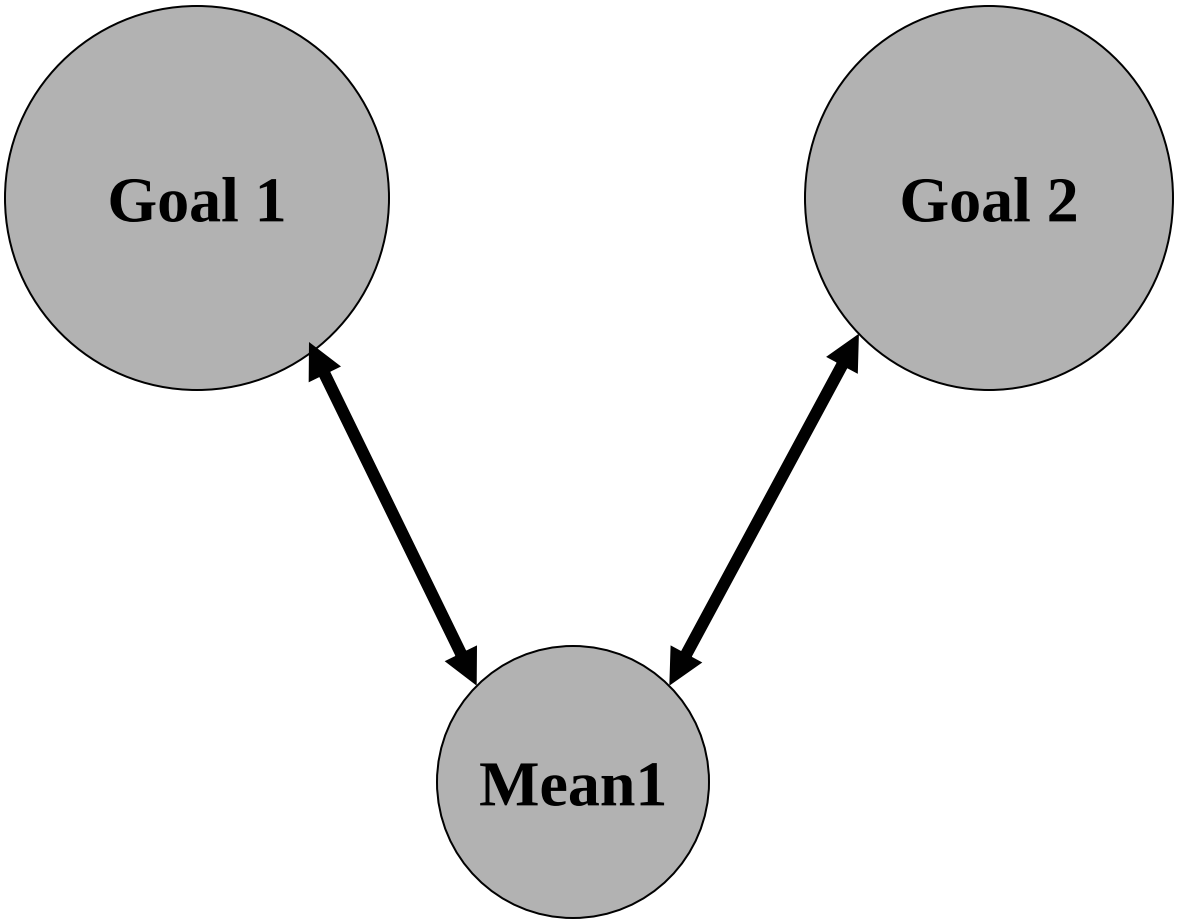


Figure 4

Uniqueness and Strength of Goal-Means Association

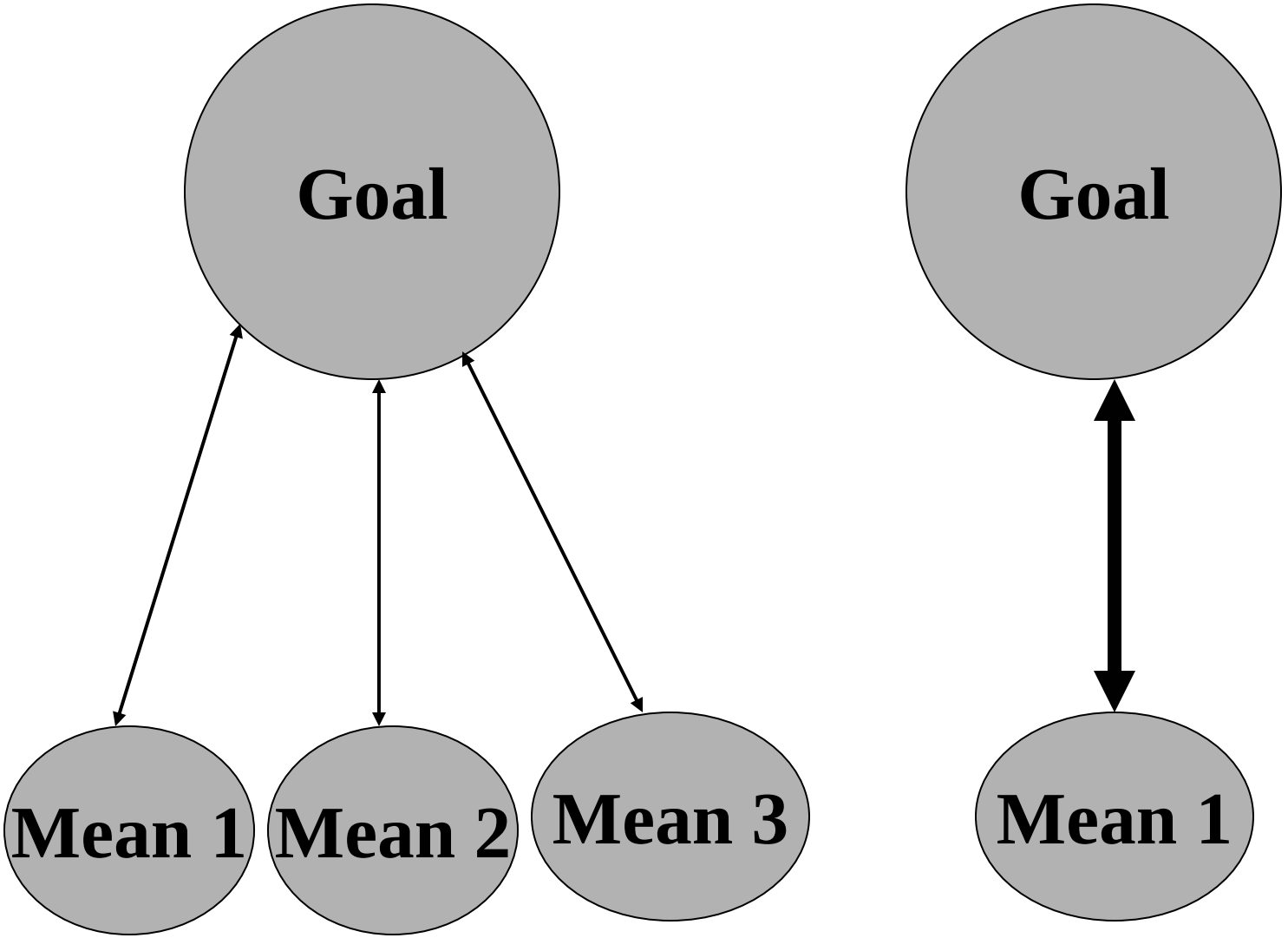


Figure 5

Uniqueness and Strength of Mean-Goal Association

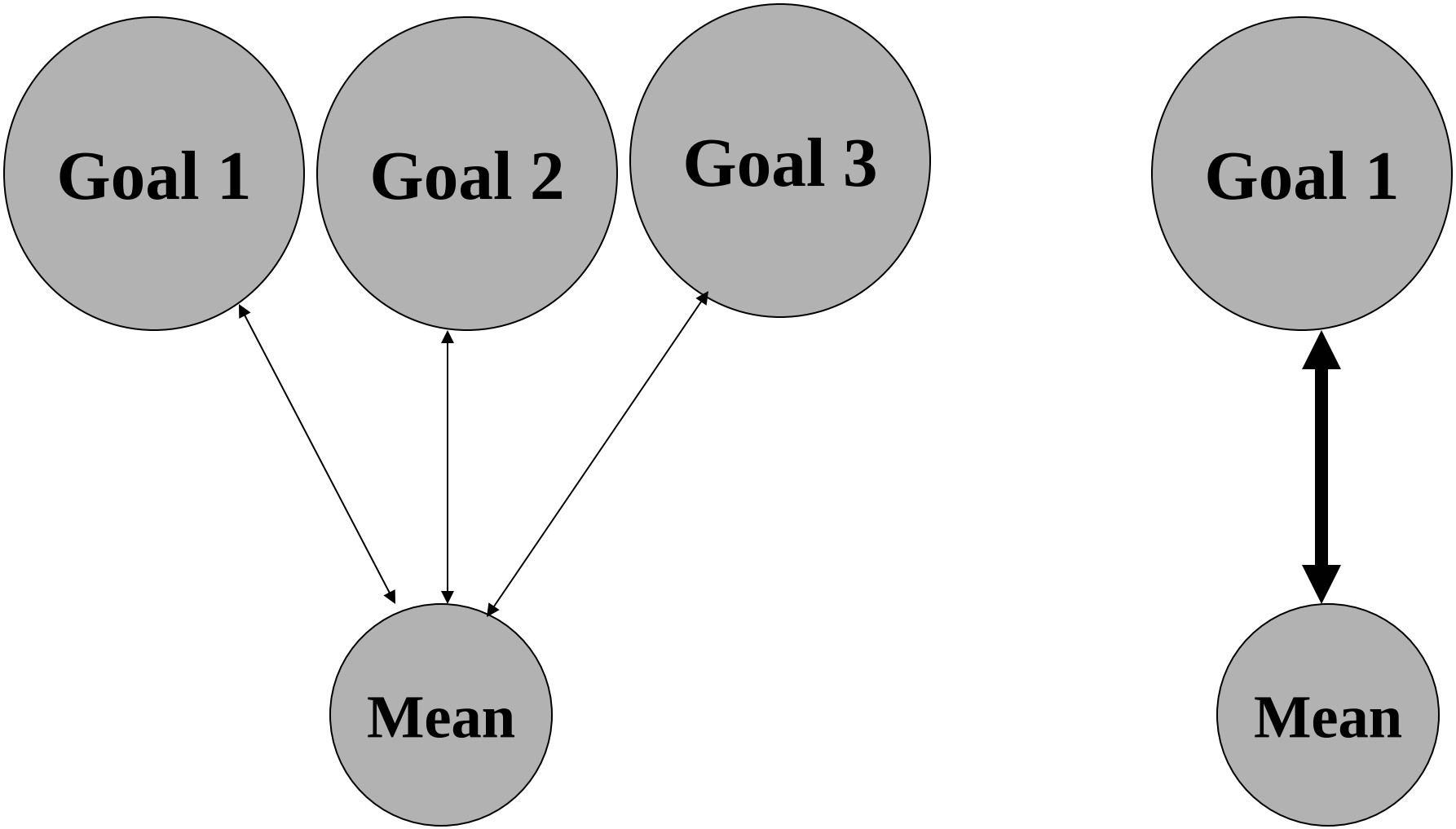
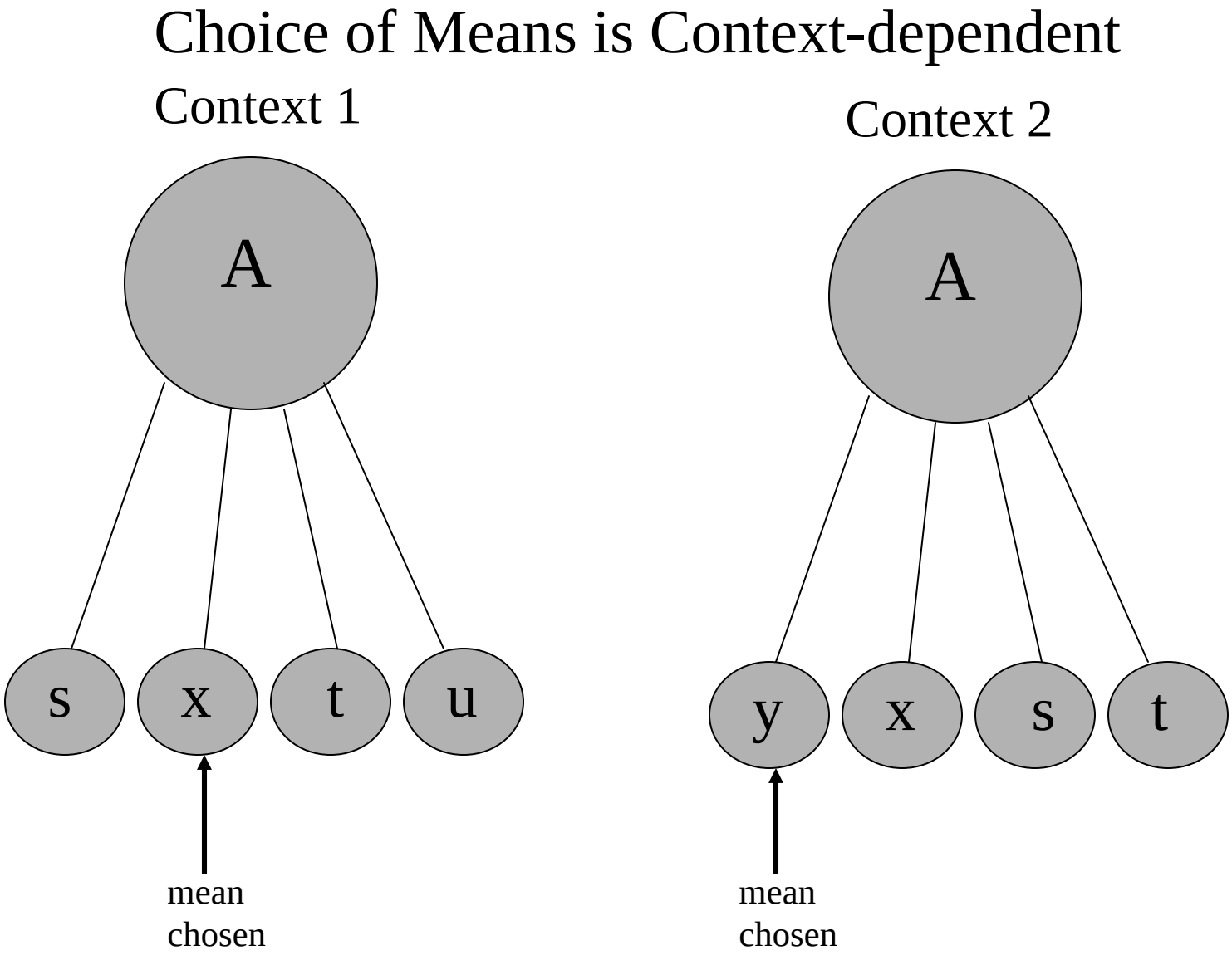


Figure 6


Choice of Means is Context-dependent
Context 1
A
s
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u
mean
chosen
Context 2
A
y
x
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mean
chosen

Figure 7

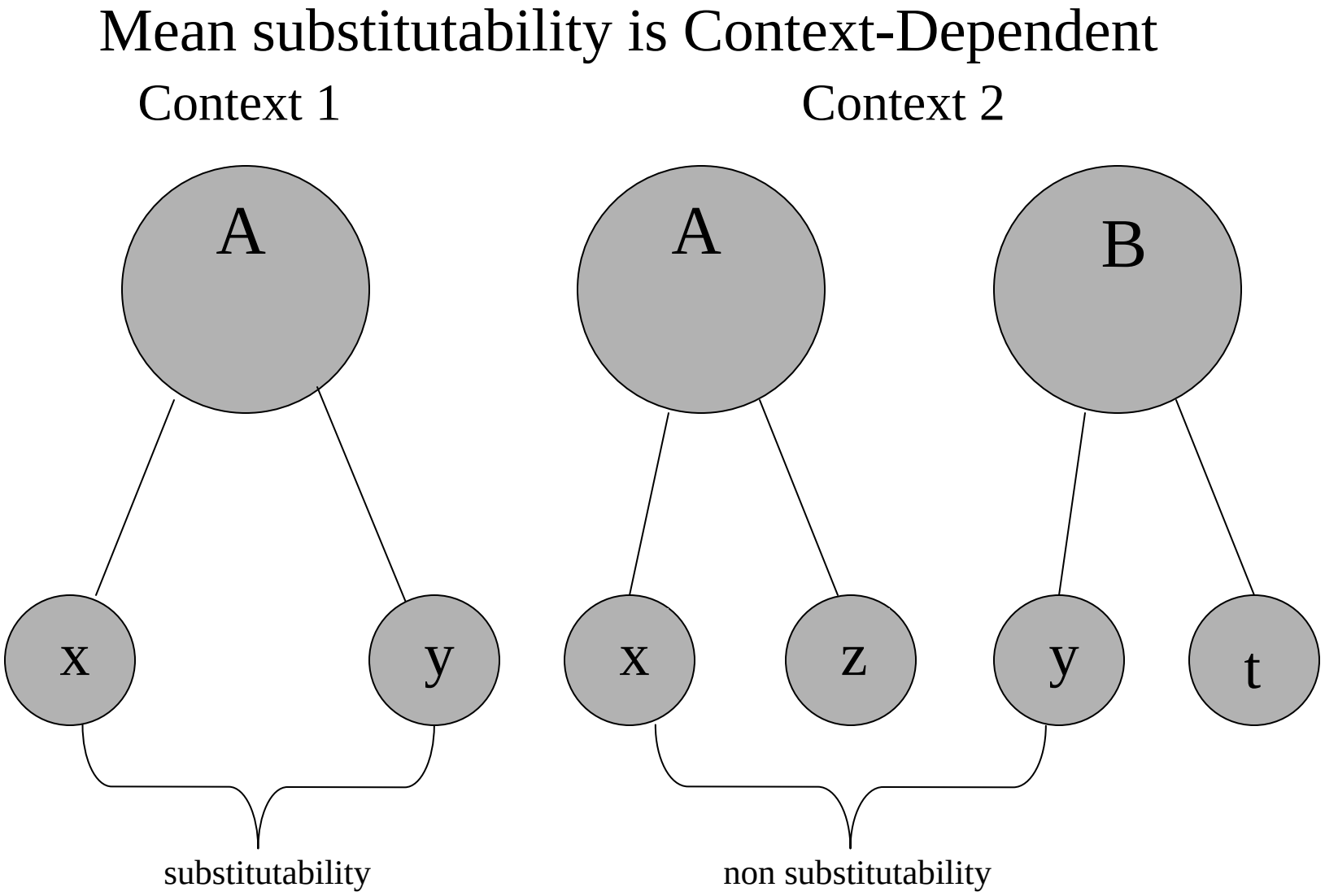

Mean substitutability is Context-Dependent
Context 1
Context 2
A
A
B
x
y
x
z
y
t
substitutability
non substitutability

Figure 8

Reaction Times to Means Under Goal and Non-Goal Priming

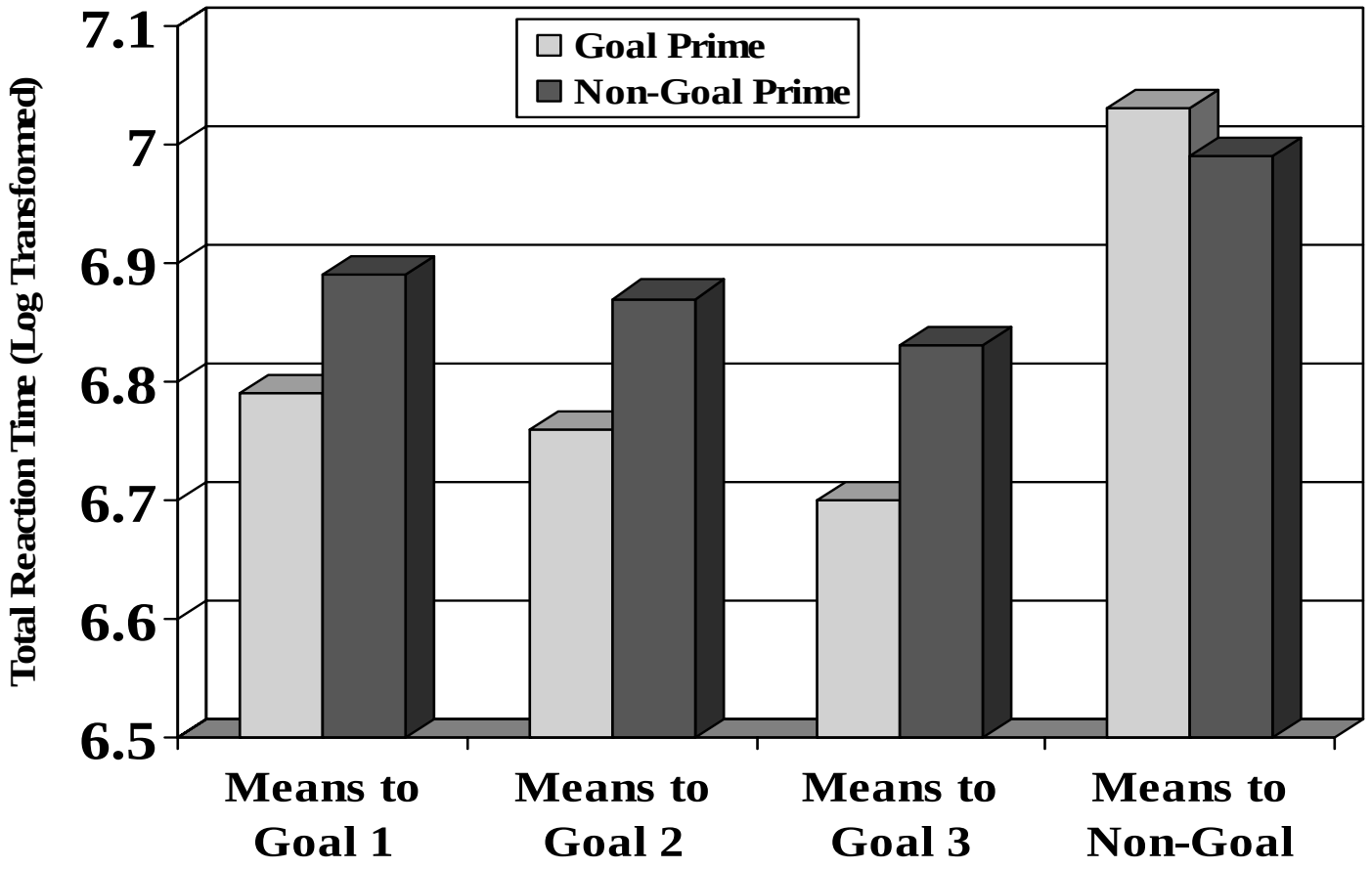


Figure 9

Correlation Between Uniqueness and Strength of the Goal-Mean Association

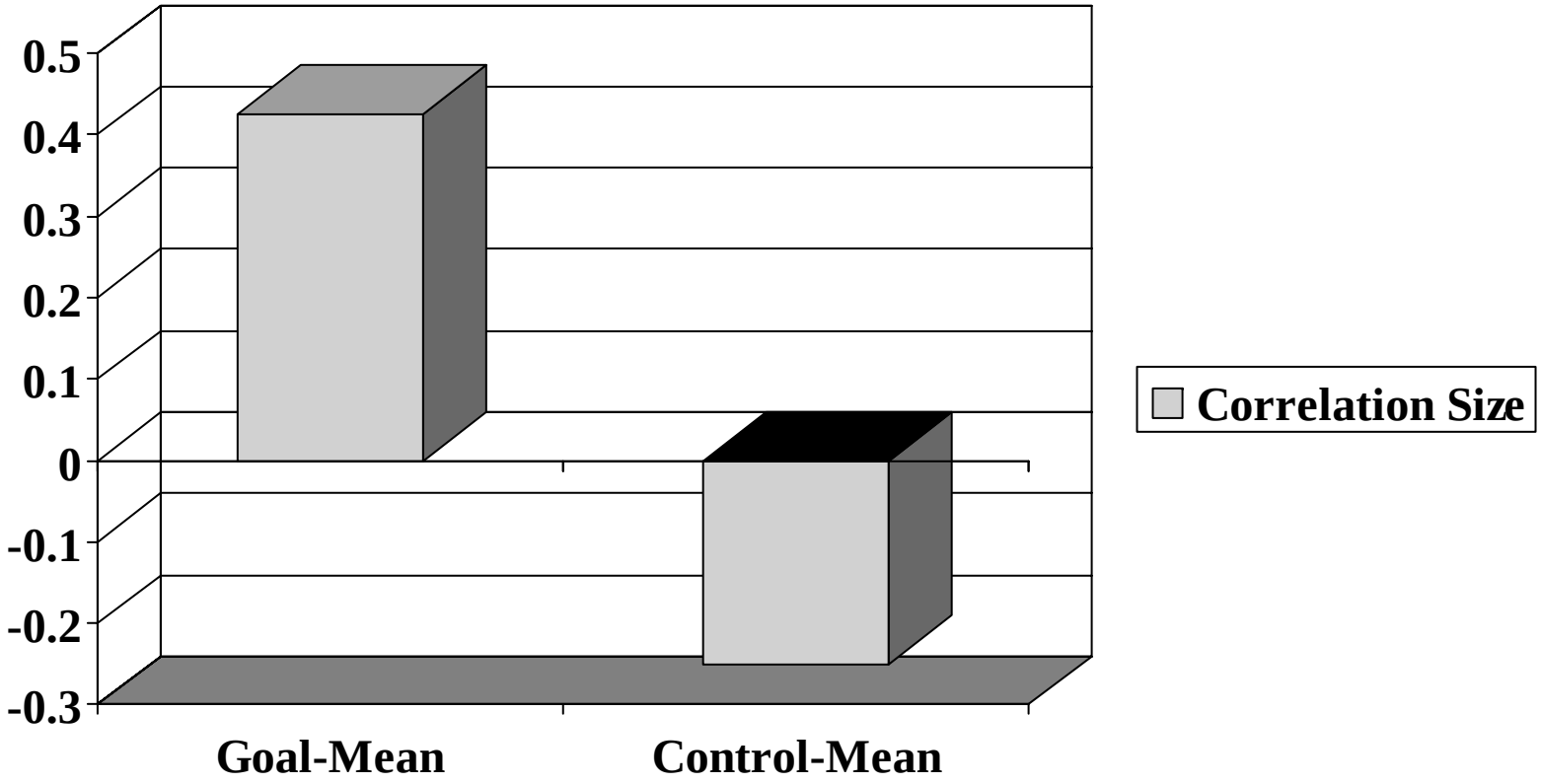


Figure 10

Degree of Commitment as Function of Means Uniqueness

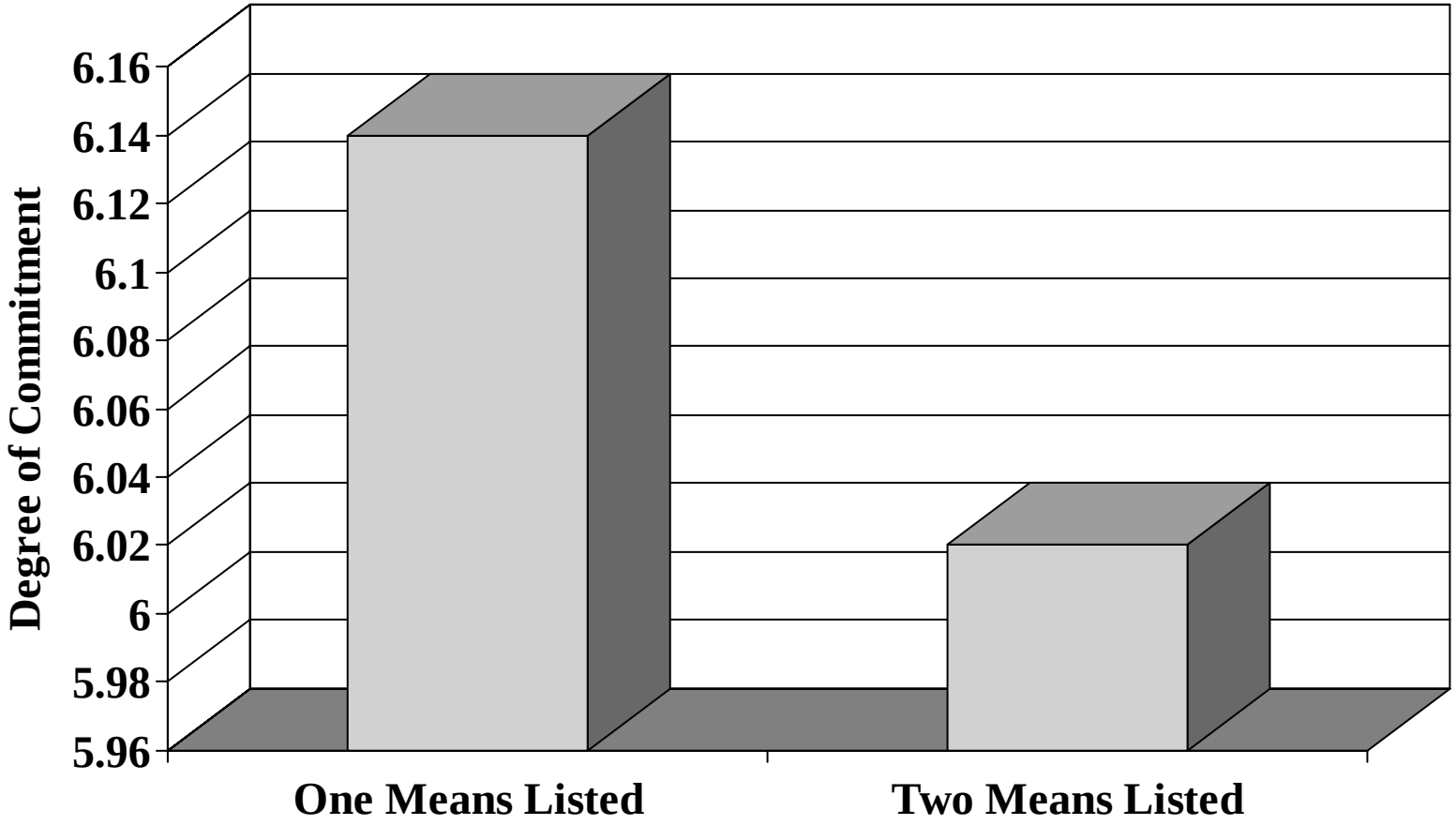


Figure 11

Correlation Between Commitment to Goal and to First Activity Listed as Function of Number of Activities

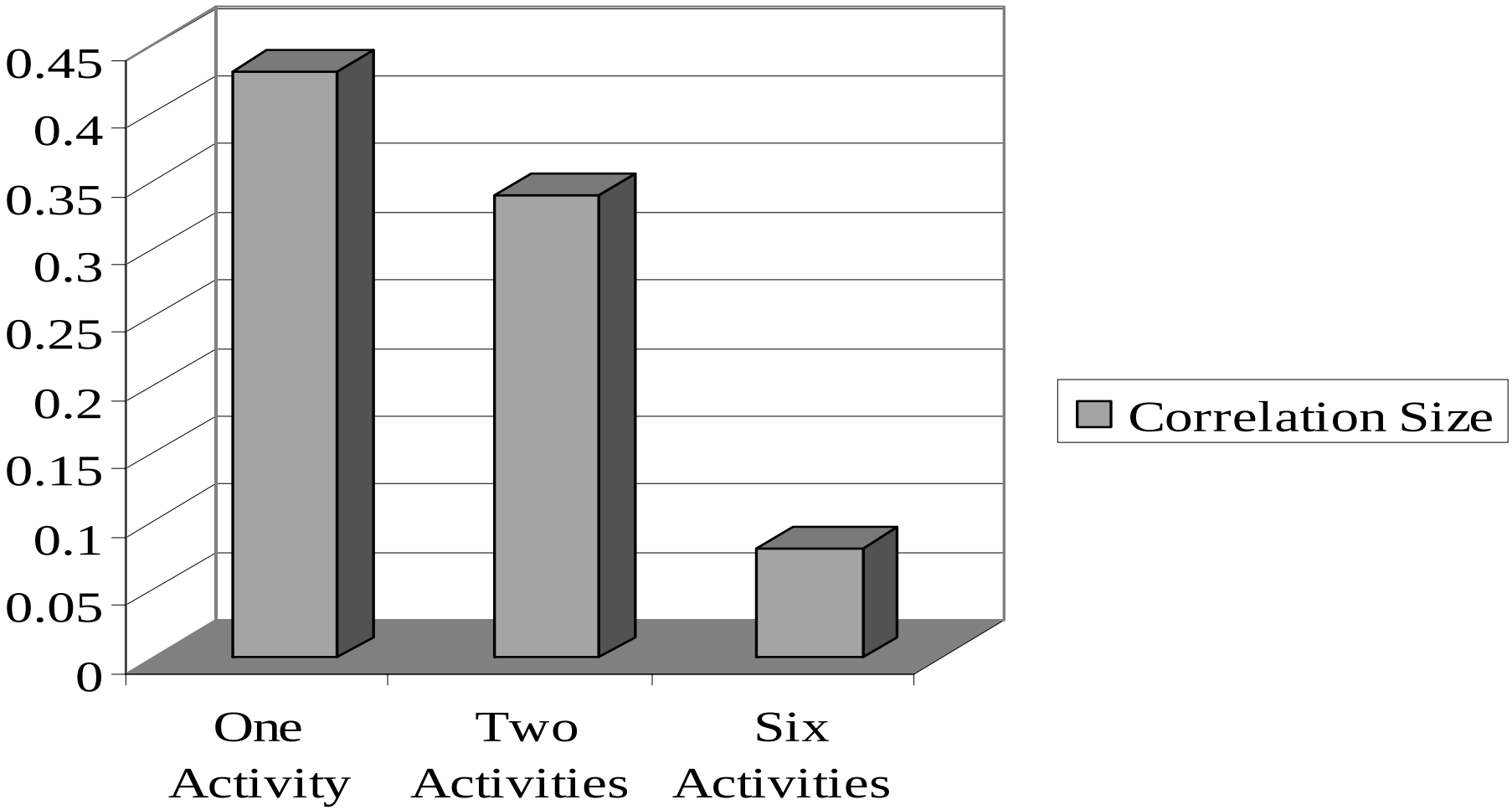


Figure 12

Correlations Between Emotional Commitment to Two Goals and Their Associated Means

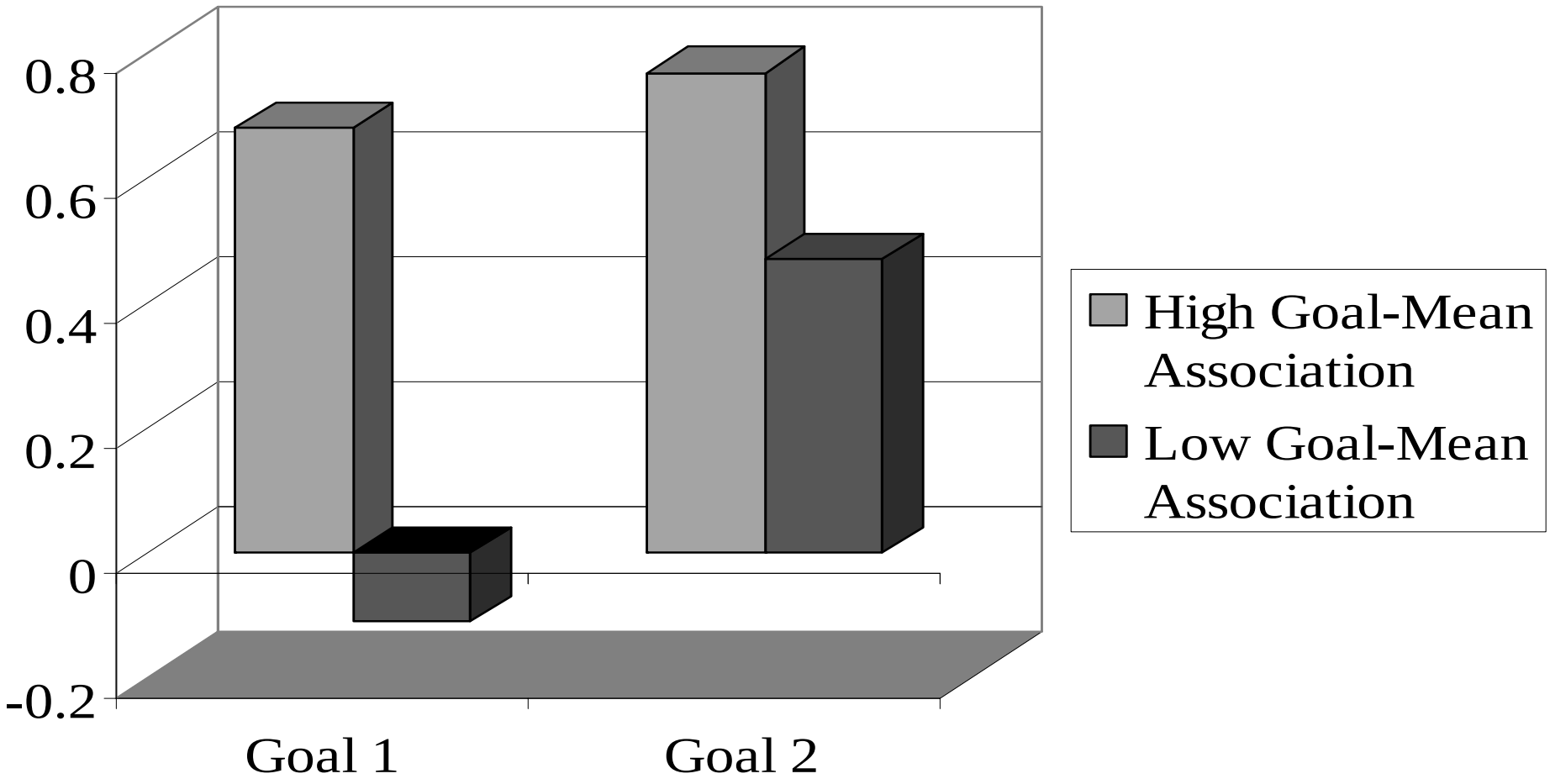


Figure 13

Correlation Between Goal-Related and Activity-Related Affect

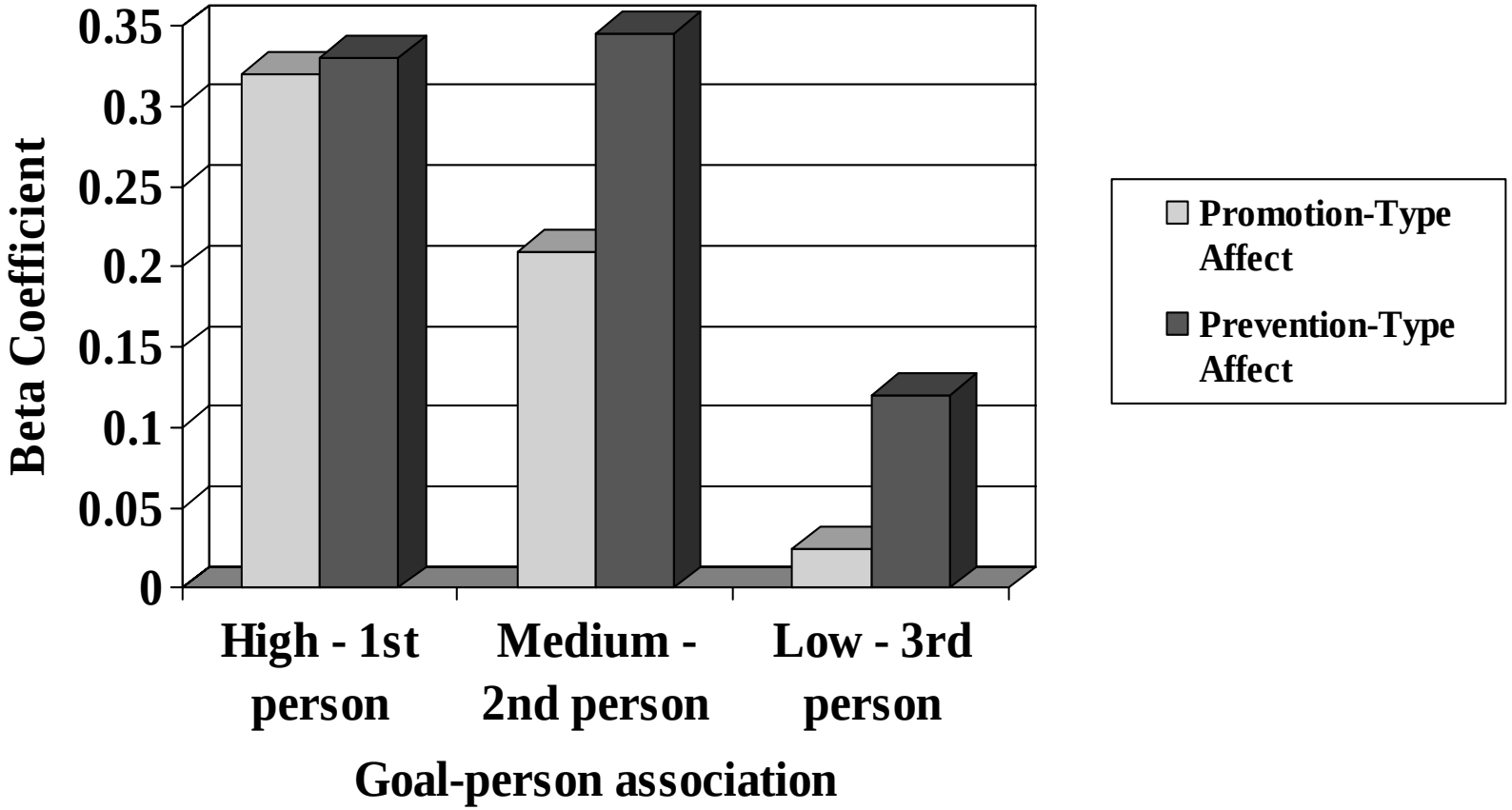


Figure 14

Effects of Manipulated Goal-Means Association

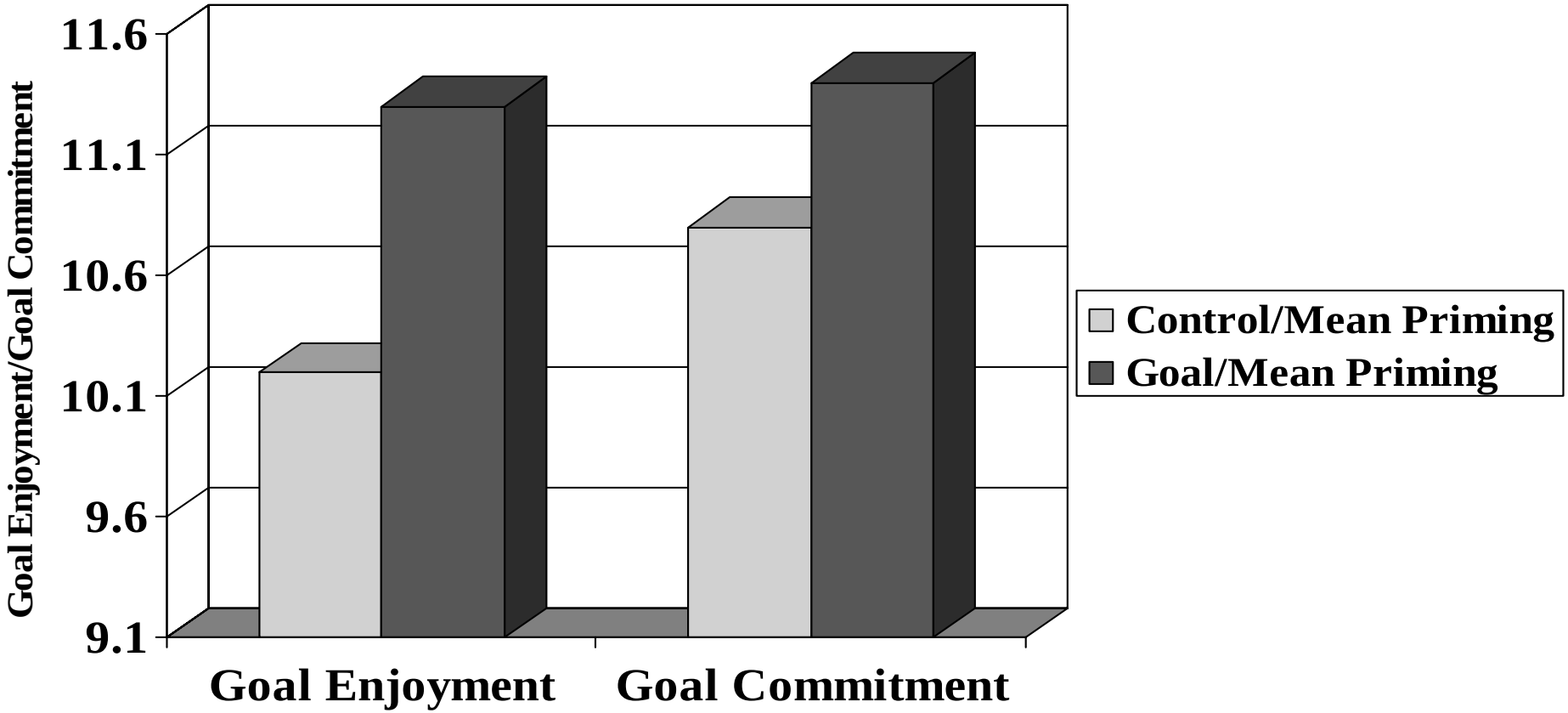


Figure 15

Goal-Commitment and Goal-Attainment as a Function of Inter-goal Association and Goals-Facilitative Relations

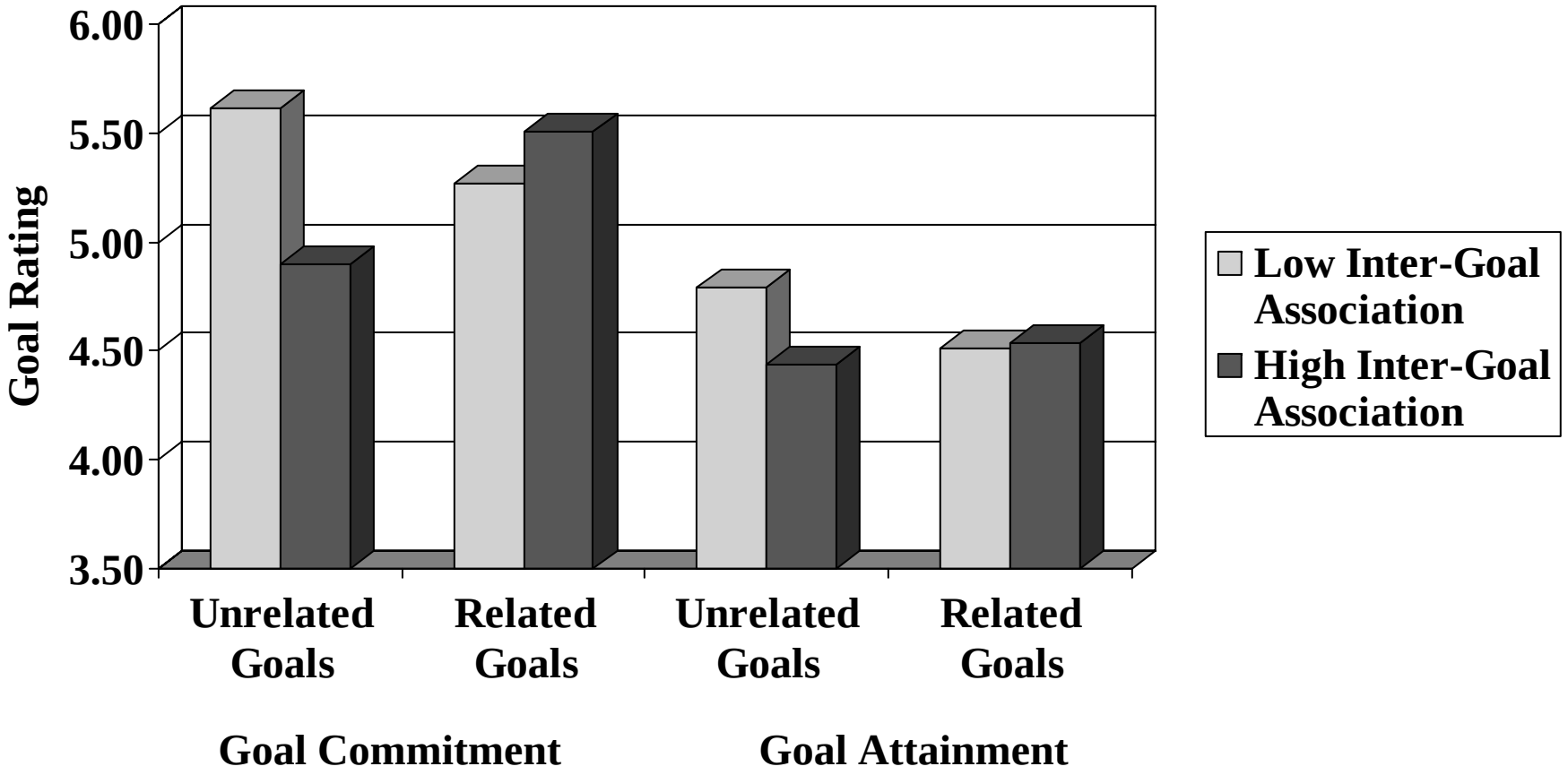


Figure 16

Activation of Competing Goals Undermines Commitment to Focal Goal

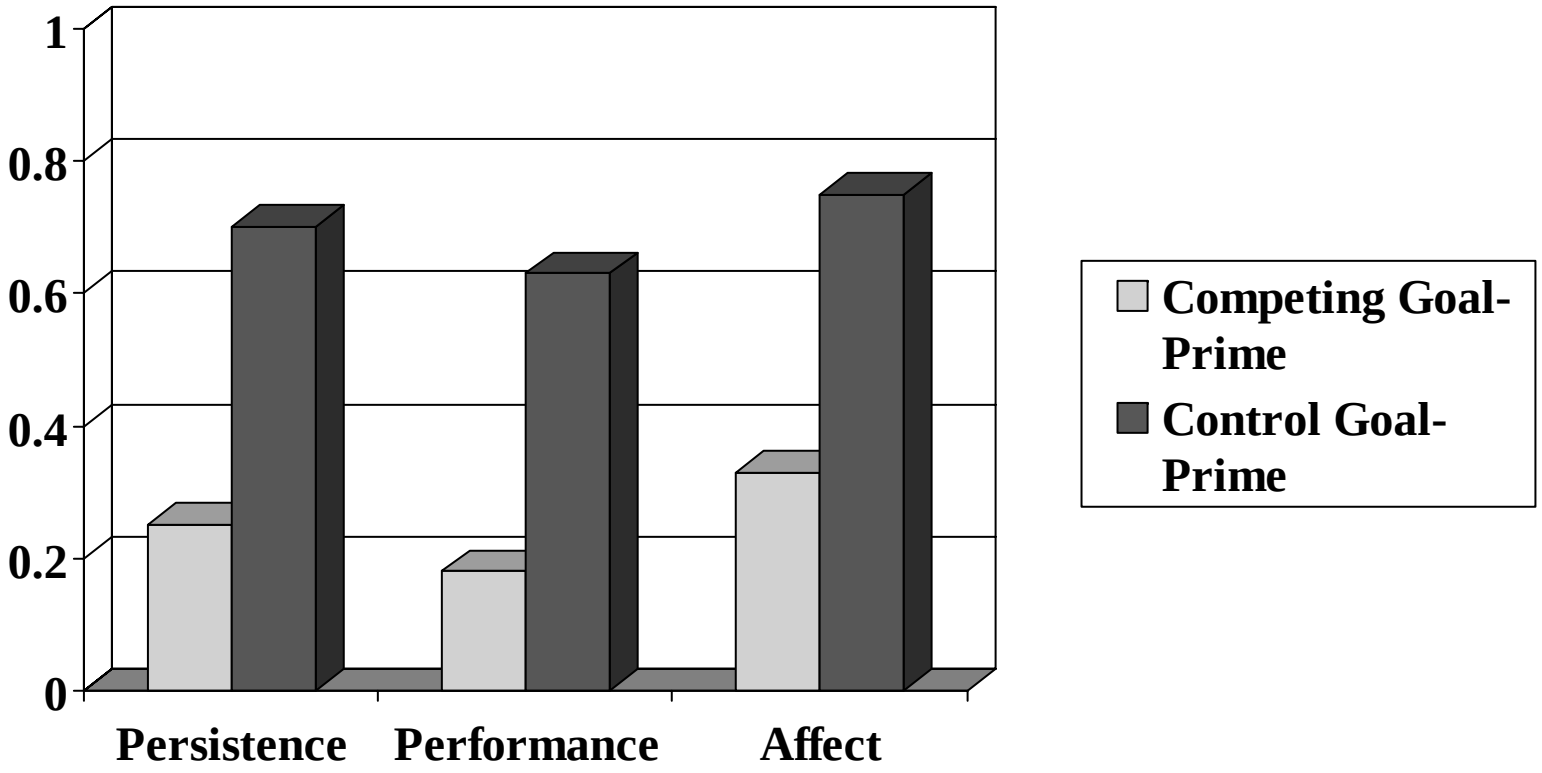


Figure 17

Lexical Decision-Times to Alternative Goals When Primed with High or Low Importance Focal Goals

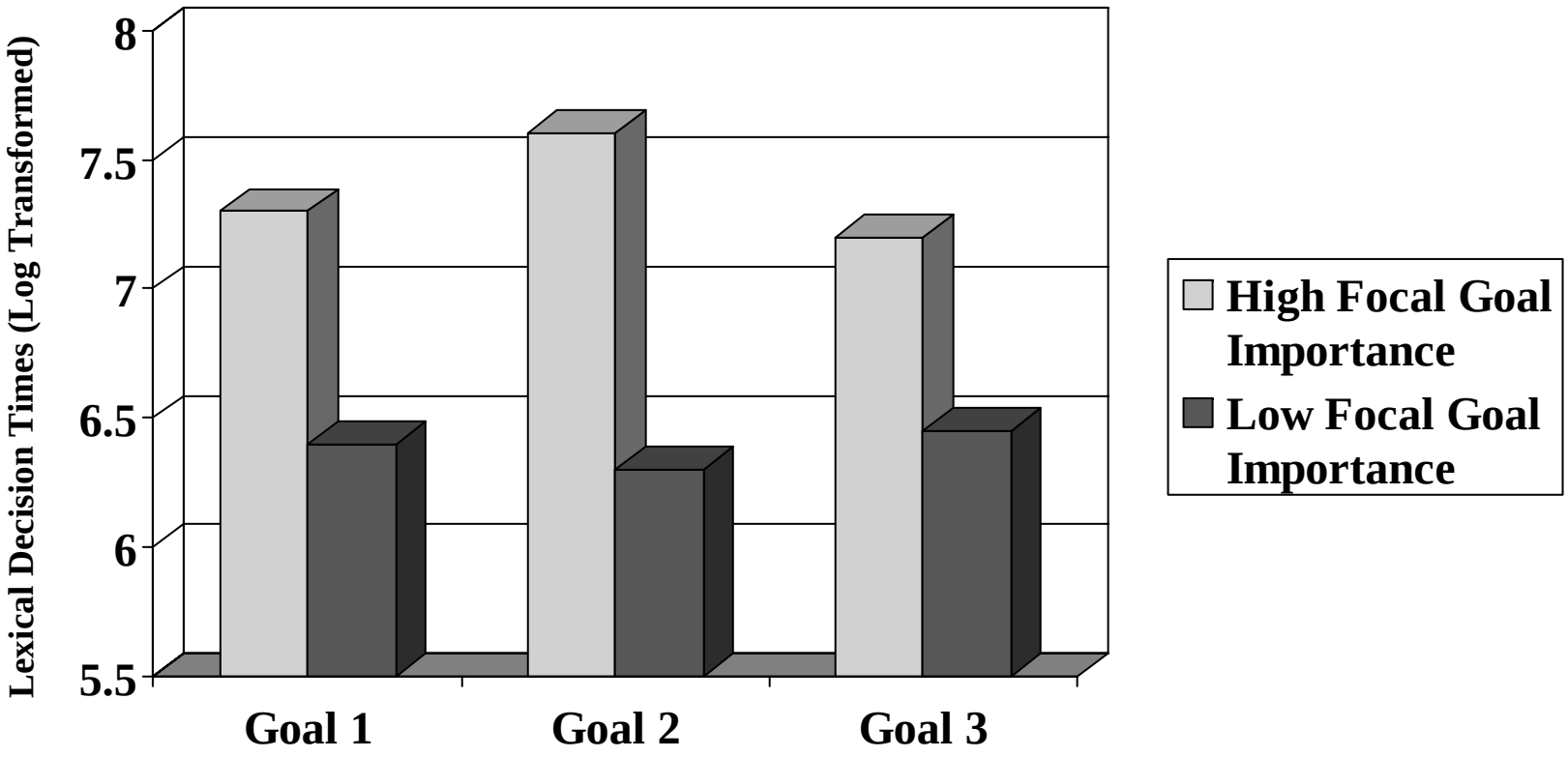


Figure 18

Lexical Decision Times to Temptations and Overarching Goal-Targets Primed by Relevant Versus Irrelevant Goals versus Temptations

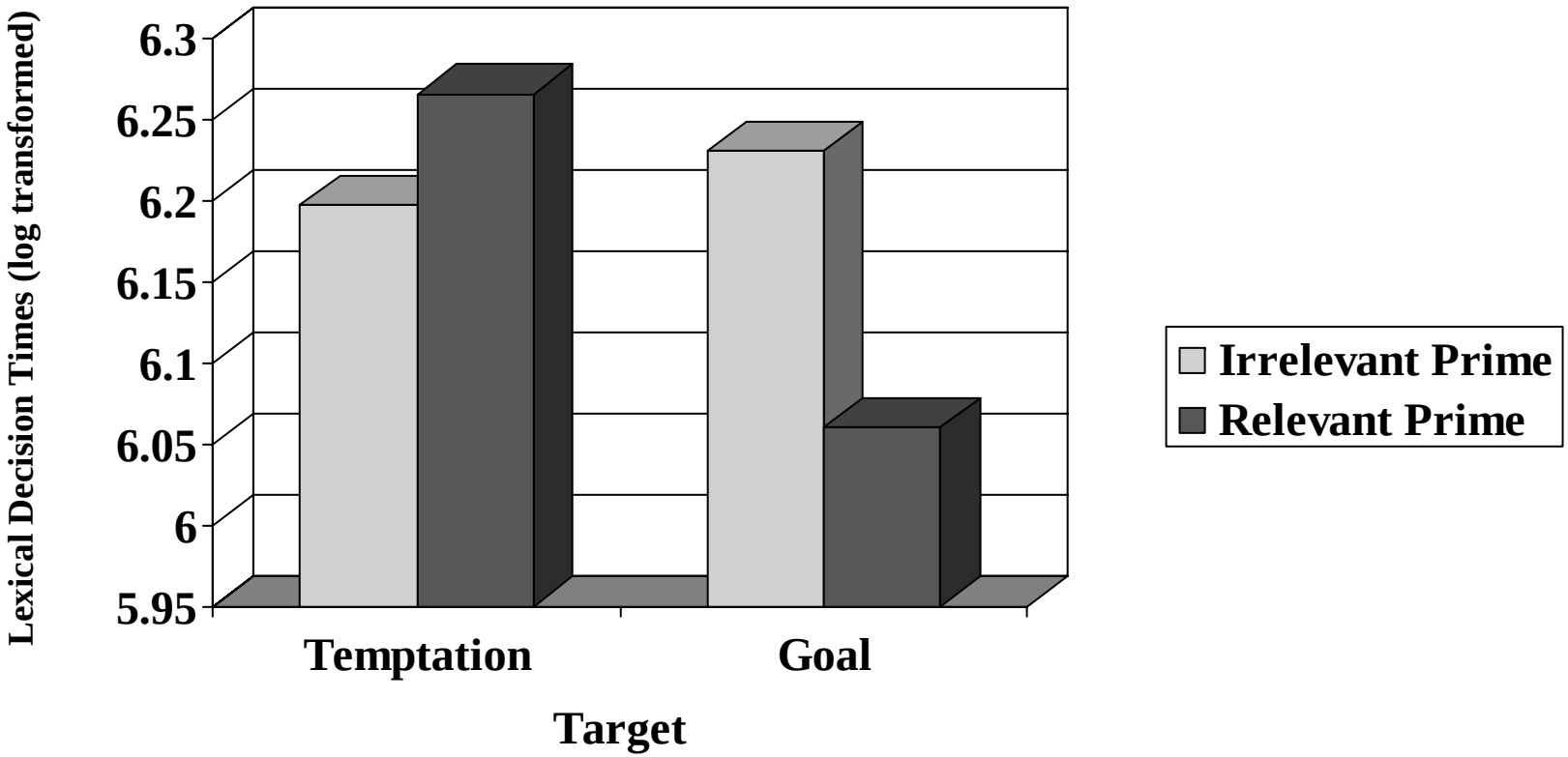


Figure 19

Lexical Decision Times to "Sin" versus "Religion" Targets After Subliminal Priming by "Religion" versus "Sin" Opposite Primes

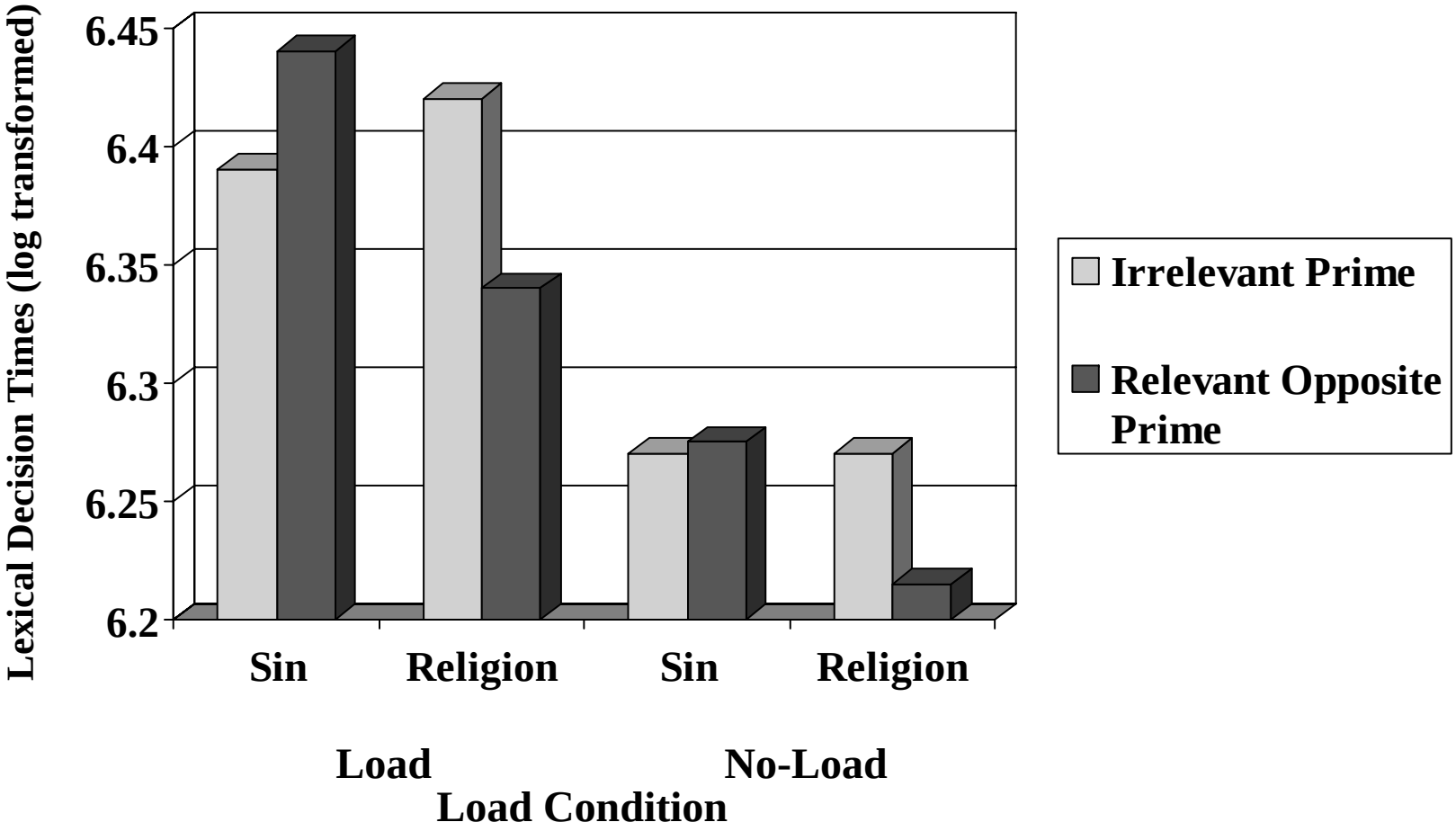


Figure 20

Lexical Decision Times to the “Diet” Target in Presence of “Fattening Food”, “Diet-Related” or Irrelevant Primes

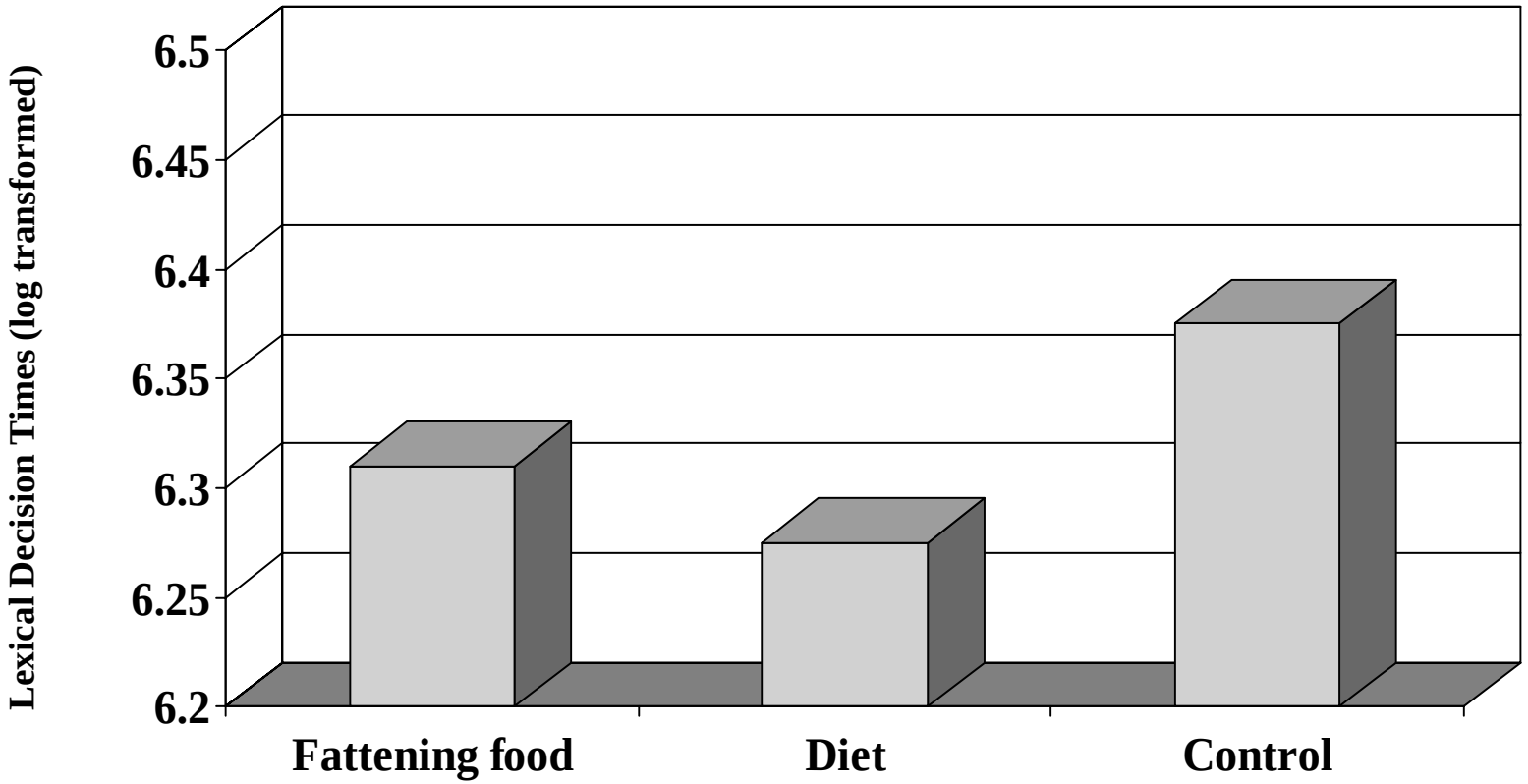


Figure 21

Percentage of Participants Choosing a Twix-Bar over an Apple as Function of “Fattening Food”, “Diet”, and Irrelevant Priming

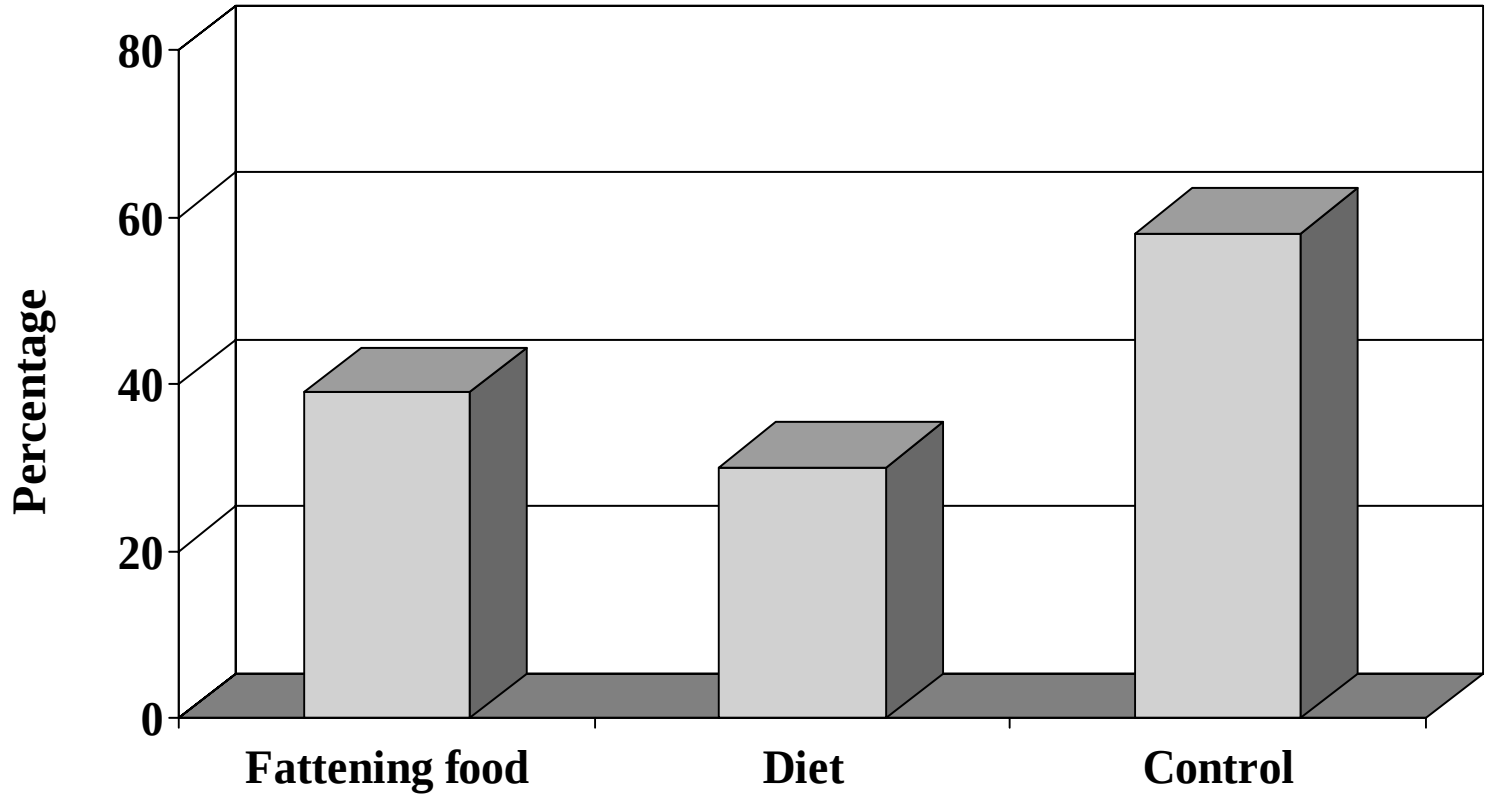


Figure 22

Lexical Decision Times for “Study” Related Targets for “Good” versus “Bad” Students

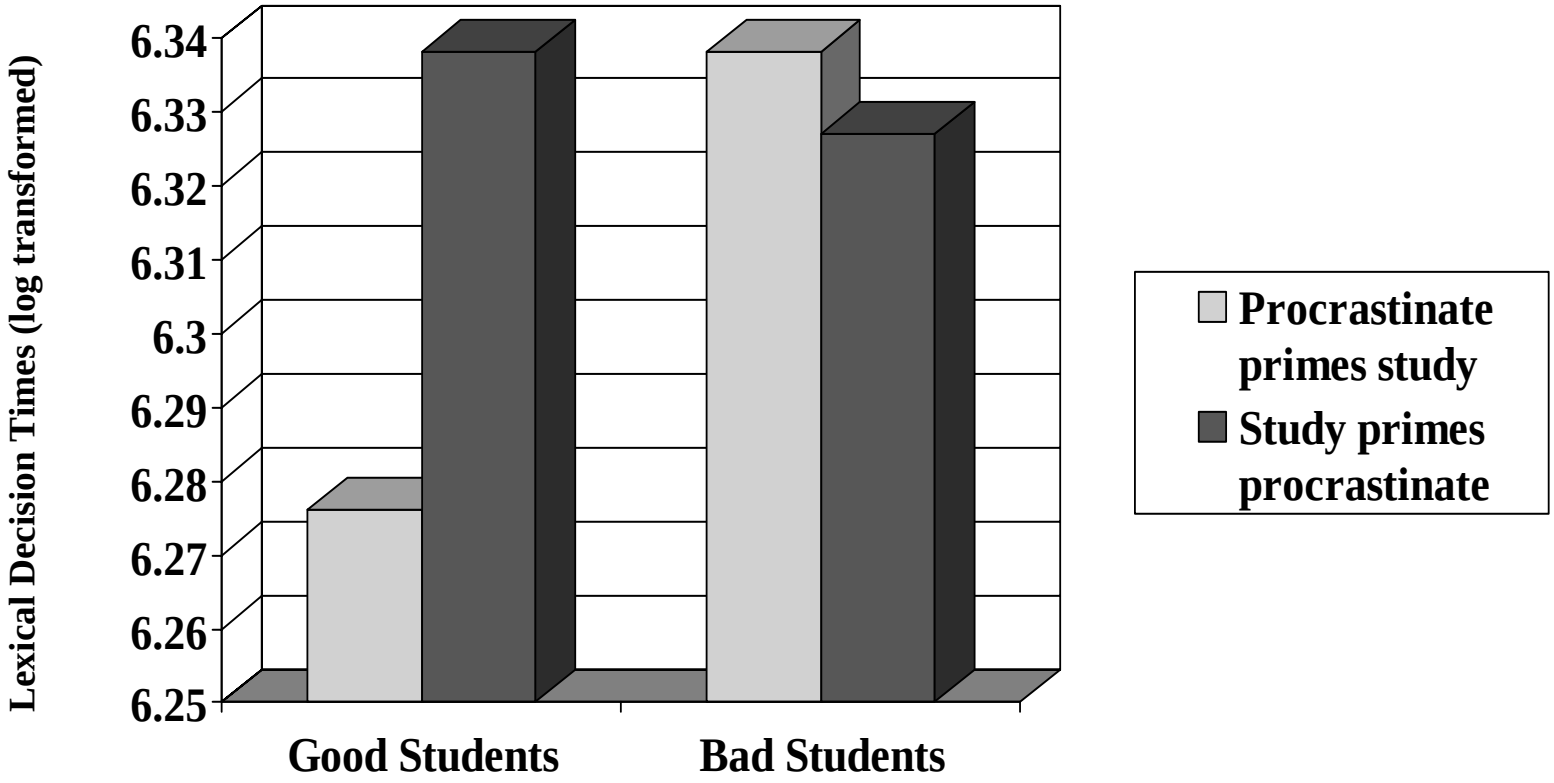


Figure 23

Packaging of Same Prizes to Suggest Two (A) versus One (B) Goals

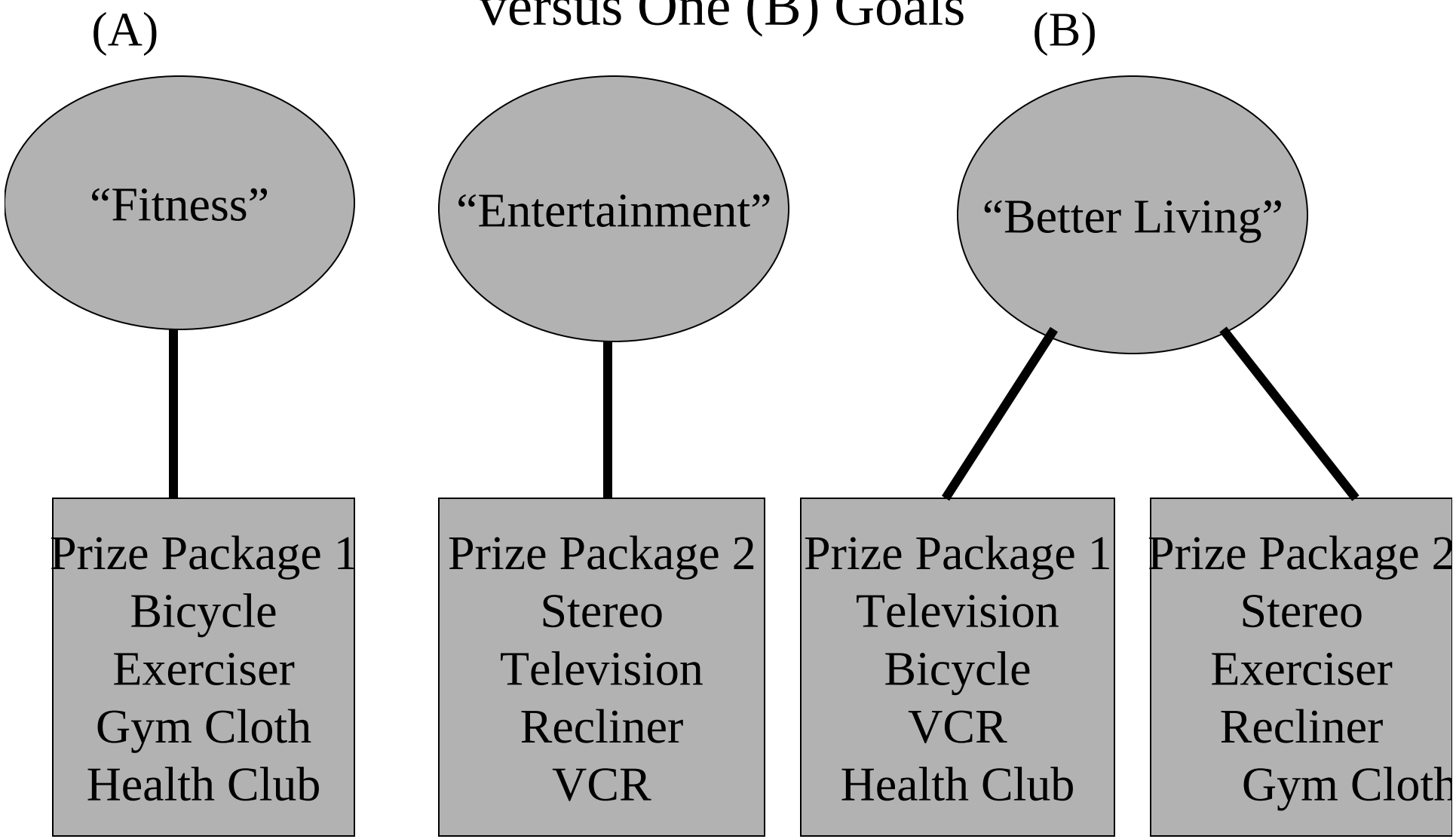


Figure 24

Interest in Playing a Lottery Serving One Goal versus Two Goals

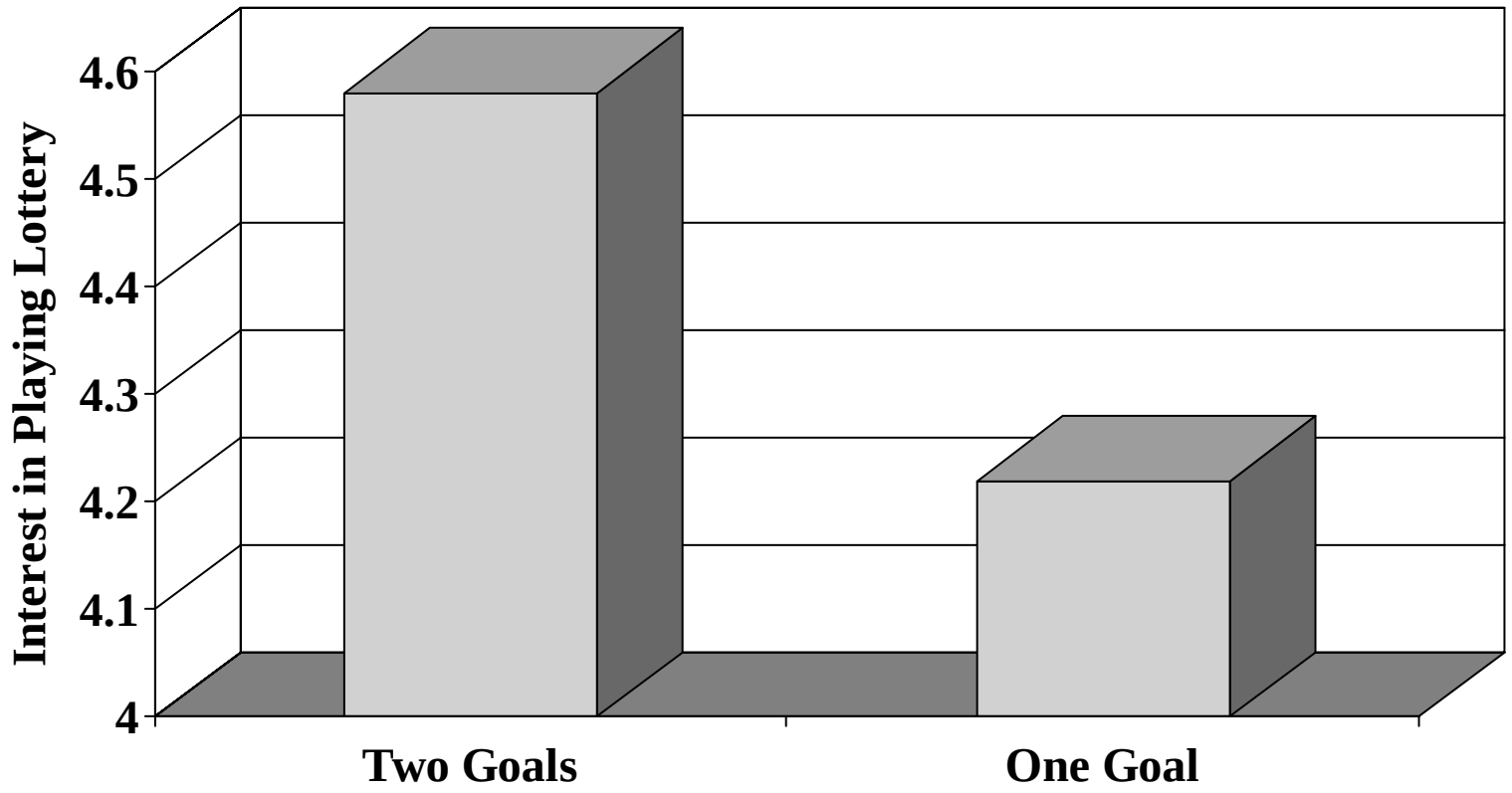


Figure 25

A Multifinality Interpretation of the Nisbett and Wilson (1977) Finding of a Right-Position Preference

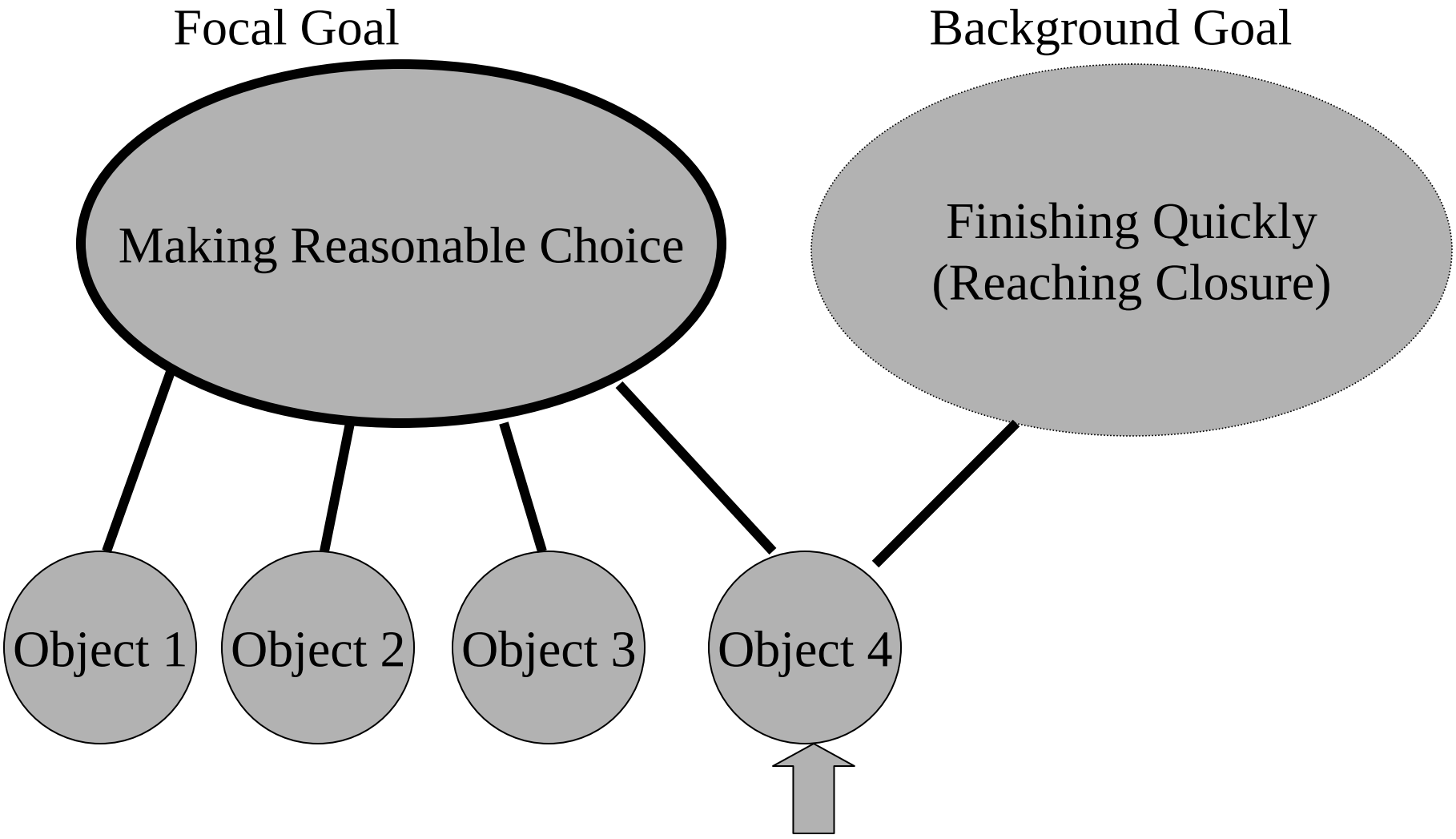


Figure 26

Frequency of Choices as Function of Need for Closure

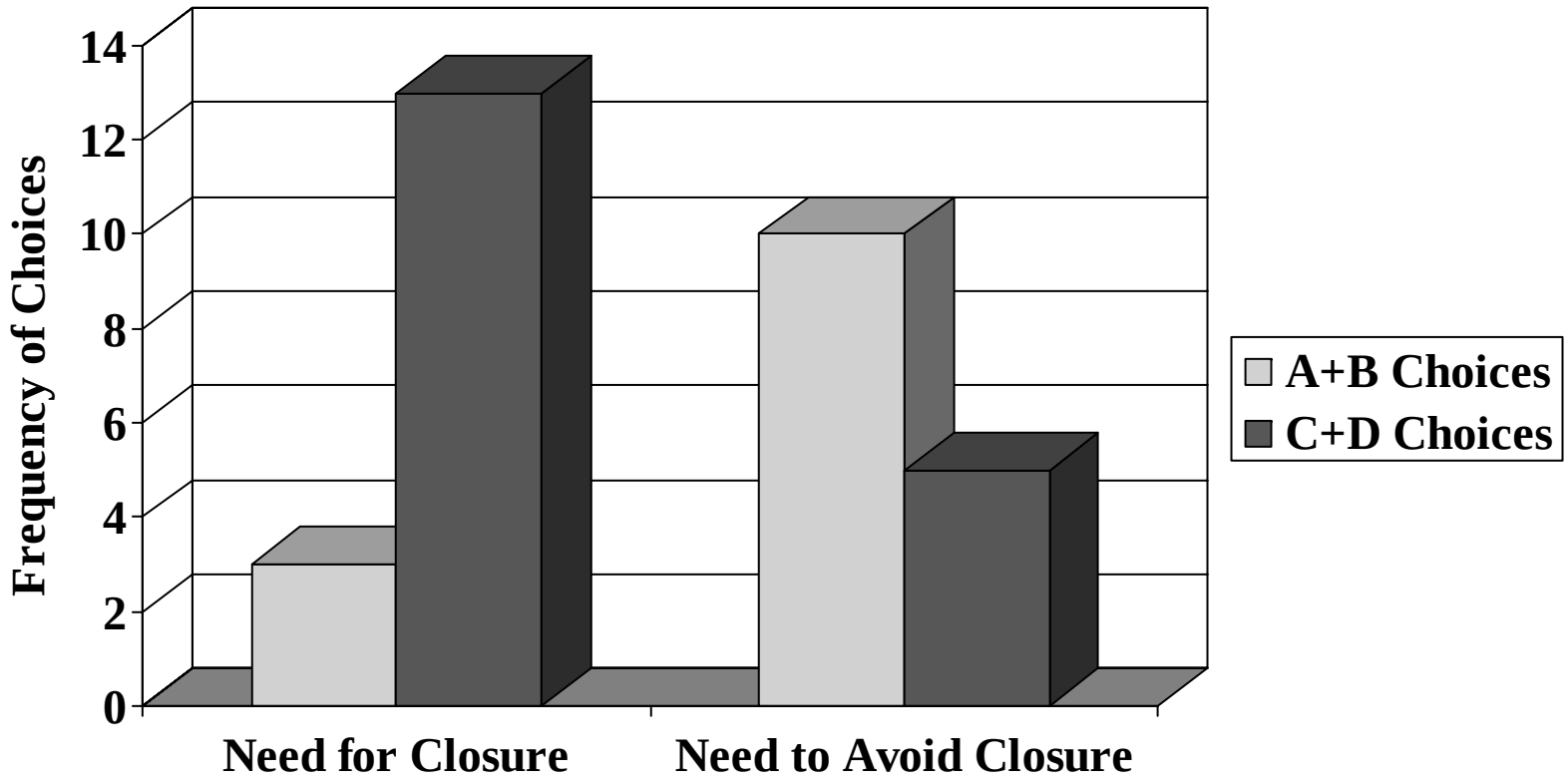


Figure 27

Ratings of Durability of Materials as Function of Identification with the University of Maryland

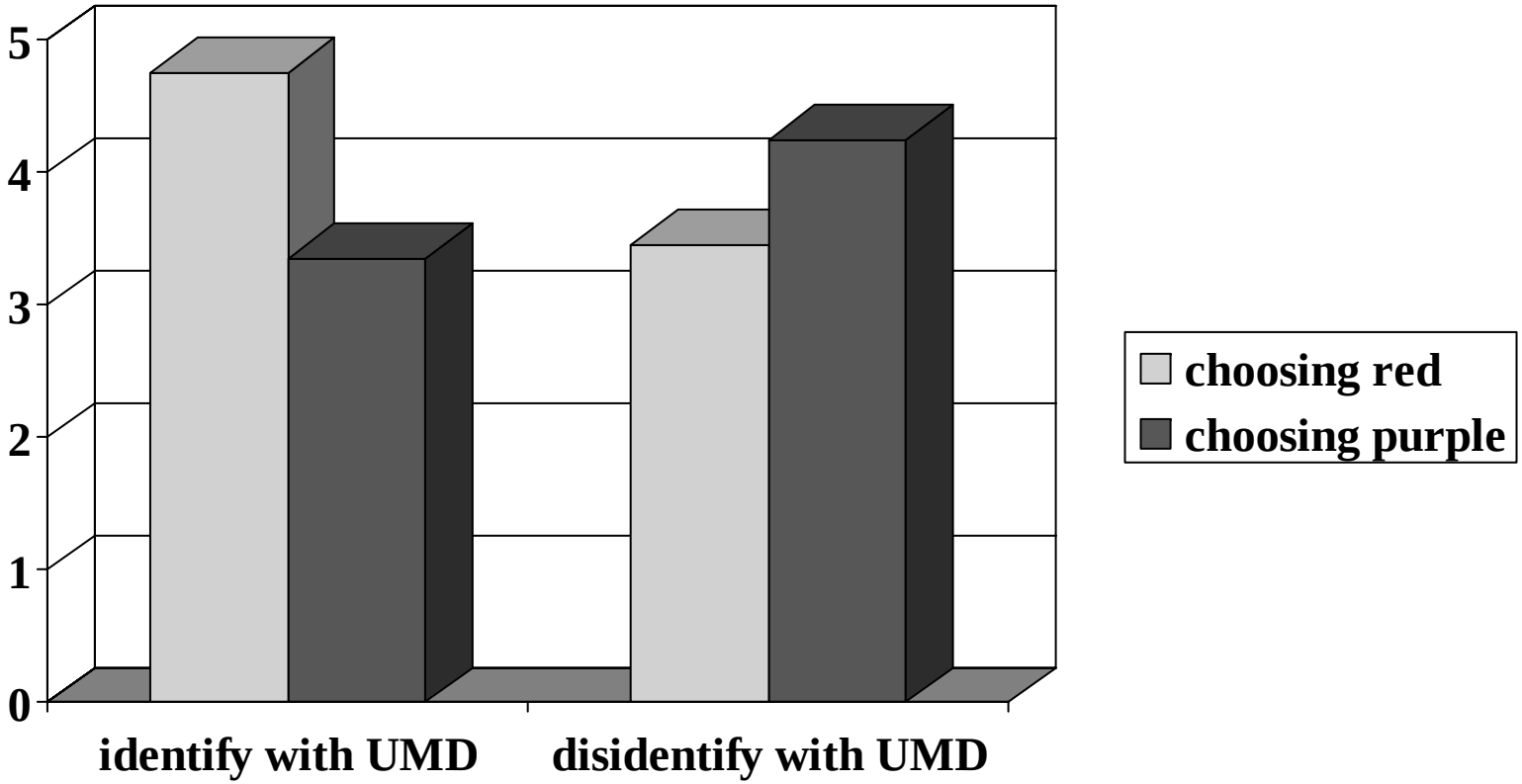


Figure 28

Number of Means to a Focal Goal as Function of the Presence of Goal-Alternatives

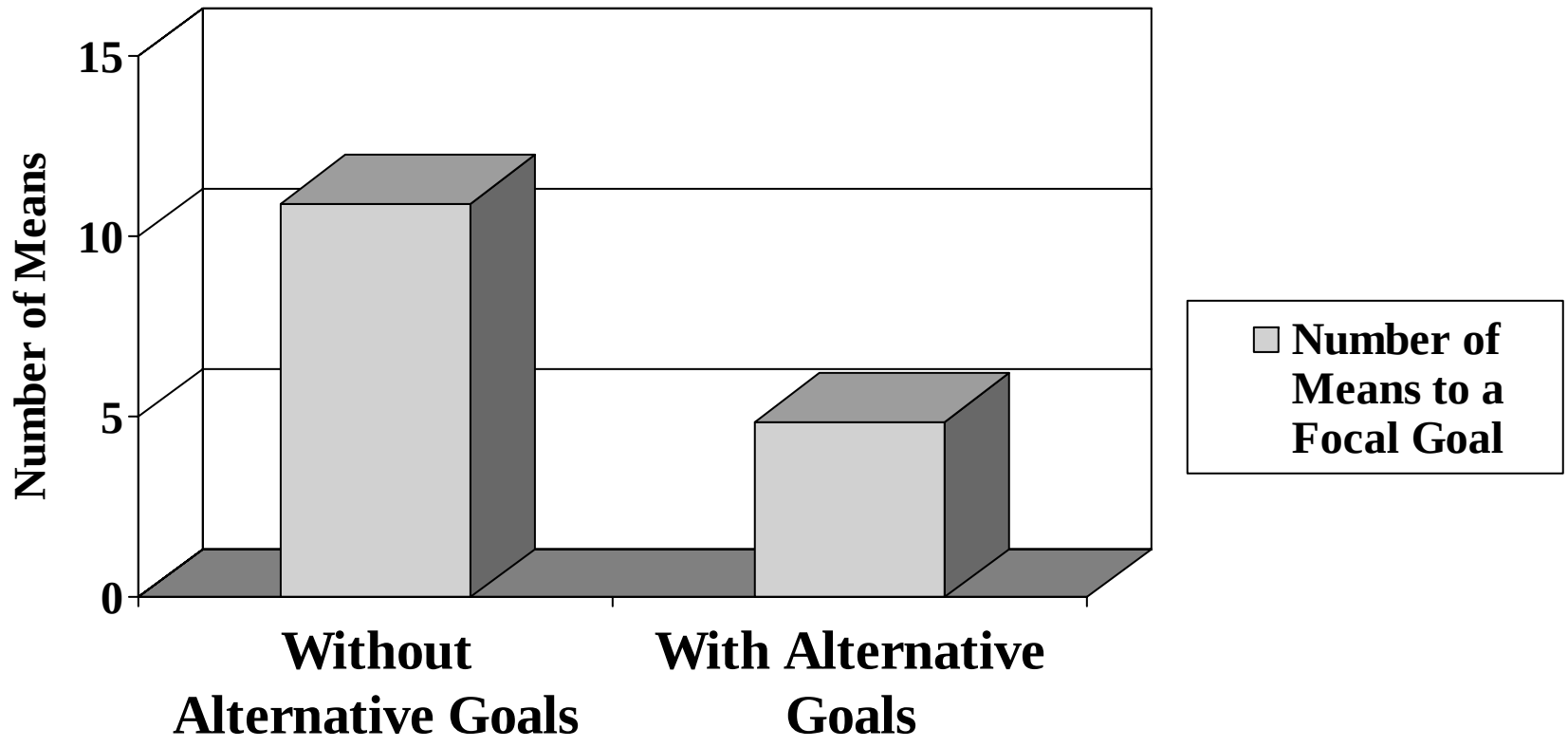


Figure 29

Number of Means Generated for the First Goal Listed as a Function of the Alternative Goals Listed

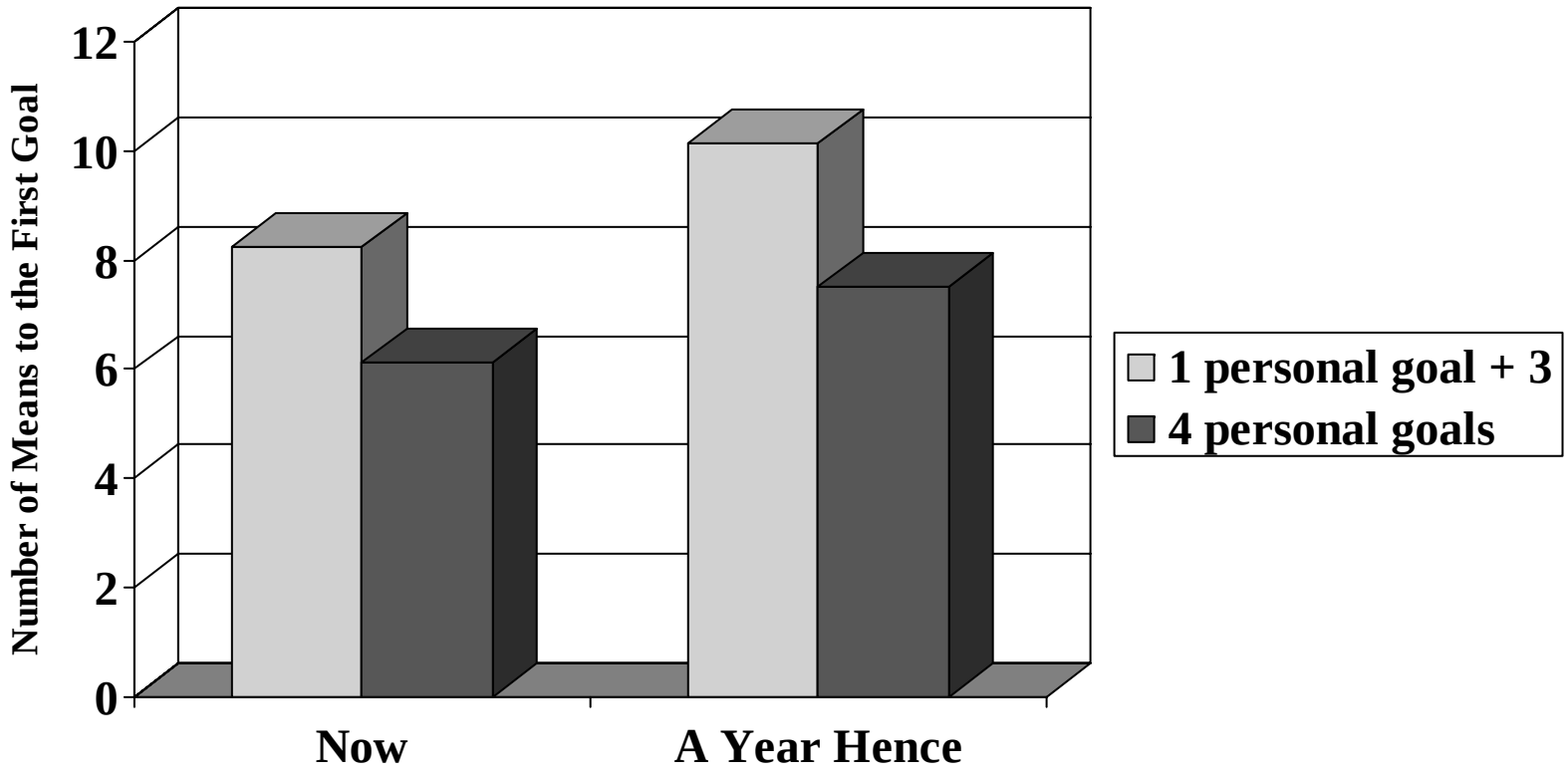


Figure 30

The Effect of Goal-Commonality and Success/Failure on Second Task-Performance

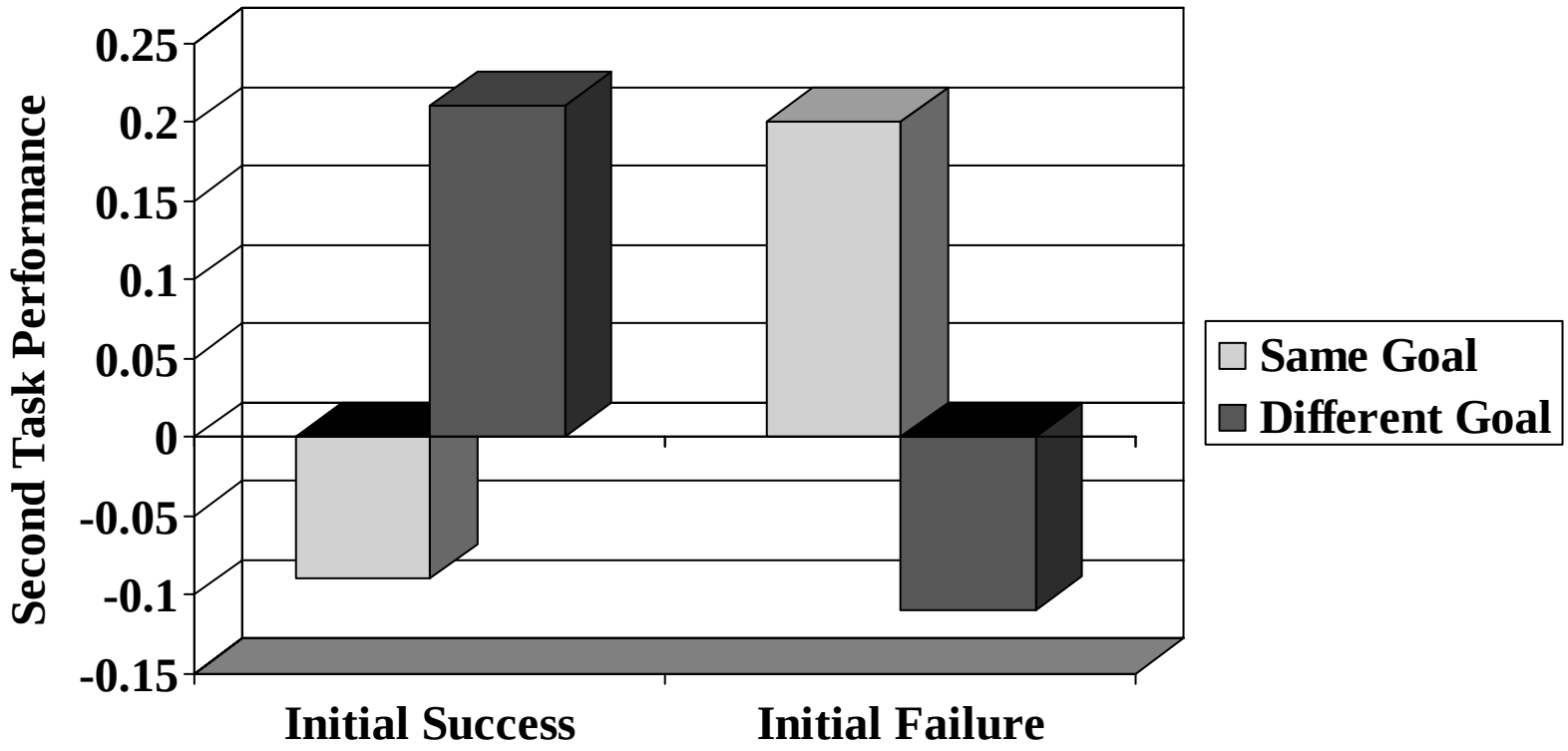


Figure 31

Preference for Sincerity Demonstration over Self-Affirmation in a Hypocrisy Manipulations Study

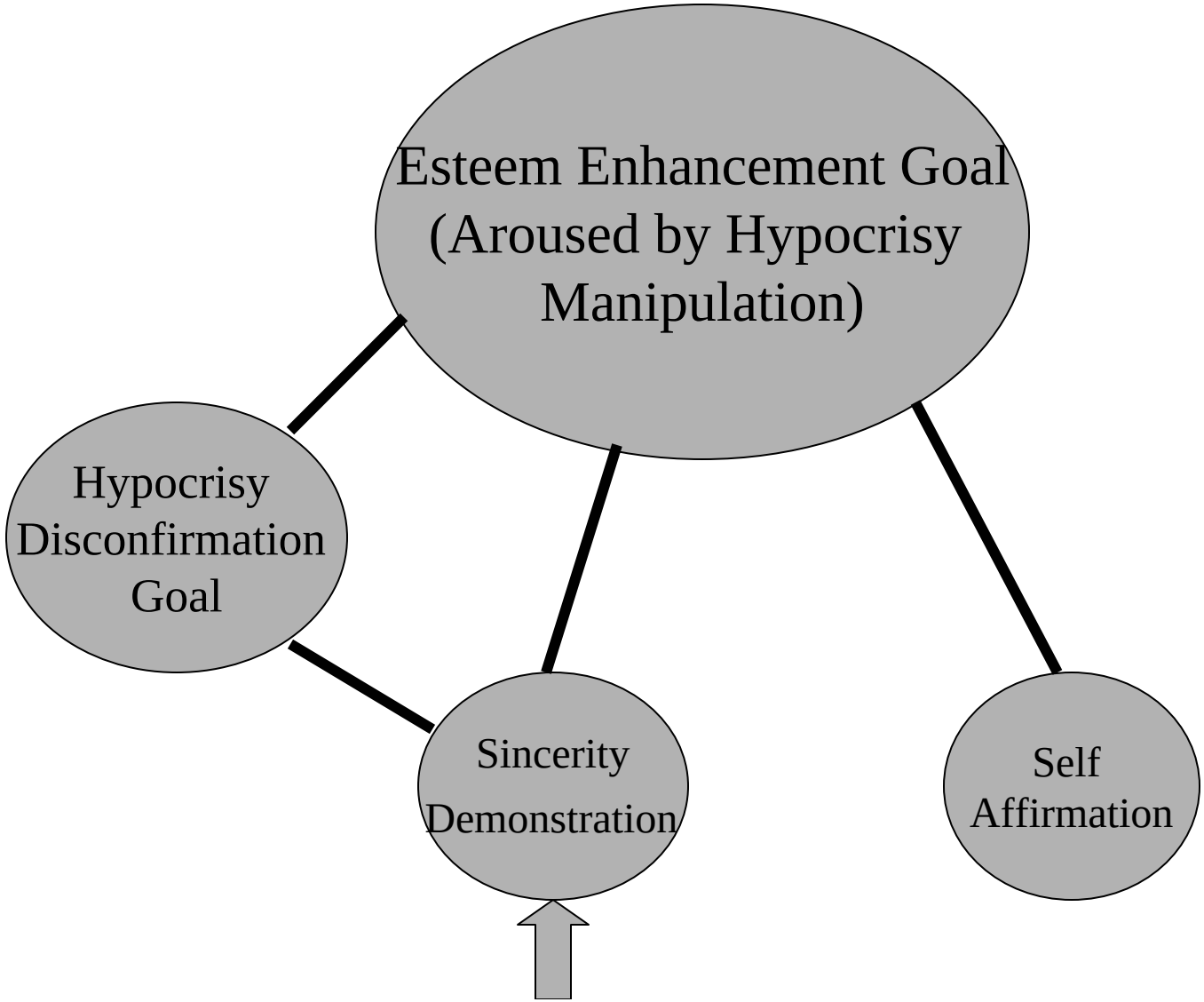


Figure 32

Preference for Courage-Affirmation over Sincerity Demonstration in a (hypothetical) Cowardice-Manipulation Study

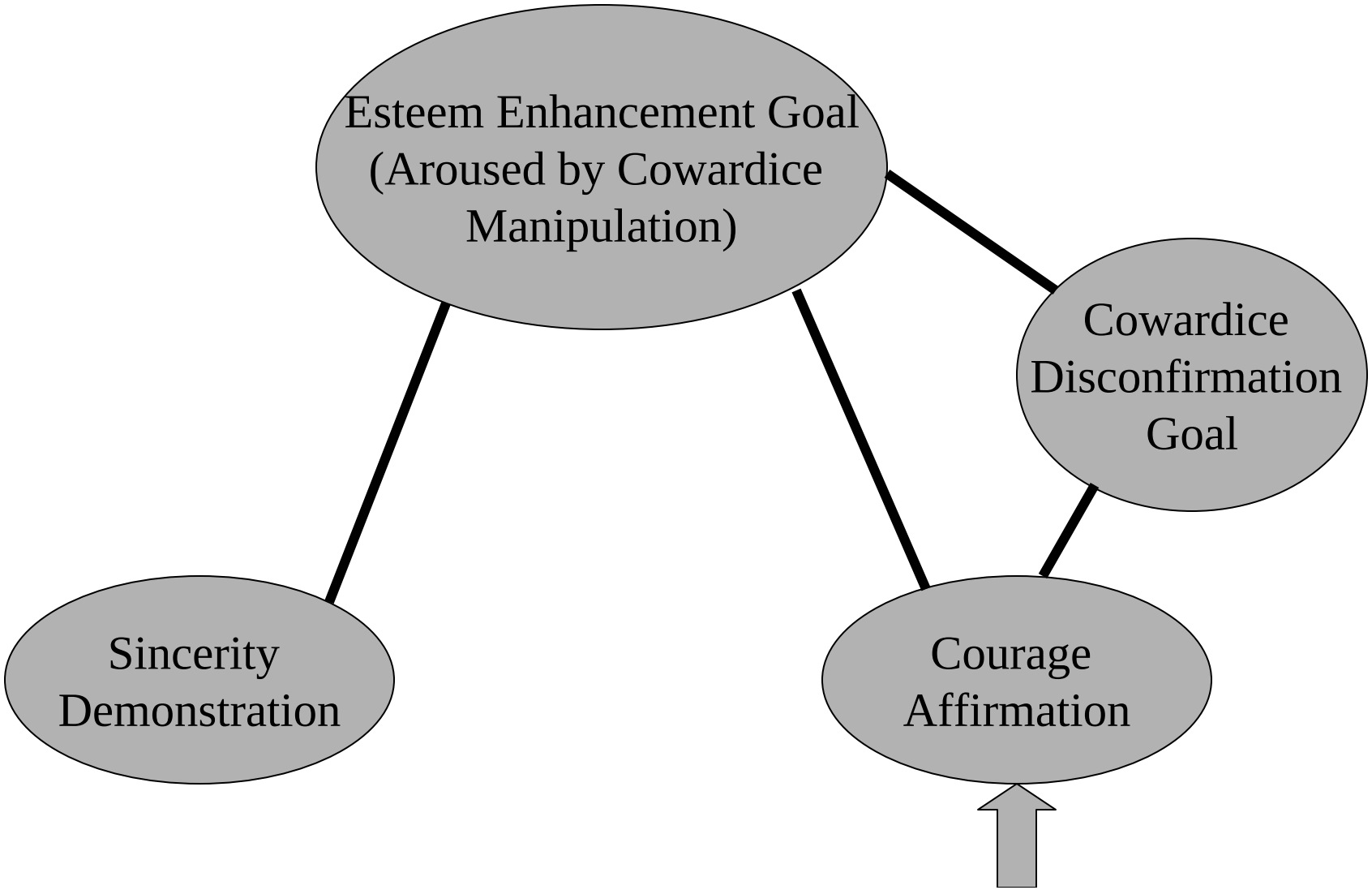


Figure 33

Full Substitutability of Self-Affirmation and Sincerity Demonstration When Esteem-Enhancement Goal is Aroused by Other Means

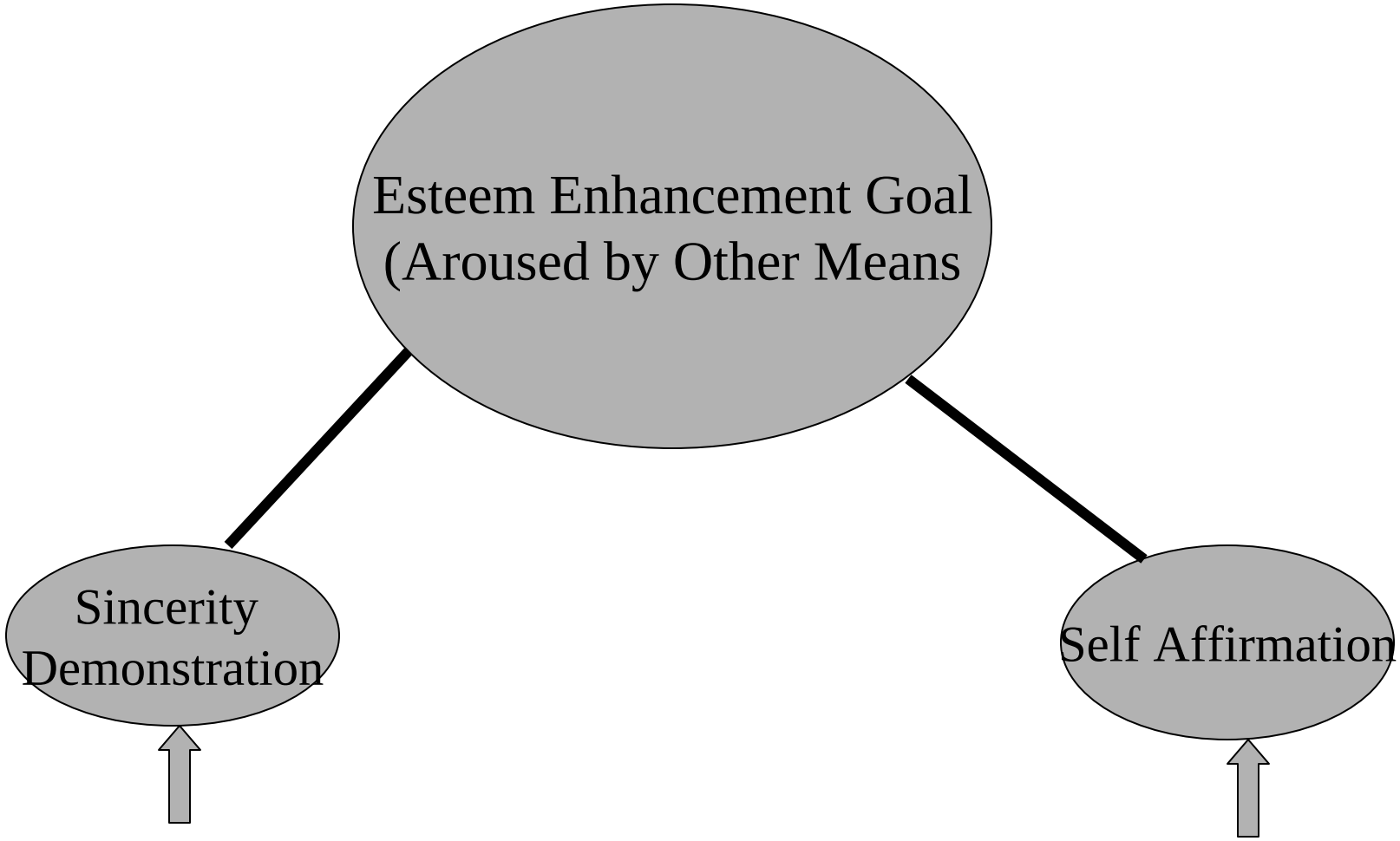


Figure 34

Commitment to Goals as a Function of Social Primes

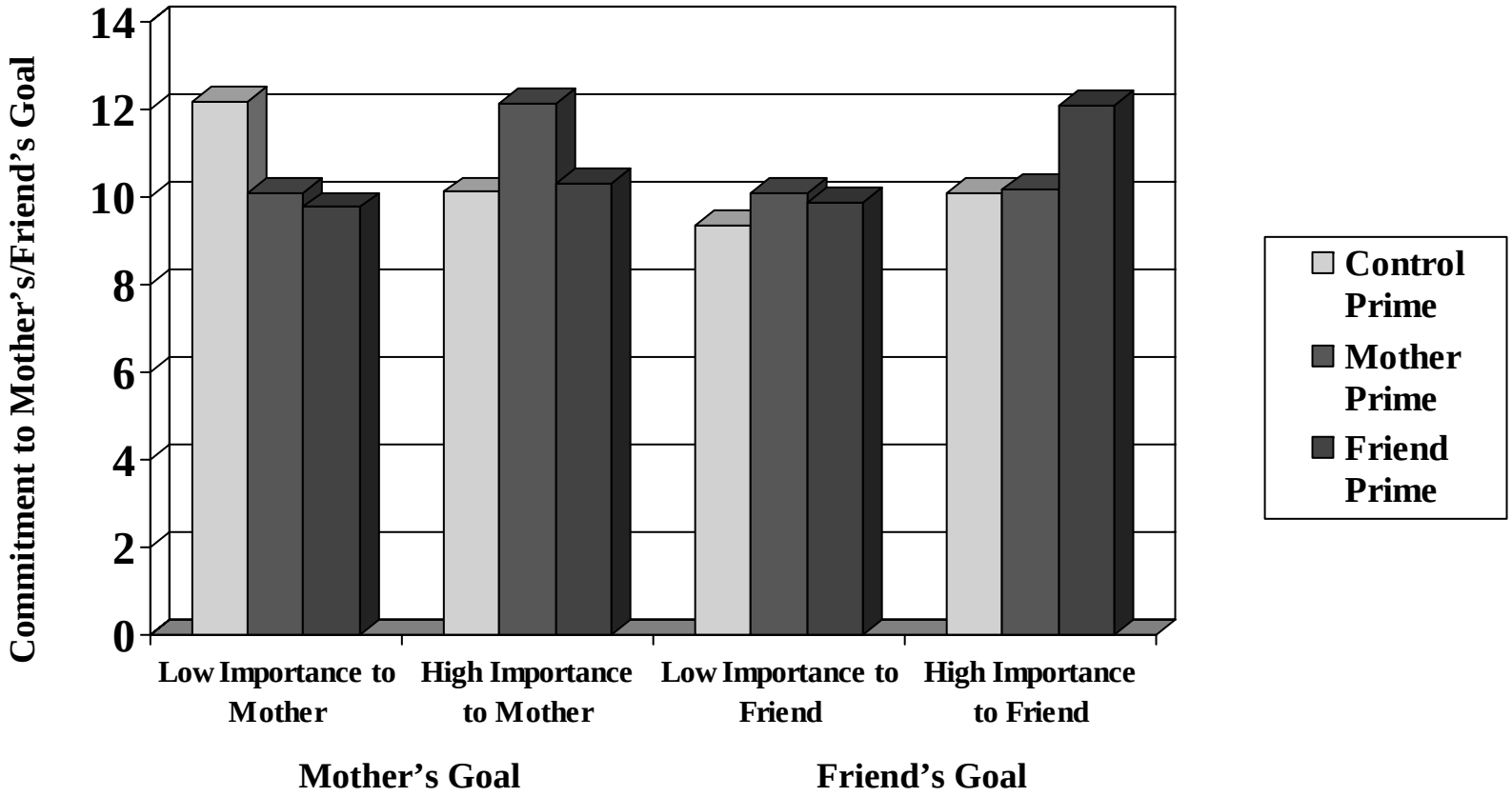


Figure 35

Goal-Related Reaction Times as a Function of Social Primes

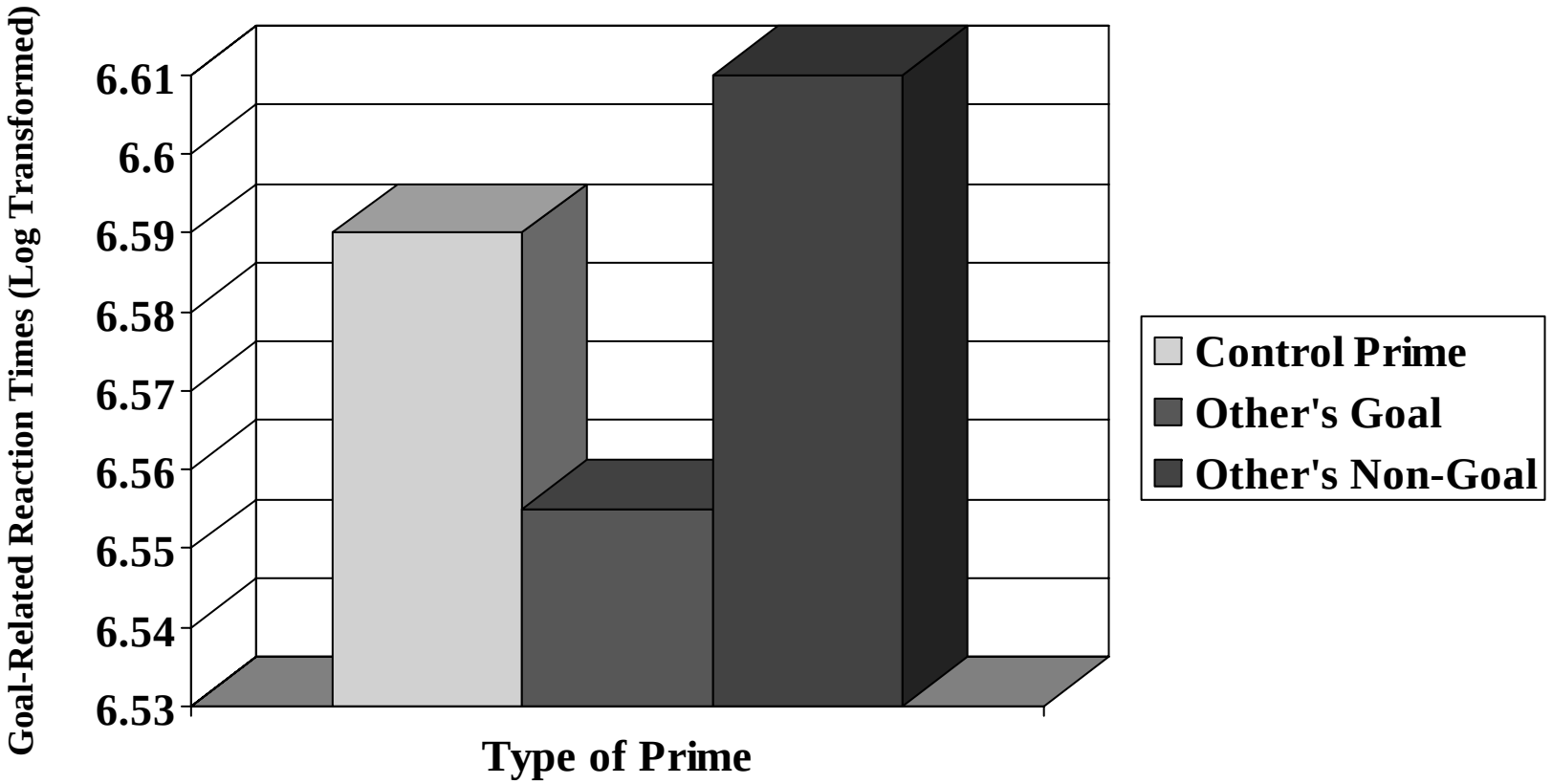
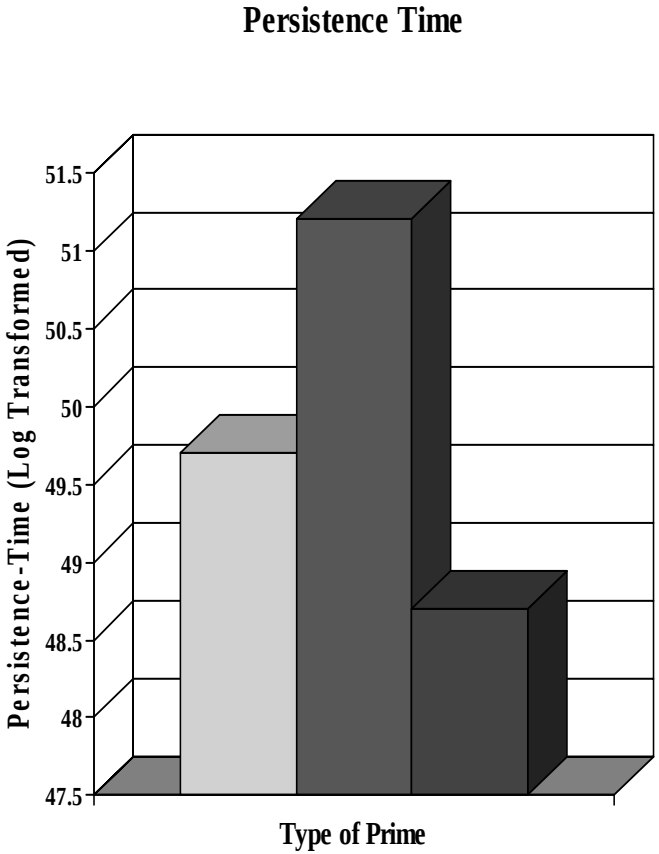


Figure 36

Persistence Time and Solutions Found as a Function of a Social Prime



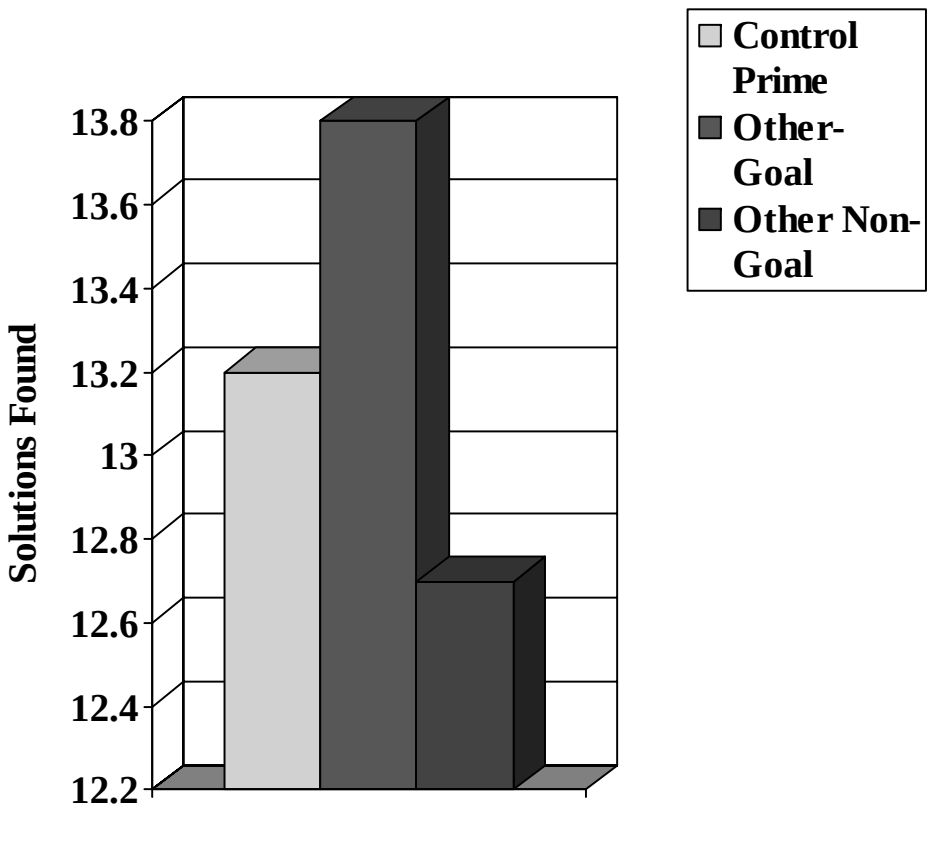


Figure 37

Differences in Friendship Patterns Between German and US Samples