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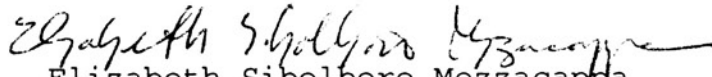
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ABSTRACT

Title of Dissertation: Group Cohesiveness, Deviation, Stress, and Conformity

Elizabeth Sibolboro Mezzacappa, Ph.D., 1993

Thesis directed by: Neil E. Grunberg, Professor,

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The survival and performance of several types of groups (e.g., astronaut crews and military units) depend on the quality of the members' interaction. Group cohesiveness has been assumed to have a positive effect on group members' performance, interaction, and well-being. However, results of studies have been contradictory. The inconsistency can be partially attributed to absence of a conceptual mechanism linking group cohesiveness with social behavior.

The present laboratory experiment examined the effect of group cohesiveness on conformity to a group norm. Group cohesiveness was postulated to increase the stress of deviating. Conformity was postulated to eliminate deviation and to decrease stress. The general hypotheses were that deviation from the group is stressful, and that conformity reduces the stress; the greater the group cohesiveness and the threat of punishment for deviating (TPN), the greater should be the stress response and conformity.

The experiment included 92 men and women in a 2x2 factorial design crossing High and Low Cohesiveness and TPN. Cohesiveness was manipulated by placing the subject in a group of self-reported high or low attraction. TPN was manipulated by the group's negative or positive/neutral responses to a subject's deviance. Subjects first answered a series of simple perceptual questions, next were shown that they deviated from the group and the group's reaction to the differing answer, and then answered the same series of questions a second time. Conformity was measured by number of changes in answers and changes in confidence about answers given. During the session,

stress responses were measured by mood and symptom self-reports and by cardiovascular and urinary biochemical measures.

In general, the hypotheses were confirmed. Deviation from the group increased stress responses; however, conformity did not decrease stress responses. Higher cohesiveness and TPN were associated with greater conformity, but were not associated with stress. Greater systolic blood pressure responses were associated with greater conformity. Conformers showed greater stress response to deviation and attraction to the group compared with non-conformers. These findings are relevant to the investigation of the relationship between social behavior and health, and to a new approach to group selection.

GROUP COHESIVENESS, DEVIATION, STRESS, AND CONFORMITY

by

Elizabeth Sibolboro Mezzacappa

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I would like to thank, the many people who help me beat the odds:

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Dedicated to
Our Lady of the Highways
and
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INTRODUCTION

In 1991, a group of experts on space exploration published "America at the Threshold" (Stafford, 1991), a report in which recommendations for near future space exploration were outlined. This report proposed several missions, all of which require a crew of at least six persons for 14 to 1000 day missions. In proposing these mission scenarios, the report identified research in human factors (i.e., design of habitat and environment, human-machine interface, and psychosocial interactions) as essential. Furthermore, it proposed that underlying the possibility of long duration space travel are the operational assumptions that: 1) long-term health issues, both physiological and psychological, will be resolved, and 2) guidelines for maintaining crew health and performance in space and planetary environments will be established.

As part of meeting these operational assumptions, the role of group cohesiveness in crew health and performance has been emphasized (Leonov & Lebedev, 1975; Christensen & Talbot, 1985; Stafford, 1991). The experience in analog isolated and confined environments (ICEs) and the long duration Soviet space missions clearly demonstrate that interpersonal compatibility is an important factor to mission outcome and overall performance (Gunderson 1973; Gunderson & Nelson, 1966; Leonov & Lebedev, 1975). Therefore, selection and training procedures are planned to promote a high degree of group cohesiveness within future space crews (Conners, Harrison, & Akins, 1985). The underlying

assumptions of these procedures are that high cohesiveness will result in more harmonious relations and less interpersonal stress.

There also are potentially negative aspects of highly cohesive crews. One example is the phenomena of "groupthink" (Janis, 1971), a situation in which, in an effort to maintain group harmony, members submit more readily to conformity pressures, leading to suppression of thoughts that are critical of the group, and to poorer group performance and decisions. Furthermore, the assumption that highly cohesive groups will enjoy less interpersonal stress must be examined critically. If an individual crew member holds a different set of beliefs or behavior patterns from the others, a likely situation in light of the planned multi-national missions (Santy, 1987), then it is possible that heightened conformity pressures in cohesive crews over long duration missions could result in a heightened stress response for that individual. This response could arise because of the strong desire to maintain one's own belief and practices and the strong need to maintain harmony within the crew. A clearer understanding of the relationship between group cohesiveness and crew responses is necessary to understand and utilize the positive effects of crew cohesiveness, and to minimize the more negative effects.

The present research was designed to investigate several assumptions relevant to the selection of cohesive crews. Specifically, this investigation examined responses associated with not conforming to the group and situational and individual determinants of conformity behavior in cohesive groups. The goal was to test the hypothesis that increasing group cohesiveness and the threat of punishment for non-

conformity (TPN) will increase the likelihood that a group member will conform and will have a heightened stress response in a conformity pressure situation. Conformity response under group pressure was indexed primarily by the number of responses made that were in accord with the group, and were contrary to previous responses to the same stimuli, and secondarily by decreases in confidence in one's own response. Stress responses were indexed by self-report of mood, emotions, and symptoms; changes in urinary and cortisol; and heart rate and blood pressure fluctuations throughout the experimental session.

This introduction begins with an overview of the major concepts relevant to the proposed work: group cohesiveness, conformity, and stress. Then, the literature on group cohesiveness and conformity pressures is reviewed with a discussion of possible reasons for contradictory findings in the existing literature. Next, the introduction reviews the effects of conformity pressure on stress responses. Then, specific hypotheses of the proposed work are presented.

Group Cohesiveness

Conceptualization

Social Psychological/Group Dynamics. The conceptualization and definition of group cohesiveness has been a source of debate and confusion over the last 40 years (Gross & Martin, 1952a; Gross & Martin, 1952b; Keyton & Springston, 1990; Mudrack, 1989a; Schachter, 1952). The Festinger, Schachter, and Back (1950) group dynamics definition, however, is the most frequently cited. They defined cohesiveness as the total field of forces that act on members to remain in the group.

Furthermore, these investigators suggested that cohesiveness is related to the average magnitude of the force in all parts of the group. Two factors were proposed to affect the force field: 1) the attractiveness of the group (i.e., the extent to which the group is a goal in and of itself and has positive valence), and 2) the extent to which the group mediates goals that are important for members. A subsequent examination of these two factors (Back, 1951) led to the conclusion that the consequences of cohesiveness derived from either of these two situations were the same: increased influence of the group over members.

Cohesiveness derived from interpersonal attraction, task direction, or group prestige all increased influence of the group over members, and led Back (1951) to conclude that cohesiveness was a unitary concept.

Lott and Lott (1965) and Lott (1961) basing their work on the Hullian drive framework, defined cohesiveness with a focus primarily on the attractiveness factor. Cohesiveness was defined as "that group property which is inferred from the number and strength of mutual positive attitudes among the members of the group" (p. 259). These authors defended their somewhat selective focus saying that "there is good reason to assume that interpersonal attraction, liking or positive attitudes among group members is central to the cohesiveness of a small group" (p.259). The Hullian perspective emphasized attraction to individuals over attraction to the group as a unit. While there may be important differences between the two circumstances, in general, the notion of an individual's attraction to the group and group members is central to the social psychological definition of cohesiveness.

Sociological. Within sociology, a slightly different conceptualization of cohesiveness predominates. Emphasizing the importance of social bonds and structure, cohesiveness is synonymous with the terms solidarity, integration, unity, and interdependence (Cooley, 1925; Durkheim, 1933; Gross & Martin, 1952a; Homans, 1950). Sociometric variables are the primary measure of an individual's status within the social structure of the group (number of choices he or she receives for companion, leader, etc.) and serve as an index of integration within the group (number of mutual choices) (French, 1951; Darley, Gross, & Martin, 1951; Gross & Martin, 1952a; Gross & Martin, 1952b; Riecken & Homans, 1954). In contrast with the conceptualization of Festinger, Schachter, and Back (1950), the sociological orientation focused on the group as a whole and on members' places in it.

Differences between Social Psychological and Sociological

Conceptualizations At least two differences between the two perspectives are readily apparent. The difference concerns the level of analysis. Findings in the social psychological studies emphasized the individual level, whereas the sociological orientation emphasized the group level of analysis. The second difference concerns the importance of the direction of attraction. Social psychologists index cohesiveness as some function related to the individual members' attraction to the group, whereas sociologists index cohesiveness as a function of the number of choices that a group member receives from other members.

Followers of the two perspectives have debated these issues. For example, although universally cited, the Festinger, Schachter, and Back (1950) conceptualization came under question initially by Gross and

Martin (1952a) who favored a more sociologically oriented tradition. More recently, the Festinger, Schachter, and Back (1950) assertions have been challenged by Mudrack (1989a), Tziner (1982a, 1982b), and Zaccaro (1991). An examination of the original Gross and Martin (1952a, 1952b) criticisms, Schachter's (1952) rebuttal, and more recent versions of the Gross and Martin (1952a) criticisms provide insight into the complexities in operationalizations of cohesiveness, as well as the predictions arising out of different conceptualizations.

Original Gross and Martin (1952a) Criticism. Three main points formed the majority of the objections to the Festinger, Schachter, and Back (1950) conceptualization, and the subsequent Back (1951) experiment. The first criticism was that the definition focused too much on the individual and not much on group level phenomena (like most of social psychology, as observed by Steiner, 1974). Gross and Martin (1952a) offered an alternative conceptualization of cohesiveness on a group level. Cohesiveness, proposed Gross and Martin (1952a), is best thought of as the resistance of a group to disruptive forces, or in common sense terms, the notion of "sticking-togetherness" of the group (p. 553). This conceptualization emphasizes that cohesiveness is related to the strength of the relational bonds among members. The stronger the bonds, that is, the more cohesive, the less likely the group will disintegrate and fall apart under crises. A similar conceptualization was used in an earlier study by French (1941). Gross and Martin (1952) asserted that compared with the Festinger, Schachter, and Back (1950) definition focused on the individual level, a group

level definition would better lead to investigation of real world problems.

The second main criticism of Gross and Martin (1952a) focused on the ideas engendered in the terms "total field of forces." The third criticism examined the idea of cohesiveness as a "unitary concept." Because of their implications on operationalization and conceptualization, these last two points are addressed in the following sections, including Schachter's (1952) reply.

"Total Field of Forces". Gross and Martin (1952a) contended that conceptualization of cohesiveness as the total field of forces oriented toward groups required an attempt to index all the total forces of the situation, or a statement limiting the generalizability of the findings. Alternatively, they asserted that a measure of some resulting summation of the force be used. Gross and Martin (1952a) believed that the Festinger, Schachter, and Back (1950) and the Back (1951) investigations failed to do either of these. Schachter (1952) countered that, as in any study, technical feasibility precluded measurement of all the relevant forces. Furthermore, he argued that there were ample data to support the assertion that the friendship index used as an operationalization of cohesiveness was indeed a major component of cohesiveness and, therefore, would be the most fruitful yet feasible measure of cohesiveness.

This interchange highlights three methods by which cohesiveness can be measured or assessed. The first, most desirable but least attainable, is measurement of the total field of forces relevant to the cohesiveness situation. This index may be attempted by inclusion of

many types of measures in order to characterize the situation. The second, used by Festinger, Schachter, and Back (1950) is to identify major components of cohesiveness, such as friendship and take the measurement of the major component as an approximation of the total field of forces. The third method is to estimate the resultant force through a general assessment of how eager a person is to be a member of the group, advocated by Gross and Martin (1952a) and used in other investigation related to the Festinger, Schachter, and Back (1950) study (i.e., Schachter, Ellertson, McBride, & Gregory, 1951; Festinger, Gerard, Hymovitch, Kelley, & Raven, 1952).

Mudrack (1989a) also noted shades of different implications for different conceptualizations and definition of cohesiveness among the Festinger, Schachter, and Back (1950), Back (1951), and Festinger (1950) studies. Mudrack (1989a) noted that subsequent to the original Festinger, Schachter, and Back (1950) conceptualization, Festinger (1950) somewhat revised the definition of cohesiveness as "the resultant of all the forces acting on members to remain in the group" (p. 274). Mudrack (1989a) asserted that, although the change in definition appears slight, the distinction is important. Whereas the Festinger, Schachter, and Back (1950) definition implied that the variables accounting for the total field of forces should be assessed, the later definition implied that only the resultant summation of forces need be studied. Mudrack (1989a) held that this unresolved distinction contributed to the uncertainty over the definition of group cohesiveness. To add to the confusion, Back (1951) misquoted the Festinger, Schachter, and Back (1950) definition to read "the resultant forces that are acting on the

members to stay in a group; in other words, cohesiveness is the attraction of membership in a group for its members" (Back, 1951; p. 9) instead of "the resultant of all forces" (Festinger, 1950; p. 274) or "the total field of forces" (Festinger, Schachter, & Back, 1950; p. 164). Within a short time and among the same authors, there was a significant evolution of conceptualization.

Again, these issues are most relevant to the operationalization and level of assessment, whether to assess as completely as possible the total field of forces, to identify a major component of the total, or to assess some resultant of the total field, regardless of source of cohesiveness.

"Unitary Concept". Gross and Martin (1952a) also questioned Back's (1951) conclusions that cohesiveness was a unitary concept. Back (1951) found that regardless of the source of cohesiveness (i.e., personal attraction, task direction, or group prestige), the same effects on influence resulted. Gross and Martin (1952a) asserted that in order for cohesiveness to be correctly conceptualized as a unitary concept, "whose utility for theory construction cannot be shown to be improved by splitting it up into components" (p.551), the separate measures or sources for cohesiveness should be highly correlated. They concluded that because only three of the total field of forces were measured and because high correlations between the three were not demonstrated, that the conclusions of cohesiveness as a unitary concept were premature. In his reply, Schachter (1952) questioned the assertion that the sources of cohesiveness should be highly correlated, maintaining that because increasing either the strength of friendship

ties, the attractiveness of the group's activities, or prestige will increase the amount of influence exerted and accepted, cohesiveness can be accurately labeled as a unitary concept.

The crux of the argument may simply be the definition of "unitary concept." Gross and Martin's (1952) may be a construct that cannot be decomposed into components, and Schachter's (1952) a construct having difference sources, but the same end result. More recent debate echoes the original criticisms of Gross and Martin (1952a).

Several researchers in the last decade reasserted Gross and Martin's (1952) position that cohesiveness cannot be called a unitary or unidimensional concept (Tziner, 1982b; Zaccaro, 1991). Tziner (1982b) indicated that groups can be characterized as attractive because: 1) they provide a social framework for individuals initially bound by interpersonal attraction (socio-emotional cohesiveness), or 2) the performance and attainment of goals associated with membership (task cohesiveness). The distinction between attractiveness of group and goal mediation by the group was originally made by Festinger, Schachter, and Back (1950).

Zaccaro (1991) similarly differentiated cohesiveness into interpersonal and task (instrumental) cohesiveness. Task and interpersonal cohesiveness were assessed in nine squadrons containing an average of 69 members each, made up of undergraduate military cadets. Both types of cohesiveness were tested for correlations with several individual and group performance variables, as well as on group process variables. Individual performance measures included number of demerits received and absenteeism. Group performance measures included reports

of how well the group was coordinated, made decisions, and shared information. Group process variables included degree of role ambiguity and role conflict experienced. Compared with interpersonal cohesion, task cohesion had significantly greater negative correlation with role uncertainty, absenteeism, and demerits.¹

Zacarro (1991) concluded that because of these two different associations between the types of cohesiveness and group performance processes, cohesiveness could not be considered as a unitary concept. Previous work by Zacarro and McCoy (1988) and Zacarro and Lowe (1988) also provide evidence that task and interpersonal cohesiveness have different results for behavior.

Proposed Explanation for Controversy

The controversy over the unitary construct issue stems from several sources: 1) misinterpretation of the original findings taken out of context from Festinger, Schachter, and Back (1950) and Back (1951); 2) differences in fundamental theoretical orientations, that is mechanism oriented, formulations of field theory compared with trait-behavior associations; and 3) distinctions between cohesiveness as a group property versus a group trait.

¹It is noteworthy that high cohesiveness does not necessarily guarantee high performance or productivity (Schachter, Ellertson, McBride, & Gregory, 1951). If increasing cohesiveness does increase influence over members to follow the group norm, but that norm is lower than the level of performance that can be expected from the group, then increasing the cohesiveness of the group decreases productivity. Alternatively, a group with low cohesiveness may show minimal resistance to increased performance standards imposed by outside authorities. A group with high cohesiveness may resist adopting increased standards not set by the group itself.

First, the original findings as presented by Schachter (p. 560, 1952) that is often misinterpreted or misunderstood is "...increasing the strength of friendships, the attractiveness of activities or the prestige of the group will all increase the amount of influence exerted and accepted." This statement is within a context of research on social influence and communication. Therefore, the statements that regardless of source, cohesiveness has the same consequences were made in reference to consequences for group influence. Investigators appear to have interpreted statements to mean that they should result in the same behavior (Tziner, 1982b; Zaccaro, 1991), which is not what is originally stated. In fact, in the same investigation that Back (1951) presented evidence that regardless of source, cohesiveness results are the same on influence, he does present differences in behavior.

Relative to this shift in interpretation are differences between researchers in the Lewinian, field theory tradition, compared with a trait-behavior tradition. Festinger, Schachter, and Back (1950), Back (1951), and related works were in the context of the theoretical system that focused on mechanisms underlying behavior incorporating concepts such as pressure and tension and forces. Predictions of behavior followed from understanding these mechanisms and processes. For example, cohesiveness is associated with increased pressures to uniformity, resulting in increased influence of the group over member behavior, which results in members increasing efforts to follow the group's directions or norm of behavior. In this sense, cohesiveness is a property of "binding together" (Schachter, 1952, p.560).

In contrast to the perspectives of cohesiveness as a group property, is the perspective of Gross and Martin (1952a), Tziner (1982b), and Zacarro (1991) that group cohesiveness is a trait. Furthermore, just as in individual psychology, certain traits are expected to be associated with certain behaviors. Perhaps it is this perspective that led Gross and Martin (1952a) to assert that the measures of cohesiveness sources should be highly correlated, much like the notions of concurrent and construct validity of questionnaire items. Items that purport to measure the same construct should be highly correlated. In addition, groups with the trait of being task cohesive should have behavior patterns reflecting this trait in behavior relevant to task performance. Similarly, groups with the trait of interpersonal cohesiveness should show behavior patterns reflecting this trait in behavior relevant to interpersonal behavior.

It is possible that much of the controversy in the field of group cohesiveness stems from different fundamental theoretical orientations. Researchers should keep in mind the distinctions between group cohesiveness as a property of the group versus a trait of the group when attempting to conceptualize, define, and operationalize cohesiveness.

Current Work on Group Cohesiveness

Following about two decades of research (from the late 1940s to the late 1960s), the study of group cohesiveness, like the study of groups, declined markedly. Several reasons have been posited for this phenomenon (Zander, 1979; McGrath & Kravitz, 1982; Hilgard, 1987). Hilgard (1987) regarded the disappearance of leaders (due to death or movement on to other topics) as one of the important factors. In

addition, the contradictions in findings in small group research, and the challenging logistics daunted would-be group dynamicists.

McGrath and Kravitz (1982) in the 1982 Annual Review of Psychology presented an interesting examination of the development of group dynamics from the bright and advancing field in the early 1950s, to peaceful harmony and consolidation in the 60s (but, without great theoretical advances), to the malaise of the 70s. McGrath and Kravitz (1982) ended their review saying that the study of groups was "undergoing a renaissance."

However, eight years later, in the next chapter on groups in the Annual Review of Psychology, Levine and Moreland (1990) declared that "Groups are alive and well, but living elsewhere" (p. 620). No longer was the study of groups, and in particular group cohesiveness, primarily the domain of social psychology, but also appeared in industrial/organizational psychology (Mudrack, 1989a; Mudrack, 1989b; Hackman, 1990; Drescher, Burlingame, & Fuhrman, 1985; Greene, 1989; Piper, Marrach, Lacroix, Richardsen & Jones, 1983; Tziner, 1982a; Tziner, 1982b; Steel, Shane & Kennedy, 1990; Goodman, 1986) and sports psychology (Carron, 1982; Spink, 1990; Yukelson, Weinberg & Jackson, 1984; Carron & Chelladurai, 1981). The classical studies of jury dynamics began to appear within the field of behavioral decision theory (Stasser, Kerr, & Bray, 1982). Environmental psychology grew in importance with work on crowding (Paulus, 1980; Freedman, 1975; Baum & Valins, 1977). Studies of group cohesiveness within social psychology focused on task performance enhancement (Zaccaro & McCoy, 1988; Zaccaro & Lowe, 1988; Hoogstraten & Vorst, 1978).

Recent work on cohesiveness and consequences are tied to immediate practical ends, such as increasing productivity or job performance (Mudrack, 1989b; Hackman, 1990). In part because of this focus, the emphasis has been on naturally occurring groups, such as work groups and sports teams. In general, the trend is to explain "complex behavior in natural groups" (p. 621, Levine & Moreland, 1990), a situation that Levine and Moreland (1990) hold to have positive implications for theory, methodology, and funding.

Summary: Group Cohesiveness

The conceptualization and operationalization of group cohesiveness has been debated for as long as it has been studied. The confusion may be, in part, a result of differences in the conceptualization of group cohesiveness as a property versus a trait. While the study of cohesiveness is important, like the study of small groups in general, it has decreased in activity in traditional social psychology.

Conformity and Non-conformity

Conformity

In contrast to the definitions of group cohesiveness, conceptualizations of conformity (or yielding behavior) and non-conformity (i.e., independence, resistance) are fairly uniform. Kiesler (1969) described conformity as some behavior change or attitude change that occurs as the result of some real or imagined group pressure. Walker and Heyns (1962) defined conformity as movement toward some norm or standard, and non-conformity as movement away from such a norm or standard. Bass (1961) described conformity as behavior reflecting the successful influence of other persons.

The behavior of conformity can be further classified in two ways: 1) whether the behavior reflects a true acceptance of the norm (in other words, private acceptance, private conformity or true conversion), or 2) whether the person just goes along with the group. Public conformity may be accompanied by private conformity (Festinger, 1953; Kelman, 1958; Allen, 1965; Kiesler, 1969; Kiesler & Kiesler, 1969). This situation also has been called conversion (Blake & Mouton, 1961). Conformity without a true change in private acceptance has been termed compliance (Kiesler, 1969; Kiesler & Kiesler, 1969) or public conformity without private conformity. The two conditions of private acceptance and public conformity can be combined together to reflect four types of conformity behaviors: public conformity/private acceptance, public non-conformity/private acceptance, public conformity/private non-conformity, public non-conformity/private non-conformity. These behaviors arise under different conditions and have different implications for behavior over time (Kiesler & Kiesler, 1969; Festinger, 1953). Therefore, conformity may be considered to be a complex phenomena and should be differentiated into several distinct psychological processes (Allen, 1965).

Non-conformity

The concept of non-conformity as the converse of conformity is conceptually clear and therefore is seldom explicitly defined. Non-conformity may be described as independence or resistance to group pressures or anti-conformity (Willis, 1965) or counter-conformity (Crutchfield 1959). Anti-conformity or counter-conformity refers to behavior that attempts to move farther away from the group norm.

Whereas the differentiation between public and private conformity focuses on motivation or underlying psychological mechanisms, non-conformity also may be classified as to degree of deviation from norm. Allport's (1934) J curve of conformity is an example. Allport (1934) proposed that a majority of persons will comply to the full extent with certain norms, lesser numbers follow the norm to a lesser degree, but a greater proportion completely disregard the norm altogether. Asch (1956) also recognized that deviation from norm could be classified according to distance from the norm.

Recent work on non-conformity or dissent focuses on what personality characteristics are associated with deviation or degree of deviation from norm rather than on what personality or situational characteristics are associated with conformity. For example, Maslach (1974) and Maslach, Stapp, and Santee (1987) studied the trait of individuation or the willingness of a person to individuate or differentiate him or herself from others. Individuation is the converse of the social psychological concept of deindividuation-- the phenomena where situational factors that are present in a group prevent a person from awareness of him or herself as a separate individual (Diener, 1980; Festinger, Pepitone, & Newcomb, 1952; Singer, Brush, & Lublin, 1965; Zimbardo, 1969). As measured by the Individuation Scale (Maslach, Stapp, & Santee, 1987), individuation was negatively correlated with conformity (Santee & Maslach, 1982).

Conformity Paradigms

Most studies of conformity have used variants of the Asch-Crutchfield conformity pressure paradigm (Asch, 1955, 1956; Crutchfield,

1955). The classic Asch studies (1956) examined conformity by a minority of one against a unanimous group opinion (from 1 to 15 others) on unambiguous perceptual stimuli. While in the presence of a group, one true subject was asked to give judgments about the lengths of lines. However, the subject could give his (only men were run) judgment only after hearing the judgments of the confederates in the group who had been instructed to give the same erroneous answer. Conformity was measured by the numbers of times the true subjects yielded to the group pressure by answering as the rest of the group did, instead of giving the correct answer. Without conformity pressures present, control subjects performed the task virtually without error, whereas under conformity pressures, subjects increased their errors by following the majority's judgments. Control subjects, who responded without knowing of anyone else's answers, gave errorless performances. In contrast, only 25% of the experimental subjects, who were exposed to confederates' erroneous answers, performed without error. These findings indicated that there was a strong effect of conformity pressures on experimental subjects.

Crutchfield (1955) used a similar paradigm, but instead of giving verbal responses, subjects in groups switched on lights to indicate their judgments. The responses attributed to the other group members were visible to each subject on his panel, but no subject directly could see anyone respond. As with the Asch (1956) paradigm, subjects were asked to respond only after seeing the judgments of the other members. In actuality, the experimenter programmed the lights and the basic

result was similar to Asch's; subject responses were influenced strongly by the judgments of others in the group.

Determinants of Conformity

Situational Factors. Conformity has been found to be influenced by a variety of individual differences, situation, and stimuli factors (Allen, 1965; Graham, 1965; Hare, 1976; Kiesler, 1969). Conformity is increased when subjects are in groups that have been previously successful (Kidd & Campbell, 1955), when subjects are required to make public responses face-to-face with the opposition (Deutsch & Gerard, 1955), when stimuli are ambiguous (Walker & Heyns, 1962; Luchins & Luchins, 1965) or difficult (Crutchfield, 1955), or when members are interdependent (Deutsch & Gerard, 1955; Thibaut & Strickland, 1956) or similar (Festinger & Thibaut, 1951) or unanimously opposed (Asch, 1956). Conformity can be increased when the group size is increased reaching a maximum of three opposed persons after which there is no significant increase in conformity rates (Asch, 1956).

Individual Difference Factors. Several investigations have focused solely on personality and individual difference factors (Crutchfield, 1955; Janis, 1954; Tuddenham, 1959). Women are reported to conform more than men (Eagly, 1978). People who feel that they lack competence are more likely to conform (Croner & Willis, 1961; Rosenberg, 1963). Persons with low self esteem, social inadequacy, inhibition of aggression, or depressive tendencies conform more than others (Janis, 1954). Conformity behavior is negatively correlated with intelligence and intellectual achievement, psychological sensitivity, perceptiveness of self and others, security in social status, and male drive and vigor

(Tuddenham, 1959). People high in conformity are reported to be submissive to authority; inhibited; have a narrow range of interest; are unable to make decision without delay; desire clarity, symmetry, certainty; express conventionality for rules; are anxious; and are distrustful of others (Crutchfield, 1955). In general, factors that decrease a subject's certainty of his or her response, or increase the subjective correctness of the group increase conformity. However, there is little subsequent replication of the individual differences work that clarifies the relationship with conformity.

Group Cohesiveness and Conformity

The Consequences of Group Cohesiveness

The relationship among conformity, group cohesiveness, and attraction to group has been investigated several times (Allen, 1965; Hare, 1976; Kiesler, 1969). In an overview of the consequences of group cohesiveness, Lott and Lott (1965) stated that there was well-established evidence concerning the effect of interpersonal attraction on the evaluation of the situation, on evaluation or perceptions of persons who are liked, and most relevant to the proposed experiment, uniformity of behavior or opinions on certain issues. Likewise, Cartwright (1968) proposed that there were four principal consequences of group cohesiveness: 1) the ability of the group to retain its members, 2) the degree of participation and loyalty of members, 3) feelings of security on the part of members, and 4) the power of the group to influence its members.

Pressures to Uniformity Studies

This last consequence is the most relevant to the conformity-cohesiveness association and was extensively studied in the classic series of investigations on pressures to uniformity by Festinger, Schachter, and colleagues (Festinger, Schachter, & Back, 1950; Schachter, 1951; Back, 1951; Schachter, Ellertson, McBride, & Gregory, 1951). Festinger, Schachter, and Back (1950) in the Westgate West study found that the greater the cohesiveness of a group, the fewer deviates there were from the group pattern of behavior. Schachter, Ellertson, McBride, and Gregory (1951) found that highly cohesiveness groups were more able to influence the task performance of members compared with low cohesive groups. This finding was confirmed in a replication by Berkowitz (1954). Back (1951) found that highly cohesive dyads changed more toward the partner's position than did less cohesive groups. Based on these studies, cohesiveness clearly increases the level of influence groups exert on members. Therefore, it is reasonable to predict that increasing cohesiveness in groups will increase the likelihood that members will adopt the group norm of behavior-- that is, increase the likelihood that members will conform to the group norm. However well-established and justified this prediction may be based on the pressure to uniformity series of investigations, conformity studies have found equivocal results.

Evidence Supporting a Group Cohesiveness-Conformity Relationship

Several investigations examined the hypothesis that increasing group cohesiveness should increase conformity rates. Deutsch and Gerard (1955) compared conformity rates in groups of members motivated to act

as a group with aggregates of separated individuals with no group membership motivation. Cohesiveness can be assumed to be greater in the induced membership condition compared with the aggregate condition. As expected, conformity was greater in the group versus aggregate condition. Bovard (1951) compared convergence of individual judgments in group-centered classes versus leader-centered classes. The group-centered class differed from the leader-centered class in that there was greater verbal interaction and more opportunities for group decision and less of a role for the leader. The conditions may be considered as bolstering relatively greater levels of cohesiveness (Lott & Lott, 1965). Students in the class, which numbered about 20, were asked to hand in written estimations of the length of a green triangle presented to the group. They were then told a fictitious average of all the estimations of the class. After this procedure, they handed in another written estimation. Bovard (1951) found that there was greater convergence of the second estimates in the group-centered compared with the leader-centered classes. Therefore, he concluded that group-centered units, or more cohesive units, modified individual perceptions of stimuli to a greater extent than did leader-centered units.

In a second similar study, Bovard (1953b) compared stable units (groups having a relatively long history of interaction) and temporary units (groups having a short history of interaction). Again, the stable units were assumed to foster greater cohesiveness than the temporary units (Lott & Lott, 1965). Using estimations of the number of dots in a figure, Bovard (1953b) found that the stable groups had greater

convergence of estimates toward a common norm compared with the temporary groups.

Lott and Lott (1961), using a similar paradigm to investigate association between attraction to group and conformity, measured cohesiveness and conformity in groups of 6-10 friends. Results indicated a significant positive correlation between group cohesiveness and conformity to a norm. Gerard (1954) examined opinion change in groups of high attraction and low attraction of individuals who strongly disagreed, mildly disagreed, or agreed with the others in the group. Upon first coming to the laboratory, subjects were asked to give a prediction on the outcome of a fictitious story. They were then divided according to the degree of disagreement-agreement. In addition, half were given instructions associated with high attraction among group members, the other half were given instructions associated with low attraction (Back, 1951). The three person groups then discussed among themselves their predictions. This discussion period constituted the conformity pressure segment of the experiment. After this influence period, subjects gave a second prediction. A week later, each subject met individually with a paid confederate who was instructed to challenge the subject's prediction. This segment was intended to test the retention of the social influences in the absence of the group itself. Compared with the low attraction group, the high attraction group showed a convergence of opinion and had a greater proportion of subjects who had originally disagreed with the group change toward the group norm. Furthermore, in the absence of the group itself, high attraction

agreeing or mildly disagreeing group members showed more enduring group influence in challenges by the paid confederate.

Other evidence that group cohesiveness increases conformity was presented by Lambert and Lowy (1957). Subjects were assigned to groups together with high or low acquaintance others. Subjects then filled out a section of a three-part attitudinal questionnaire in each of these situations: alone before the experiment, together in the presence of the group but without any interaction, and after a group discussion of the items on the questionnaire. Each person's conformity to the group was assessed by the degree of his or her regression toward the group mean. Lambert and Lowy (1957) found that, compared with the low acquaintance subjects, high acquaintance subjects showed a greater and significant reduction in variability from the alone to the together responses, and from the alone to the discussion responses. Based on these results, the investigators concluded that the low acquaintance subjects were not attitudinally perturbed by the presence or discussion of others and did not perceive any gain from modifying their attitudes, whereas the high acquaintance subjects perceived some gain from conforming.

An investigation by Kiesler and DeSalvo (1967) also supports the notion that group cohesiveness increases conformity. Subjects in groups were asked to evaluate two tasks and indicate which one they preferred. Then, either high or low attraction was induced in the subjects. Next, the experimenter announced that most of the group had chosen the task opposite to the one that the subject reported preferring. After more procedures, ratings of the tasks were taken again. Results indicated

that the greater the attraction to the group, the more the subject's second opinion of the task was influenced.

Kelley and Volkart (1952) also found that the greater the valuation (or attraction to group), the greater was the resistance to counternorm influence. Pre-manipulation opinion was assessed in Boy Scout groups. Then, the boys heard a statement by a guest speaker that was opposite to the group's assumed stance on a particular subject. Post-manipulation opinion was assessed for change in the direction of the statement. When the subjects were told that their answers were not to be revealed to the rest of the group, the greater the subject valued his Boy Scout membership, the less he reported a change in opinion in the direction of the speaker. In fact, those subjects who placed the highest value on Boy Scout memberships showed post-manipulation opinions that became more extreme in the direction of the Boy Scout norm.

Evidence Supporting a Curvilinear Relationship between Group Cohesiveness and Conformity

Two studies by Kiesler (1963) and Kiesler and Corbin (1965) support a U-shaped relationship between attraction to group and conformity. After a group discussion on baseball, subjects were asked via questionnaire what they believed would be the final ranking of National League baseball teams. Subjects were then given bogus feedback giving the alleged consensus of the final rankings that was in disagreement with the subjects' opinions. After more discussion, the subjects were again asked to predict the team rankings. Conformity was assessed by change in opinion to be more aligned with the bogus consensus. Attraction to the group was induced by perceived acceptance.

Those subjects in the high attraction condition were informed that they were highly accepted by the group. Those subjects in the low attraction condition were informed that they were not well accepted by the group. This manipulation was successful; subjects told that they were highly accepted reported more attraction to the group compare with those who were not accepted. The highest conformity rates were found in subjects who had been induced to have the highest attraction to the group. The second highest conformity rates were found in subjects who had been induced to have the lowest attraction for the group. Those medium in attraction showed the least conformity. Kiesler (1963) concluded that the relationship between attraction to the group and conformity to its norms was a curvilinear one, with the highest conformity rates at the high and low ends of attraction. Kiesler (1963) proposed that in conditions where it is difficult for a person to leave a situation, people who are not attracted to the group (because they are not accepted) try to improve their lot by conforming in order to get the group to accept them.

In a study using a similar procedure, Kiesler and Corbin (1965) found that commitment to continue as a group member mediated the attraction-conformity relationship. When subjects were not committed to continue in the group, there was a monotonic relationship between attraction and conformity to group norms. However, when subjects were committed to continuing as a member, the less the subject was attracted, the less he conformed, down to a point, after which the less attracted the greater the conformity. In addition, after conformity, low attraction subjects increased their attraction to the group.

One observation must be noted in the Kiesler (1963) and the Kiesler and Corbin (1965) investigations. To manipulate attraction, subjects received bogus approval or acceptance ratings allegedly from the other group members. Although the resulting attraction to the group was as expected (greater approval, greater attraction), the conditions of manipulated acceptance did not appear to affect conformity rates independently of attraction. However, later studies by Dittes and Kelley (1956) and Jackson and Saltzstein (1958) found that low group acceptance increased conformity behavior.

Relevant to the issue of group acceptance is Hollander's (1958) concept of "idiosyncrasy credit." Idiosyncrasy credit is the extent to which one's idiosyncrasy (deviating) behavior is allowed before the group applies sanctions. Hollander (1958) proposed that conformity to the group increases status and increases idiosyncrasy credits. Those members who are highly accepted (i.e., leaders and others of high status) accrue credits through their contribution to the group. Assuming a member is aware of how much credit he or she has with the group, the individual may perceive more freedom to deviate from the group and, therefore, may show less conformity. It is clear that the variable of acceptance affects conformity behavior in and of itself.

Schroder and Hunt (1958) presented some indirect evidence that attraction to group is related to conformity with the group. Among subjects who yielded to the group on occasions when the group answer was highly discrepant from their own, significantly greater devaluation of their own performance resulted when they were criticized by an attractive versus a non-attractive source.

Evidence Not Supporting a Relationship between Group Cohesiveness and Conformity

Based on the above findings, one might conclude that increasing group cohesiveness increases conformity pressures on group members. However, several other studies have found negative results. Bovard (1953b) found that stable groups showed greater convergence of opinion on the number of dots in a figure than did temporary groups, but the stable group did not show convergence in the estimations of the length of a green triangle. Furthermore, in a later similar study of units of 5-13 persons, Bovard (1953a) found a negative and non-significant correlation between liking for group and conformity.

Downing (1958) examined the relationship between cohesiveness and group influence in an autokinetic effect paradigm based on Sherif (1935). Subjects first were tested individually for estimates of perceived light movements. Groups of one true subject and two confederates were made up for the second session. Both confederates were trained to give estimates either consistently greater (positive induction) or lesser (negative induction) than those given by the subject. Furthermore, the groups were divided between those receiving instructions resulting in high and low attraction (Back, 1951). Contrary to what would be expected based on the highly similar Schachter, Ellertson, McBride, and Gregory (1958) study, the low cohesive subjects were influenced to a greater extent compared with the high cohesive groups.

Also not supportive of a relationship between group cohesiveness and conformity are the results of a study by Walker and Heyns (1962).

Subjects were presented with information of the life of "Johnny Rocco," and were asked by questionnaire about their opinion of whether he or his environment should be to blame for the crime he committed. Subjects then were instructed in a manner to induce high or low attraction toward the group based on Back (1951). In a modified Crutchfield paradigm, subjects listened to the alleged opinions of the three other subjects present at the time before giving his own (in actuality, the opinions heard had been pre-recorded). Contrary to what studies of pressures to uniformity found, low attraction subjects conformed more to the perceived group norm than did high attraction subjects.

In the first of two studies by McKelvey and Kerr (1988), groups of four strangers or four friends made judgments about the presence or absence of tones with static noise. Subjects among strangers were more likely to conform to the group judgment than subjects among friends. In the second study, using the autokinetic effect, McKelvey and Kerr (1988) varied both the group size (either two or six) and the stranger/friend relationship and found that, although either variable alone did not show a significant main effect on conformity, the interaction was significant. Although a subject is equally as likely to conform with one stranger or friend, the subject is more likely to conform among five strangers than five friends. Based on these studies, one may reach the entirely opposite conclusion, i.e., not only is high cohesiveness unrelated to increased conformity, but low cohesiveness increases conformity.

The equivocality of the findings may stem from the notion that whether or not cohesiveness affects compliant behavior from members

depends on the relative strengths of forces corresponding to a person's own needs and induced forces (Festinger, 1953). In situations where a member has little or no preference of a behavior alternative to the one advocated by the group, increasing the group's induced forces, or increasing the cohesiveness of the group, does little to increase the likelihood that the person will adopt the norm behavior. Because the induced forces have little own forces to overcome, there is a ceiling effect, over which increasing strength of force has no additional effect. However, in cases where a person has moderate or strong preference of a behavior alternative to the one advocated by the group, increasing the group's induced forces will increase the likelihood that the person will adopt the norm behavior.

Festinger (1953) further noted that conformity is not a homogeneous phenomena, and that public conformity can occur, with or without private acceptance of group norm. In predicting in which situations public conformity is and is not consistent with private acceptance, Festinger (1953) postulated two categories of induced forces: 1) those that corresponded to rewards of conformity (such as establishment of social reality, attainment of personal goal, social esteem), and 2) those that correspond to threat or punishment in deviation (such as loss of validation of social reality, loss of personal goals, ridicule from others). (These two categories of induced forces are hereafter referred to as ORC, "offers of reward for conformity [or compliance]" and TPN, "threat or punishment for non-conformity [or non-compliance]"). Festinger (1953) held that in groups where induced forces were of ORC, public acceptance would be accompanied

by private acceptance. In groups where induced forces were of TPN, public acceptance would not be accompanied by private acceptance.² Festinger (1953) further indicated that this latter situation would arise only in situations where members are constrained from leaving the group. Because of its special significance to the proposed work and to its potential application to space crews, this point is addressed in more detail below in the context of stress consequences.

Extrapolating from the findings of pressures to uniformity, these two forces may be linked to group cohesiveness in the way that other social influences are; that is, greater group cohesiveness is associated with greater group influences. Therefore, it may be hypothesized that greater cohesiveness is associated with greater offers of rewards for conformity and threats or punishment for non-conformity. However, it is important to realize the implications of what Festinger (1953) proposed, that there exist social forces that increase with group cohesiveness but have differing consequences for conformity, and that in different situations (e.g., in isolated and confined environments compared with a typical workplace) may vary in intensities and relative strength. Furthermore, the group cohesiveness-conformity relationship may be modified by the relative predominance of ORC or TPN in the particular situation.

The propositions of the existence of ORC and TPN were derived from his theoretical works, but Festinger (1953) did not present direct evidence of their effect. Later, Festinger (1957) summarized previously

²This is not to say that ORC and TPN operate in a different manner. Festinger proposed that they do operate in the same way, but in this instance (where members cannot leave the group), ORC and TPN have different consequences.

unpublished investigations that demonstrated that the offer of rewards for compliance or threat of punishment for non-compliance results in forced compliance, i.e., when someone "goes along with the group" but still adheres to one's original private opinion. Furthermore, Festinger (1957) proposed that this situation produces dissonance. However, the inconsistencies producing dissonance are different for those individuals who outwardly comply with the group and for those who do not comply. In the first instance, cognitions about one's true opinion are at odds with the knowledge of one's compliant behavior. In the second instance, one's cognitions about possible rewards lost or punishments incurred are at odds with one's non-compliant behavior.

While in both instances dissonance is experienced, they also differ in the relationship between the magnitude of dissonance and the magnitude of the reward offered and punishment threatened. Among those who comply, increasing the possible reward or punishment should decrease the dissonance. The greatest dissonance occurs at ORC or TPN levels that slightly exceed the level at which the individual complies. Maximal opinion change toward the group occurs at this point. In contrast, among those who do not comply, increasing reward or punishment (i.e., ORC or TPN) should increase dissonance, with the greatest dissonance occurring at ORC or TPN levels slightly less than those at which the individual complies. At this point, there is a "boomerang" effect where belief in original opinion increases. Festinger (1957) cited and further analyzed the study by Kelman (1953) as support for his assertions, demonstrating that for compliers there is a negative

relationship between reward offered or punishment threatened, but for non-compliers the relationship is positive.

Other investigators who studied the relationship between group cohesiveness and conformity also report results that are consistent with the presence of ORC and TPN as important modifiers of the group cohesiveness-conformity relationship (Dittes & Kelley, 1956; Jackson & Saltzstein, 1958; Kiesler, 1963; Kiesler & Corbin, 1965; Thibaut & Strickland, 1956; Walker & Heyns, 1962; Wilson, 1960). That is, the group cohesiveness-conformity relationship was modified by what subjects believed were the rewards for complying or the punishments for non-compliance. Support for the existence of ORC come from findings from investigations that indicate that the relationship of group cohesiveness to conformity is modified by acceptance by the group (Jackson & Saltzstein, 1958), whether or not conformity would lead to greater liking by the group (Walker & Heyns, 1962), and whether or not conformity would lead the group as a whole to be rewarded (Thibaut & Strickland, 1956). In general, yielding or independence was influenced by whether or not conformity would result in greater popularity (Wilson, 1960).

Support for the existence of TPN comes from the findings that the relationship between group cohesiveness and conformity is modified by the opportunity or ability of subjects to leave the group (and thereby escape punishment) (Kiesler, 1963; Kiesler & Corbin, 1965), and the subject's belief that disagreement with the group is equivalent to potential rejection (Wilson, 1960, Dittes & Kelley, 1956). Clearly, how group cohesiveness affects member conformity is partly determined by

what the member believes is the outcome of conformity or non-conformity, especially in terms of the group reaction. The belief can be assumed to be a function of individual characteristics, context, and the rewards and sanctions the group has formally or informally put in place. Therefore, any study examining the effect of group cohesiveness on conformity must take these factors into consideration. Although, as outlined above, there has been substantial evidence of the importance and influence of the concepts of ORC and TPN, there has yet to be a direct test of their impact on the cohesiveness-conformity relationship. It is possible that these two understudied constructs are key determinants to conformity in groups.

ORC, TPN, and Subsequent Conformity

Experiencing actual rewards or punishments for conformity or non-conformity may affect the likelihood of conformity in later situations. As an example, a person may be rejected by the group because of deviance. If that rejection is experienced as punishing, in the next occasion that arises calling for conformity, the individual may try to conform more than before to try to avoid a repeat punishment. If, however, the rejection is experienced as liberating, then the individual is less likely to conform in a future situation. The past experience of the consequences of conformity or non-conformity influences current perceptions of the possible rewards for conformity or punishments for non-conformity. The current perceptions should, in turn, influence conformity behavior.

Another way past offers of rewards for conformity or threat of punishment for non-conformity affect subsequent behavior is through

effects on cohesiveness. Festinger (1953) proposed that application of TPN results in decreased group cohesiveness. Avoidance of punishment induces forces directed away from the group. That is, attraction to the group may be decreased in order to avoid the threat of punishment. Changes in cohesiveness may result in changes in the extent of influence a group has over members and, therefore, should affect conformity behavior. Therefore, TPN or actual rejection from a group may decrease attraction to the group, and possibly alter the likelihood of conformity.

Stress

Overview and History of the Stress Concept

In contrast to the relatively neglected areas of group cohesiveness and conformity, research on stress is currently pervasive. As there are several recent reviews of stress available (Baum & Singer, 1987; Monat & Lazarus, 1990; Levine, 1986; Johnson & Anderson, 1990; Asterita, 1985; Everly & Sobelman, 1987), only a brief summary is presented here.

Cannon (1929) is credited with the earliest research on stress. His book, Bodily changes in pain, hunger, fear and rage, details the work conducted in the Harvard Physiology laboratory and in collaboration with others around the world. The preface of the first edition states "A group of remarkable alterations in the bodily economy have been discovered, all of which can reasonably be regarded as responses that are nicely adapted to the individual's welfare and preservation" (p.vii). The investigation results indicated that: 1) adrenal secretion was increased under emotional excitement, and 2) primarily consequent to

the adrenal release there are several physiological responses: increases of blood sugar, improved contraction of fatigued muscle, increased coagulation time, and an increase in red blood corpuscles. Cannon (1929) interpreted these changes as resulting from the evolutionary pressures of survival. Taken as a whole, these changes were an effective means by which one could prepare for the "fight or flight" to survive.

Whereas Cannon (1929) emphasized the adrenin (adrenalin, epinephrine) actions as critical to the bodily response to stress, Selye's (1956) conceptualization of stress emphasized the role of the corticosteroids and resulting physiological response. Based on his work on numerous different physical stressors (cold, heat, exercise, fasting, infection), Selye (1956) concluded that, regardless of source, exposure to stress resulted in a triad of changes: adrenal enlargement, gastrointestinal ulcers, and thymicolymphatic shrinkage. As objective measures of stress, these changes became the basis of his stress concept, specifically that stress is the non-specific response of the body to any demand. Furthermore, Selye (1956) formulated the concept of the General Adaptation Syndrome (GAS) response to stress. The GAS consists of three sequential stages of response to stress: an initial alarm reaction, followed by a stage of resistance, and if stress is prolonged, a third stage of exhaustion.

Mason (1974, 1975a, 1975b) challenged the notion of the non-specific nature of stress. Based on multihormonal experiments on primates, Mason (1974) presented evidence that different stressors resulted in different hormonal profiles. Furthermore, he asserted that

the non-specificity of response to diverse stimuli was in all probability the result of the psychological experience of stress common to all of them. Mason (1975b) went on to emphasize the importance of the psychological dimension in the experience and response of stress.

The extension of stress variables into the cognitive dimension as well as greater attention to individual differences was largely a result of the work on appraisal of Lazarus and colleagues (Lazarus, 1966; Lazarus & Opton, 1966; Monat & Lazarus, 1990; Lazarus & Folkman, 1990). Stress is proposed to have three processes consisting of threat, a state in which a person anticipates harm, appraisal, processes in which the person evaluates cues to assess future conditions, and if a stimulus has been appraised as threatening, the coping processes are commenced to reduce or eliminate the anticipated harm. The cognitive style that an individual uses in these processes determines whether or not one stimulus or another is stressful. In addition, Glass and Singer (1972) found that cognitive control over a source of stress also determines a person's response to stress. Glass and Singer (1972) found that perceived controllability and predictability facilitated adaptation to a noise stressor as well as lessened the performance decrements after the stress.

Current Conceptualizations of Stress

Current stress investigations conceptualize stress as processes involving environmental and social context, genetic and individual differences, system wide responses in the behavioral, psychological and physiological realms, their mechanisms and mediators (Baum, Grunberg, & Singer, 1982; Baum, Davidson, Singer, & Street, 1987; Singer & Davidson,

1990; Everly, 1987; Eichler, Silverman, & Pratt, 1986). Investigators have strongly advised a multilevel assessment of stress using self-reports, behavior, psychophysiological, and biochemical indices (Baum, Grunberg & Singer, 1982; Grunberg & Singer, 1990). This multilevel and multimodal approach is evident in the definition of stress by Baum (1990) as a negative emotional experience accompanied by biochemical, physiological, and behavioral changes directed toward adaptation either by manipulating the situation to alter the stressor or by accommodating to its effects.

Conformity and Stress

Stress Response Indices

The stress response can be measured at several levels each of which provides an index of the phenomenon. A person may report through questionnaire or verbal statements that he or she is experiencing negative moods or emotions such as anxiety or fear. Biochemically, stress can be indexed by increases in blood and urine catecholamines and cortisol (Baum, Grunberg, & Singer, 1982; Grunberg & Singer, 1990), following from Cannon (1929) and Selye (1956). In addition, measurement of plasma free fatty acid (FFA) have been used as an index of autonomic arousal based on the evidence that in fasted non-exercising humans, that levels of FFA increase under psychological arousal (Bogdonoff & Estes, 1961). Perhaps the most popular psychophysiological index of stress are electrodermal (galvanic skin response, skin conductance level) and cardiovascular measures (Blascovich & Kelsey, 1990; Contrada & Krantz, 1988; Fowles, 1986; Kasprovicz, Manuck, Malkoff, & Krantz, 1990; Krantz, Contrada, Hill, & Friedler, 1988; Papillo & Shapiro, 1990), where

increasing levels or measures are indicative of a stress response. Although there appear to be several indices of stress, the most information can be obtained by using multimodal and multilevel measures that combine as many as possible into a comprehensive index of stress (Baum, Grunberg, & Singer, 1982).

Physiological and psychophysiological measures have been extensively used in stress research, but not as extensively in social situations (Blascovich & Kelsey, 1990). During the 1940s-60s, when the greatest amount of research on conformity was done, methods of assessing arousal were for the most part limited to galvanic skin response, verbal statements, self-reports of anxiety, casual observation, and in a few instances plasma free fatty acid. Invariably, only one measure at a time was included in the experiment.

In the following sections, the evidence that conformity pressures are subjectively experienced as stressful is reviewed. While singularly each study using a single stress index is not sufficient to conclude that stress is involved in a group conformity situation, together the findings are consistent: 1) conformity pressures in a small group are associated with a stress response, 2) degree of stress response may predict conformity behavior, and 3) stress response is influenced by conformity behavior.

Evidence that the Stress Response is Involved in Conformity Pressures Situations

Informal Observation and Interview Data. Several investigators have reported that a substantial number of subjects report to be experiencing stress under conformity pressures (Asch, 1956; Gerard &

Rotter, 1961; Horowitz, 1954; Tuddenham & McBride, 1959). Asch (1956) asked subjects to describe their concern or doubt over their judgments. 82% of the subjects reported concern over the disagreement with the group. Subjects also gave statements such as "It was a conflicting situation" (p. 28), "I feel like a silly fool" (p. 31), and "Thought there was something wrong with me and wouldn't want to show it" (p. 32). Statements such as these, as well as observations during the experimental and interview sessions lead Asch to describe the reactions of subjects in the following manner:

The contradictions from the majority, which first produced a series of cognitive reactions, such as perplexity and doubt about the situation at large, eventually aroused a number of emotional reactions centering around the self. As the disagreement persisted many began to wonder whether it signified a defect in themselves. They found it painful to be (as they imagined) the focus of attention, in addition to which they feared exposure of their weakness which they suspected the group would disapprove. These circumstances fostered an oppressive sense of loneliness which increased in prominence as subjects contrasted their situation with the apparent assurance and solidity of the majority (p. 32).

Other post-experiment inquiries about subject reactions are consistent with Asch's (1956) conclusions. Tuddenham and McBride (1959) reported that several subjects told the experimenter that they had felt anxiety and apprehension. Based on their observation of subjects, Gerard and Rotter (1961) described their subjects as "perturbed" (p. 571). Horowitz (1954) reported that, in response to a post-experimental questionnaire, some subjects indicated anxiety from disagreeing with the group.

These self-reports suggest that the conformity paradigm leads to negative emotions such as anxiety, concern, doubt, apprehension, or fear, all

of which may be indicative of a stress response. More objective metrics of stress were reported by several studies using electrodermal or sweating responses to the conformity pressure situation.

Electrodermal and Palmar Sweat Indices of Stress Response. Smith (1936) asked subjects about their degree of agreement or disagreement on a variety of attitude statements. Later, while subjects were instrumented to measure galvanic skin response (GSR, greater response was thought to be associated with greater emotionality), the subject was informed of his or her peer group's opinion for each of the statements, which were reportedly calculated from individual ratings. After hearing the group opinion, the subject was asked again about agreement or disagreement on the attitude expressed. Smith (1936) found that subject responses that disagreed with the group opinion were accompanied by greater GSR than were responses that agreed with the group opinion. Furthermore, subjects who conformed by changing their opinion to match the group showed less GSR than those who changed their opinions to go against the group.

Hoffman (1957) categorized subjects as high or low in conformity need based on questionnaire responses, and then performed an experiment based on Smith (1936). Six weeks before the experiment, each subject was asked to give their initial opinion on a number of social attitude items. During the experiment, the investigator announced the alleged norm for each of the items. After a moment the subject was asked to state agreement or disagreement with the statement. Galvanic skin responses were monitored throughout the procedure. Comparisons were made among periods where subjects' initial answers agreed and disagreed with the group norm, and where conformity did and did not occur. For high and low conformity need subjects, changing one's

answer to a conforming one produced less stress compared with non-conformity, but produced more stress compared with being in initial agreement with the norm all along. For the high conformity need subjects, the difference in galvanic skin response were significant between periods of conformity versus non-conformity and between non-conformity versus initial agreement.

Evidence that suggests that stress is important in conformity behavior was presented in a similar study by Lawson and Stagner (1957). Degree of anxiety, as measured by Palmar sweating, was assessed before and after group conformity pressures. The more initially anxious subjects shifted their opinion more than the less anxious ones, and showed greater fluctuation in sweating from pre- to post-experiment. Lawson and Stagner (1957) concluded that autonomic involvement was great under group pressure, and that the level of anxiety was an important factor in attitude shift. In another study examining electrodermal indices of stress, Costell and Leiderman (1968) found that, compared with the non-deviating subjects, deviating subjects had greater levels of arousal. Subjects who conformed during the study had arousal levels greater than non-deviating controls but less than the non-conforming subjects.

One might conclude that the experience of being under conformity pressures is stressful based on the evidence from informal observation, verbal statements, and the increase in electrodermal activity measures under group pressure. Furthermore, the evidence indicates that these emotional and electrodermal stress response indices are associated with later conformity behavior (Lawson & Stagner, 1957). In addition, conforming or non-conforming appears to influence the stress response as indicated by the electrodermal data from Costell and Leiderman (1968) and Hoffman (1957), where conformity

was found to be associated with a decrease in electrodermal activity and non-conformity with greater levels of electrodermal activity than with conformity.

Plasma Free Fatty Acid as an Index of Stress Response. In addition to observation, verbal and questionnaire self-reports, and electrodermal activity, stress response as indexed by plasma free fatty acid (FFA) has been used in the group pressure paradigm (Bogdonoff, Back, Klein, Estes, & Nichols, 1962; Back, Bogdonoff, Shaw, & Klein, 1963). One study using this technique examined the patterns of arousal throughout different levels of conformity pressures and their relation to subject conformity (Bogdonoff, Back, Klein, Estes, & Nichols, 1962; Back, Bogdonoff, Shaw, & Klein, 1963). Groups of four subjects were run in a modified Crutchfield paradigm. Free fatty acid (FFA) levels (which have been found to rise in emotional arousal to threatening situations) were assessed four times throughout the experiment. The investigators found that the rise in FFA during the pre-experimental instruction period was positively correlated with the amount of conformity in the experiment. Furthermore, the decrease in FFA during the course of the experimental period was positively correlated with the amount of social conformity. As was found in the electrodermal response measures, stress response as indexed by FFA was predictive of later conformity, and social conformity was associated with a decrease in plasma FFA.

Stress Response Modulation by Coping. Alternative methods of coping with conformity pressures may result in different patterns of stress response. For example, Festinger, Gerard, Hymovitch, Kelley, and Raven (1952) found that extremely deviant members reject the group before the group rejects them. In this instance, there should be a lessening of a stress response to deviation, because the individual does not consider the group to be a valid comparison

group. Furthermore, it is reasonable to assume that individuals who cope with conformity pressures by altering their true belief should show little if any stress response compared with individuals who wish to maintain their independence and adhere to their original opinion.

Relevant to the Festinger, Gerard, Hymovitch, Kelley, and Raven (1952) study is the work by Gormly (1971, 1984) and the difference in psychophysiological response in several different styles of coping with disagreement. Gormly (1971, 1984) identified subjects on the basis of their responses to disagreement: those who conformed, those who tended to underrecall degree of disagreement, those who rejected the disagreeer, and those who devalued the importance of the situation. Based on galvanic skin response, Gormly (1971, 1984) found that physiological activation in response to disagreement was influenced by the style that the individual typically used. Underrecallers exhibited the lowest arousal pre-session, but increased to the highest level post-session. Devaluators declined in arousal throughout the session, and had the lowest post-session level of arousal. Rejectors had the lowest arousal levels pre-session, and increased toward the end of the session. Based on the findings reported by Gormly (1971, 1984), differences in coping responses to disagreement with the group may result in differences in psychophysiological arousal measures.

Asch (1956), based on informal observation of 123 subjects, also reported that the stress perceived and the way in which an individual dealt with the stress influenced his or her conformity behavior.

What can be said concerning the reality value of the situation? For most it was a situation of appreciable tension, although there were important differences in responsiveness to the majority. Some felt the conflict more keenly than others; divergences in this

respect may have been significantly connected with independence and yielding (Asch, 1956, p.35).

Effect of Stress on Conformity

Singer (personal communication, January 12, 1993) compared the rates of conformity in an Asch-Crutchfield paradigm under different conditions of physiological arousal induced by injections of epinephrine. Following the paradigm of Schachter and Singer (1962), there were three conditions: 1) Epinephrine Informed (Epi Inf) where subjects were injected with epinephrine and were also lead to expect the attendant symptoms of pounding heart, flushing, etc., 2) Epinephrine Ignorant (Epi Ign) where subjects were injected with epinephrine, but were not lead to expect the attendant symptoms, and 3) Placebo, where subjects were given a placebo injection and were not lead to expect any symptoms. In the Epi Inf and Placebo conditions, about one-third of the subjects were classified as conforming, similar to the rates found by Asch (1956). In the Epi Ign condition after the first critical trial, subjects tended to polarize into those who never conformed and those who conformed on every trial. Singer interpreted the results to indicate that, during the first critical trial, the unexplained arousal of the Epi Ign subjects induced a decision to conform or not conform for the duration of the experiment. The subject then conformed or remained independent in accordance with that first decision, regardless of the stimuli presented. In contrast, Singer proposed that subjects in the Epinephrine Informed or Placebo conditions made the decision to conform or not each time the stimuli was presented. While the proposed experiment is not designed to directly examine these effects, the findings of the Singer experiment must be kept in mind, and

the possible role of stress response in determining the pattern and process of conformity will be examined by post-hoc analyses.

Stress and Conformity and "Diffusion of Responsibility"

The findings in the bystander intervention in emergencies studies (Darley & Latané, 1968; Latané & Darley, 1968) also are relevant to the relationship between stress and conformity. The basic finding in these paradigms is that in a non-responding (to the emergency) group, a person is less likely to respond compared with when he or she is alone. This response is attributed to two reactions by the person to the group: 1) social influence concerning the interpretation of the importance of the situation, and 2) diffusion of responsibility, that is the notion that "I am not acting, but neither are they. If something negative happens because of inaction, I am not totally to blame!" Conformity to the group, that is, following the group's inaction, can lessen the stress of perception of an emergency situation. Acceptance of the group norm that there is nothing to be worried about may in and of itself be stress reducing. Furthermore, acceding to the group results in diffusion of responsibility and a reduction in anticipated punishments or negative consequences for not responding to the situation.

Summary: Stress Response and Conformity Pressure

The above findings suggest that negative emotions and stress responses are associated with deviation from the group (Asch, 1956; Gerard & Rotter, 1961; Hoffman, 1957; Horowitz, 1954; Smith, 1936; Tuddenham & McBride, 1959), the degree of stress response early in the experiment is predictive of the degree of conformity behavior during the course of the experiment, and degree of social conformity is correlated with degree of stress response reduction (Bogdonoff, Back, Klein, Estes, & Nichols, 1962; Back Bogdonoff, Shaw, &

Klein, 1963; Lawson & Stagner, 1957). Based on these studies, one could hypothesize that stress is an important aspect of the psychological reaction to deviation from the group, and that conformity is a response that is made at least partially to relieve that stress. Also, the coping strategy an individual uses will influence the stress response, and the stress response itself may influence conformity behavior.

Stress and ORC and TPN

The conceptualization of the constructs of offers or rewards for conformity (ORC) and threats or punishments for non-conformity (TPN) also are relevant at this point. That is, the stress experienced upon deviation from the group is largely determined by the anticipated consequences of deviation of the group, i.e., what rewards are lost or punishments incurred. Therefore, stress, or the negative emotional experience derived from expecting aversive consequences for non-conformity, is greatly influenced by the ORC and TPN influences on the individual. Because the intensity of ORC and TPN are assumed to increase as group cohesiveness increases, stress upon deviation can be expected to increase with increasing cohesiveness. This derivation highlights the point that highly cohesive crews for example, may not necessarily be the most stress-free for all individuals. If an individual differs from the group, that individual will suffer in a highly cohesive group.

TPN and Space Crews

Also of special relevance to space crews is the derivation by Festinger (1953) concerning stress and the occurrence of public compliance without private acceptance. Festinger (1953) hypothesized that this situation will occur if the person in question is restrained from leaving the situation and

if there is a threat of punishment for non-compliance (TPN). It is readily apparent that this description applies to members of a space crew or any other confined group. Members are in the constant inescapable presence of one another (Harrison, Connors, & Akins, 1985) and are, therefore, restrained from leaving the group pressure situation, at least physically. Second, the possible perceived punishment for non-compliance with the group is extreme, i.e., estrangement from the only available source of human contact. As an example of a situation of high restraint against leaving and high threat of punishment for non-compliance, Festinger (1953) singled out the Asch (1956) experiments. And as pointed out earlier in this section, observations of 123 subjects lead Asch (1956) to believe that conformity pressures induced tension and anxiety in subjects. Based on these points, the situation of high restraint against leaving and high threat of punishment for non-compliance is stressful. Furthermore, because this situation is one that may be found in space crews in the near future, investigations of conformity pressures effects under these circumstances is relevant in order to develop countermeasures against this source of stress.

Summary of Group Cohesiveness, Deviation, Stress, and Conformity

This survey of several broad areas leads to several conclusions: 1) there is evidence that group cohesiveness affects conformity, but this effect is not uniform across all situations or individual difference variables, 2) based on indirect evidence of the existence of the forces engendered by offers for rewards for conformity (ORC) and threat of punishment for non-conformity (TPN), Festinger's hypotheses identifying in which situations there is a group cohesiveness-conformity relationship requires more direct investigation, and 3) there is evidence that the experience of stress is integral to the

experience of conformity pressures, and is a factor to be considered in predicting behaviors of yielding or resistance.

The literature is lacking in several respects: 1) there exists no integrated theory relating the multitude of individual difference and situational factors to conformity and the experience of stress, 2) there exists no direct test of Festinger's constructs of ORC and TPN factors important to group influence, 3) beyond the initial investigations of stress under group pressure, almost exclusively through self-report and electrodermal measures, there need to be more sophisticated examinations of the other physiological stress responses such as in the hormonal and cardiovascular systems, and 4) there needs to be a more thorough investigation of the influence of stress on yielding and independence behavior using these different stress indices. Therefore, investigations need to consider individual differences in conjunction with situational factors, especially the group influence factors of ORC and TPN. Multimodal and multilevel indices of stress response should be used as well, in order to better characterize the stress experience and the association between stress response and conformity.

Purpose of the present experiment

The purpose of the proposed work was to investigate how group cohesiveness affects the probability of conforming in a situation configured according to Festinger's (1953) formulation of conditions in which this relationship should exist. In addition, the proposed work examined how the threat of punishment for non-conformity also affects conformity. In addition, the experiment examined the stress response arising from being the different one in the group, and how that stress related to consequent conformity or resistance behavior.

Hypotheses

Specific hypotheses were:

1. Deviation from the group is stressful.

This hypothesis was based on the evidence presented in the conformity and stress section (Asch, 1956; Tuddenham, 1959; Smith, 1936; Lawson & Stagner, 1957; Bogdonoff, Back, Klein, Estes, & Nichols, 1962; Back, Bogdonoff, Shaw, & Klein, 1963; Janis, 1954; Hoffman, 1957). Deviations from the group can then be expected to be associated with a change toward greater negative mood and symptomology in self-report indices related to stress, such as the Profile of Moods States (Lorr & McNair, 1988), and the Symptom/Emotions Checklist (Pennebaker, 1982). Deviations from the group also can be expected to be associated with increases in indices of sympathetic activity reflecting stress, specifically in urinary cortisol, and in heart rate and blood pressure.

2. Conformity is a response made to reduce stress, and conformity is accompanied by a reduction in stress.

This hypothesis was based on several studies (Bogdonoff, Back, Klein, Estes, & Nichols, 1962; Back, Bogdonoff, Shaw, & Klein, 1963; Janis, 1954; Hoffman, 1957) that found that non-conformers showed greater stress responses than conformers, and that the stress response decreased after a person conformed to the group.

3. The greater the initial stress experienced upon deviation, the more likely conformity behavior will occur.

This hypothesis is a corollary to the previous two. If deviation is stressful, and conformity can possibly reduce the associated stress, then the greater the stress the greater the likelihood that a person will conform.

This hypothesis is supported by findings on conformity and stress arousal as indexed by palmar sweat and plasma FFA (Lawson & Stagner, 1957; Bogdonoff, Back, Klein, Estes, & Nichols, 1962 and Back, Bogdonoff, Shaw, & Klein, 1963.

4. The greater the degree of threats of punishment for non-conformity (TPN), the greater is the stress response upon deviation.

This hypothesis was based on the findings that threat or anticipation of aversive events evokes a stress response (Lazarus & Opton, 1966) and that the greater the threat, the greater will be the stress response.

5. The greater the degree of threats of punishment for non-conformity, the greater the likelihood that a person will conform.

This hypothesis is a corollary to hypotheses 3 and 4. If greater TPN is associated with a greater stress response in deviation, and a greater stress response is associated with a greater likelihood of conformity, then greater TPN will result in a greater likelihood for conformity.

6. Increased group cohesiveness is associated with increased ORC and TPN.

This hypothesis is an extrapolation from the notion that, in general, the greater the group cohesiveness, the greater will be the overall influence of the group on the members (Cartwright, 1968).

7. Increased group cohesiveness is associated with increased stress responses upon deviation.

This hypothesis was derived from hypotheses 4 and 5. If it is true that increases in TPN result in greater stress upon deviation and that increased group cohesiveness increases TPN, then increased group cohesiveness should increase the stress of deviation from the norm.

8. Assuming that the necessary conditions as outlined by Festinger (1953) are present (moderate or strong preference of a behavior alternative to the one

advocated by the group), then increasing group cohesiveness should increase conformity.

This hypothesis was derived from hypotheses 3, 6, and 7. If it is true that increased cohesiveness results in increased ORC, TPN, and stress upon deviation, and these factors are associated with increased conformity, then greater cohesiveness should result in greater conformity.

Two notes must be made about these hypotheses. First, it is unclear whether increasing cohesiveness together with increasing TPN should have additive or interactive effects on conformity or stress experience. Second, conforming or independent behavior appears to be established early under group pressure, and is consistent throughout the experiment (Asch, 1956). In addition, it is the initial level of stress that has been predictive of conformity behavior (Lawson & Stagner, 1957; Bogdonoff, Back, Klein, Estes, & Nichols, 1962 and Back, Bogdonoff, Shaw, & Klein, 1963.) Therefore, the relationships outlined in these hypotheses should be strongest in, but not limited to, the early phases of the group pressure session.

The Potential Relevance of this Study to Space Mission Operations

The study of group cohesiveness, conformity, and stress is important to manned space missions in several ways: selection, training, mission support, and intervention. Knowledge in these areas is relevant to decisions about the criteria for selection of crews, and how these groups should be trained with regard to psychosocial skills (Harrison, Connors, & Akins, 1985; Kanas, 1985). In addition, insight into the relationship between conformity and group cohesiveness is important to design the decision making policies, including the division of command between the crew and mission control. Furthermore, policies regarding procedures during crew conflicts or disagreements, or

punishments or incentives for behaviors would be better guided by information about group cohesiveness, conformity, and stress (Bormanis & Logsdon, 1992).

Inasmuch as performance is affected by stress (Kantowitz & Sorkin, 1983), personnel should be aware of those possible sources of stress including those that arise in group situations. Psychosocial stress as was studied in the present work also is relevant to concerns of astronauts' health because stress affects health (Selye, 1978; Baum & Singer, 1987; Gatchel & Baum, 1983; McCubbin, Kaufman, & Nemeroff, 1991). Finally, an understanding of the multilevel stress response may be useful in diagnosis of potential psychosocial problems. As the Mason (1974) and Mason, Mahrer, Hartley, Mougey, Perlow, & Jones (1976) results highlight, there may be distinguishable physiological profiles resulting from different stressors. If this is the case, then stress response indices may be useful to identify appropriate medical psychological intervention.

METHODS

Overview

The present experiment examined hypotheses 1-8, and specifically the Threat of Punishment for Non-conformity (TPN) type of group influence. Focus on TPN was chosen because of Festinger's (1953) postulate that in groups where members cannot easily leave (such as those in space capsules), TPN forces have important consequences on conformity behavior. The overall purpose of this experiment was to examine the hypothesis that increased group cohesiveness and TPN increases stress responses and tendencies to conform to the norm. Specifically, compared with those in the Low Group Cohesiveness conditions, subjects in the conditions of High Group Cohesiveness or TPN should show a greater increase in pre-to post-conformity pressure measures of negative moods, emotions, symptomology, urinary cortisol, and greater heart rate and blood pressure throughout the session. In addition, the subjects in the High Cohesiveness and TPN conditions should show higher conformity rates.

Before the laboratory experiment, subjects were mailed several questionnaires including a "Cognitive Style and Personality Questionnaire" (CSPQ, see Appendix II), that asked subjects their opinions how best to describe a series of pictures, and a "Potential Group Members Preference Questionnaire" (PGMPQ, see Appendix III). Answers to the CSPQ questionnaire constituted the subjects' opinions before exposure to group pressure, and also were used to manipulate TPN. The PGMPQ was used to manipulate group cohesiveness.

The experimental session itself consisted of two components. The first exposed each subject to the other group members' alleged answers on the CSPQ. Through this procedure, the subject learned that most of the opinions of the others unanimously opposed the subject's own responses. The second component consisted of asking the subject to answer again the same questions to which he or she had previously responded. Any change in answers was considered to be in response to group pressures. Throughout the experiment physiological measures (i.e., heart rate, blood pressure, urinary biochemicals) were recorded to evaluate the subject's stress response to the group pressure situation. Subjects were led to believe that they participated as part of a group. In the actual experiment, however, only the individual was run.

Design

A 2x2 factorial design was used crossing two levels of cohesion, high (HC) and low (LC), and two levels of TPN, high (HT) and low (LT) (see Figure 1). Cohesiveness was manipulated by providing some demographic information on other subjects, and having the subjects rank their choices of fellow group mates³ (see Appendix III). HC subjects were told in the experimental session that the responses that they were reading were from persons whom the subject ranked as highly preferred for fellow group members. In addition, following from Back (1951), HC subjects were informed that based on the questionnaires mailed in, the group was highly compatible (see Appendix IV). LC subjects were told in the experimental session that the responses that they were

³This procedure makes attraction to individuals in a group equal to the attraction to the group, although there may be differences between the two situations. No formal attempt was made to record on what basis people were chosen, but it must be recognized that selection of fellow group members in real life will likely take into account anticipated competence in group activities as well as interpersonal attraction.

reading were from persons whom the subject ranked as not preferred for fellow group members. In addition, LC subjects were informed that based on the questionnaires mailed in, the group was not highly compatible (see Appendix IV).

TPN was manipulated by group members' responses to deviation from the group, i.e., the negative consequences of being different from the group (see Appendix V). Those in high TPN had mostly negative personality characteristics associated with their deviating responses on the CSPQ (e.g., sad, negligent), while those in low TPN had mostly neutral or positive personality characteristics associated with their deviating responses (e.g., creative, good-humored).

Measures

Group Variables

Group Cohesiveness was assessed by a self-report questionnaire based on the cohesiveness measure of Schachter, Ellertson, McBride, and Gregory (1951) and the attraction index of Byrne (1971). In general, subjects were asked to indicate their like or dislike for the members in the group, and their willingness to work with the group again. Group Cohesiveness was assessed pre- and post-conformity pressure (see Appendix VIII). Components of group influences, Offer of Reward for Conformity (ORC), and Threat of Punishment for Non-conformity (TPN), were measured by agreement with such statements as "I felt anxious about disagreeing" and "Because of my answers, the group will probably think I am abnormal" (see Appendix VIII for questions).

Individual Differences Variables

The California Psychological Inventory (Gough, 1987), the Individuation Scale (Maslach, Stapp & Santee, 1985), and the Work And Family Orientation

Questionnaire (Helmreich & Spence, 1978) were administered to assess personality variables related to conformity behavior. The Pennebaker Inventory of Limbic Languidness (Pennebaker, 1982) measured attention to physical symptoms. The Social Network Inventory (Cohen, 1991) measured social support. The individual difference variables were examined as covariates or mediators of conformity behavior and stress response (see Appendix IX for the instruments). Justifications for these measures are provided below.

Stress

Stress responses were measured as the amount of increase in autonomic, primarily sympathetic, activity as reflected in changes in urinary cortisol levels, and fluctuations in heart rate and blood pressure throughout the experiment (Baum & Fleming, 1987; Baum, Grunberg, & Singer, 1982; Baum & Singer, 1987; Grunberg & Singer, 1990). In addition, self-report measures of stress symptoms (see Appendix X) were assessed from responses on the Symptom/Emotion Checklist (Pennebaker, 1982) and the Profile of Mood States, Bi-Polar Form (Lorr & McNair, 1988).

Conformity and deviance behaviors

Conformity was assessed by comparing answers pre- and post- exposure to the groups unanimous answers, and self-reports of confidence in those responses. In addition, experimenter-derived questionnaires assessed manipulation effectiveness, suspicion, and emotional and cognitive reactions to being a deviate.

Procedure: Pre-experiment

Subjects

Healthy men and women aged 18-45 were recruited. The four groups (N=92; HC/HT, n=25; HC/LT, n=23; LC/HT, n=21; LC/LT, n=24) were balanced with regard

to sex and age. There were a similar number of men and women in each group. The mean ages of subjects were, for HC/HT, 29.28 years; for HC/LT, 27.73 years; for LC/HT, 29.67 years; for LC/LT, 28.38 years. The sample size was based on the previous literature on group cohesiveness and conformity, and on a recent study conducted in this laboratory that examined responses to group dynamics variables.

Advertisements

Ads read:

Cognitive Styles and Personality: Healthy volunteers (18-45 yrs) earn up to \$45 for 3-4 hours. Call Lisa (301) 295-3263. Medical Psychology, USUHS, Bethesda.

Telephone procedure

Subjects called in and were asked by the answering machine to leave their name, number, and the best time to call back. The experimenter called to give preliminary information and to screen subjects (see Appendix I for details).

Questionnaires Mailed to Subjects' Home

Packets mailed to subjects' homes:

The subjects received at home the following forms to complete and other items:

- 1) The California Psychological Inventory (CPI; Megargee, 1977; Gough, 1988)
- 2) Individuation Scale (INS; Maslach, Stapp, & Santee, 1985)
- 3) The Social Network Index (SNI; Cohen, 1991)
- 4) The Work and Family Orientation Questionnaire (WFOQ; Helmreich & Spence, 1978)

- 5) The Pennebaker Inventory of Limbic Languidness (PILL; Pennebaker, 1982)
- 6) Cognitive Style and Personality Questionnaire (GSPQ)
- 7) Potential Group Member Preference Questionnaire (PGMPQ)
- 8) Calendar to mark possible group meeting dates
- 9) Specimen container and directions for collection and storage of morning void.

A description of each of the items follows, and a copy of each of the questionnaires appears in Appendix IX. Instructions, directions and the calendar are presented in Appendix XI.

California Psychological Inventory (CPI)

The CPI (Megargee, 1977; Gough, 1988) is a 462-item instrument based on 20 "folk concepts" such as "Capacity for Status" and "Good Impression." The scale was developed "to predict what people will say or do in specified contexts, and to identify individuals who will be evaluated and described in particular and interpersonally significant ways" (p. 4; Gough, 1988). Analyses for reliability reported in the Administrator's Guide (Gough, 1988) have shown the median scale alpha to be +0.70 among male and female subjects. Several sections of the guide are devoted to analyses of concurrent validity with other instruments and observer ratings of subject behavior, however, no overall coefficient or coefficients are reported. The CPI was chosen for the proposed work based on the findings that certain subscales (i.e., Capacity for Status, Dominance, Responsibility) have been found to be associated with conforming behavior (Crutchfield, 1955; Harper, 1964; Hase & Goldberg, 1967; Tuddenham, 1959).

The Individuation Scale (INS)

The Individuation Scale is a 12-item instrument developed to assess people's willingness to engage in behavior that publically differentiates themselves from others. The reported test-retest reliability coefficient is +0.91; the internal consistency reliability coefficient was +0.84 in one sample, +0.87 in another. Validity testing showed the INS to be significantly related to a variety of measures of personal characteristics, and behaviors including conforming and dissenting behaviors (Maslach, Stapp, & Santee, 1985).

The Social Network Index (SNI)

The SNI (Cohen, 1991) assesses the number of social roles and contacts of subjects. Subjects receive a score for the number of roles (up to twelve), and the number of high contact and possible contact roles. These scores constitute a measure of social integration. Social support within a network is presumed to enhance self-esteem (Cohen, 1988) which, in turn, should decrease conformity behavior. In addition, social support may reduce the affective and neuroendocrine response to stress (Cohen, 1988).

The Work and Family Orientation Questionnaire (WFOQ)

The WFOQ (Helmreich & Spence, 1978) assesses achievement motivation and attitudes toward family and career. Scales are Work (desire to work hard), Mastery (desire for intellectual challenge), Competitiveness (desire to succeed in competitive interpersonal situations), and Personal Unconcern (akin to fear of failure). Alpha coefficients of reliabilities range from +0.50 to +0.76. The scales on the WFOQ have been related to performance in group situations (Helmreich, Wilhelm, & Runge, 1980).

The Pennebaker Inventory of Limbic Languidness (PILL)

The PILL asks subjects to report the frequency or occurrence of 54 common physical symptoms and sensations in order to assess general proclivity for reporting physical symptoms. Test-retest reliability is +0.79, internal consistency alpha is +0.88 (Pennebaker, 1982).

Cognitive Style and Personality Questionnaire (CSPQ)

These exercises were first completed at home and again in the experimental session under group pressure (see Appendix II). Subjects were given a series of pictures, and for each picture, two possible descriptions were provided. The subjects were asked to examine the possible descriptions and to assign to each of them a personality characteristic he or she associated with someone who would give that answer. Then the subject were asked to select the best description for the picture and indicate on a scale from 1 to 7 how confident he or she felt that this is the best description.

Development and piloting. The questionnaire items were designed in a way that subjects could be predicted to have a strong tendency to answer in a specific way. Based on Festinger's (1953) theory that cohesiveness will have an impact on conformity behavior only when there is a strong tendency to adopt behavior different from the group, items had one clearly correct choice of the two presented. In addition, a perceptual task was selected based on Liberman and Meyerhoff (1986) findings that greater conformity rates were found using a perceptual versus a logical task.

Based on these requirements, simple pictures based on the Gestalt laws of perceptual organization were created by the author (Block & Yaker, 1989; Ellis, 1938; Kohler, 1947; Kaniza, 1979). Designs were created using elements in a manner in which the overall picture could be described in more than one

way. Yet based on findings on human visual perception and organization (Block & Yunker, 1989; Ellis, 1938; Kohler, 1947; Kaniza, 1979), one answer would be more strongly favored.

A pool of 96 pictures was developed and given to pilot subjects (N=27, male and female, between ages of approximately 19 and 35). Pilot subjects were asked to describe each picture in their own words. From this original pool, 36 pictures in 3 categories (12 each of Dots, Stripes, Rows and Columns) were chosen if no pilot described the picture in a way that could not be predicted based on perceptual organization laws.

These 36 pictures were then tested. Pilot subjects (N=15, male and female graduate students) were given the questionnaire consisting of the series of pictures, and three possible descriptions for each. The questionnaire asked the pilot subjects to rank each of the possible descriptions from Best Description, Second Best Description, to Third Best Description. Based on the responses, four from each of the three categories of pictures (for a total of 12), were judged to have the most predictable answers, and were chosen as the critical trials (subject is a non-conformer) of the CSPQ. For the critical stimuli, of the two choices given, only one was factually correct. This procedure was chosen to create a conflict between choosing a correct, preferred answer or an incorrect, non-preferred answer. In addition, six neutral trials (group agrees with subject) were interspersed among the 12 critical trials. Neutral trials were included to maintain credibility of the other subjects' responses. The selected stimuli appear in Appendix IV. It is assumed that for these stimuli, subjects had a strong tendency to answer in a predictable way (following from Festinger, 1953).

Potential Group Members Preference Questionnaire (PGMPO)

All subjects were provided with a bogus list of 15 other subjects and a some biographical information which was taken over the phone (see Appendix VIII). Subjects were asked to rank these subjects according to his or her preference for these persons for group mates.

Calendar of Dates

Subjects were asked to list possible dates for the following months in order to schedule the individual group discussion. This procedure was designed to increase the plausibility of the cover story, emphasizing the group discussions, and also to ease the scheduling of the individual session.

Specimen Container and Directions

Subjects received a collection container and directions for collecting urine and storage until the experiment.

Once the subject's answers to the forms were received, the subject was contacted for his or her session.

Procedure: The Experimental Session

Overview

A summary timeline is presented in Figure 2. After an introduction and informed consent was obtained, subjects were escorted to the restroom for a urine sample. Then, the Profile of Mood States (Lorr & McNair, 1988), the Symptom/Emotion Checklist (Pennebaker, 1982), and a cohesiveness questionnaire were administered in the experimental room. Heart rate and blood pressure were measured repeatedly throughout the experiment, at two minute intervals, except during instruction periods. The conformity pressures consisted of the subject reading answers allegedly from the other group members, indicating answers that were different from the subject's. The subject then was asked to

answer the same Cognitive Style and Personality Questionnaire items that he or she had answered at home, but this time under the conformity pressures of the experiment. After the subject completed the second CSPQ, the subjects were again given the Profile of Mood States (Lorr & McNair, 1988), the Symptom/Emotion Checklist (Pennebaker, 1982), and a cohesiveness questionnaire. In addition, a final questionnaire assessing perceived offers of reward for conformity (ORC) and threat of punishment for non-conformity (TPN), general reactions, manipulation effectiveness, and any suspicions about the study was completed. Following the questionnaires, a final urine sample was collected.

Physiological Stress Response Indices

Urinary Biochemical Measures. Subjects were asked to bring their morning urine samples in the specimen cups provided in the packet mailed to their home. Before the experiment, the sample was placed on ice in a prep room. After consent was obtained, the subjects were asked to completely void into a specimen cup. After debriefing, the subjects were again asked to completely void into a second specimen cup. Aliquoting procedures are described in a section below. Cortisol levels were determined by radioimmunoassay.⁴

Cardiovascular Measures. After urine was obtained, subjects were escorted back to the room and were fitted with an automatic blood pressure cuff. Subjects were given a demonstration of the inflation, then were asked to relax with the cuff on, but not inflating for ten minutes. Then a 20

⁴Cortisol was assayed using a radioimmunoassay kit from Incstar Corporation, Stillwater, MN. Urine was incubated with cortisol tracer in antibody coated tubes. After incubation, the contents of tubes were aspirated and the tube was counted. Unknown values were interpolated from a standard curve based on the competitive binding principles of radioimmunoassay.

minute baseline period began with the cuff inflating every 2 minutes. The subjects were instructed not to move during the inflation and reading period, and to refrain from moving the cuffed arm as much as possible during the experiment. Two maps were presented to the subjects as something to "look at while you're resting." The last three measures were averaged as a baseline level. For the rest of the experiment, the cuff inflated every two minutes, but no measures were recorded during the instruction phases of the experiment.

Procedure

A summary timeline is presented in Figure 2. The subject was met at the security entrance. After greeting, the subject was taken to the experimental room. Morning urine was taken from the subject and stored on ice. After a short period of acclimation, the experimenter gave a brief overview of the study, explained the consent form, requested that the subject read the form more carefully and if the subject agreed to the terms, to sign the consent form.

The subject then was escorted to the restroom and was asked to void into a specimen cup. Experimenter took the specimen cup, measured the total volume, and then pipetted a sample into an appropriately marked polypropylene test tube containing sodium meta-bisulfite as a preservative. All tubes were placed on water ice until they were stored in the freezer for later assay for cortisol. The subject then was escorted back to the experimental room and was fitted with a blood pressure cuff. The subject was given a demonstration of the inflation, and was told to relax for 10 minutes. The cuff did not inflate during this time. Bottled water was available and the subject was encouraged to drink at this point and during the experiment in order to be able to contribute to the second void. After relaxing, the blood pressure monitor

reading began to inflate every 2 minutes. The subject was instructed to remain as still as possible while the cuff inflated and when the readings were taken. The subject was then again asked to relax for 20 minutes while baseline measures were obtained. Following this phase, the instructions period began.

The script follows:

As I explained to you in our telephone conversation, we are interested in how a person thinks is associated with his or her personality. This first session is the individual "paper and pencil" session. The second session will be a group session. The groups have already been assigned. In fact, today we will have you take a look at some of your group mate's answers to the cognitive questionnaires you all filled out at home. The purpose of this is to have you match the personal characteristics measured by the personality questionnaires with the cognitive styles measured by the cognitive tasks. That is, we will have you match personalities with cognitive styles using the responses from the questionnaires they filled out at home. In the second session, we'll have subjects actually interact in a group problem solving task, so you'll get a first hand view of each other's ways of problem solving. Then you'll get the chance again to try to match personality characteristics measured by questionnaire with each of your group mates, with the thinking processes that you saw people use when your group solved the problem jointly.

Subjects were handed a reproduced copy of their original "Potential Group Member Preference Questionnaire" with three of the subject numbers and preference rankings circled. Attached to this sheet were bogus personality profiles listing a few generic characteristics such as optimism, ambition,

caution, practicality. In addition, a bogus "compatibility profile" was attached to the sheet.

You may remember that previously you ranked your choices for group mates. This was done because we'd like subjects to have their choices of group members, but this does not always happen.

HERE THE SCRIPT DIVERGED FOR THE HIGH VERSUS LOW COHESIVENESS CONDITION

High Cohesiveness:

All the members of your group indicated high preferences for each other. As you can see from your questionnaire sheet, you gave pretty high rankings to all of the other three members of your group. In addition, according to a compatibility profile, which is a composite of the personality profiles of your group (experimenter points to bogus "compatibility profile"), your group is also highly compatible. So, your group can expect to fit together extremely well.

Low Cohesiveness:

None of the members of your group indicated preferences for each other. As you can see from your questionnaire sheet, you didn't give high rankings to any of the other three members in your group. However, according to a compatibility profile, which is a composite of the personality profiles of your group, (experimenter points to bogus "compatibility profile"), your group is marginally compatible. So, your group can expect to fit together reasonably.

AT THIS POINT THE SCRIPT WAS THE SAME FOR ALL CONDITIONS

Below each of the people's background personal information, we've attached a computer profile of their personality, based on the questionnaires they filled out. These three are your fellow group members, and their

profiles: (experimenter points out profiles) Subject #18, Subject #29, and Subject #62. Now, in this pile of sheets are the copies of your group's answers to their cognitive style questionnaires, with the identifying subject numbers blotted out. As you can see, they are marked only Person A, B, C and D. You probably recognize your handwriting as Person A. So we didn't have to make up new sheets for each person in your group when you all came in for the individual session, we made just one for the four of you. Just concentrate on the last three. You will be able to look over the three answers to each of the Cognitive Style and Personality Questionnaire items, together with these personality profiles. Then I will ask you to tell me which Person B, C, or D, really is subject #18, #29 or #62. In essence you are matching answers on a cognitive task with a personality profile. Do you have any questions?

There were 18 questions, so there are 18 sheets. I'll hand you each card, one by one. I'll give you a half a minute to look at each card. Afterwards, you will give the card back to me, and I'll place them here in front of you and we'll go on to the next. When we are all done, I'll ask you to try and identify Person B, C, and D. Any questions?

One last thing, because physiological state can affect cognitions and behavior, the monitor will be taking heart rate and blood pressure measures throughout this session, just as I did earlier. And as I mentioned before, I will be asking you to contribute some urine for chemical analyses one last time when we are done with the experiment and all the questionnaires.

Okay, first please fill out these questionnaires.

The Profile of Mood States (POMS; Lorr & McNair, 1988), the Symptom/Emotion checklist (S/E Checklist; Pennebaker, 1982), and pre-experimental cohesiveness/future studies questionnaire were given. The

cohesiveness/future studies questionnaire assessed pre-experimental group cohesiveness through questions asking whether or not the subject would be willing to work again with this particular group. After a period of rest, heart rate and blood pressure measures were taken. Then, the conformity pressure segment of the experiment began. To review again the CSPQ, the subject was required to choose the best description for each of the 18 pictures, indicate a level of confidence, and for each of the choice of descriptions, write down a personality characteristic associated with persons who chose it as an answer. For each of the 12 critical CSPQ items, every subject read that all of his or her fellow group members had chosen an answer that was opposed to his or her own. For each of the 6 neutral items, every subject's response matched those of the group. The subject was not shown degree of confidence on the items. For subjects in the High Threat of Punishment for Non-Conformity (HT) condition, the personality characteristics associated with his or her chosen answers were negative (e.g., sad, incompetent). For subjects in the Low Threat of Punishment for Non-Conformity (LT) condition, the personality characteristics associated with his or her chosen answers were neutral or slightly positive (e.g., creative, moderate). These descriptions were primarily taken from an article by Anderson (1968) listing the ranking the likability of over 500 words. Furthermore, some words were piloted for positive, neutral or negative connotations (N=19, male and female graduate students). A listing of the stimuli for High and Low TPN appears in Appendix V.

Heart rate and blood pressure were measured before the sheets were presented, then after sheets #3, #6, #9, #12, #15, and after the series had

ended. The experimenter then asked the subject to match Subject #18, #29, and #62 to Person B, C, and D, in order to follow the cover story.

After this conformity pressure manipulation, the script was as follows:

Okay, for the next part, please complete the Cognitive Style and Personality Questionnaire again...

AT THIS POINT THE SCRIPT DIVERGED FOR HIGH VERSUS LOW TPN

High TPN:

...for distribution to subjects #18, #29, and #62. We have found that subjects tend to answer these questions a little differently depending on what kind of mental work they did right before, lighting conditions, whether they drank beer or smoked during completion and even their physical state. Of course, we can't control the conditions under which subjects fill out the cognitive tasks at home, so we take another measure in the laboratory. This way we know that the data were collected with subjects under similar equivalent conditions. We'll do some simple comparisons between the home and lab condition. We will also mail out a copy to your group mates, and you will receive a copy of theirs as well. We'll ask each of you to take a look at these responses on this questionnaire which we know were taken under equivalent conditions, therefore are good comparative representations of cognitive style. Then we'll ask you to based on these answers to see if there is anyone in the group that you would rather not interact with. Again, this is to increase the chance that people will actually come to the second group session, by allowing subjects to avoid people they don't think they would have good interactions with in a group problem solving session. Rejected people can be replaced with other subjects. We'll contact you to tell you whether

you'll be invited to participate in the second session, which incidentally pays \$25.

Low TPN

...for further comparison analyses. We have found that subjects tend to answer these questions a little differently depending on what kind of mental work they did right before, lighting conditions, whether they drank beer or smoked during completion and even their physical state. Of course, we can't control the conditions under which subjects fill out the cognitive tasks at home, so we take another measure in the laboratory. This way we know that the data were collected with subjects under similar equivalent conditions. We'll do some simple comparisons between the home and lab condition. We also will mail them out to compatibility specialists. We'll ask them to take a look at these responses on this questionnaire which we know were taken under equivalent conditions, therefore are good comparative representations of cognitive style. Then we'll ask them to based on these answers to see if there is anyone in the group that they feel would not interact well with you. Again, this is to increase the chance that people will actually come to the second group session, by allowing subjects to avoid people they won't have good interactions with in a group problem solving session. Unsuitable people can be replaced with other subjects. We'll contact you to tell you when we have gotten a good group to participate with you in the second session, which incidentally pays \$25.

The subject then was asked to fill out the second CSPQ. Before the subject started, a heart rate and blood pressure reading was taken. The subjects had as much time as needed to complete the questionnaire. After the completion, another heart rate and blood pressure reading was taken, then

subjects were asked to complete a POMS, the S/E Checklist, and an experimenter-derived questionnaire that included measures of group attraction and cohesiveness, ORC and TPN, and reactions to being a deviate. The measures of reaction to being a deviate were based on the work of Gormly (1971), Horowitz (1954), Asch (1956), Smith (1936), Tuddenham and McBride (1959), Wilson (1960), Schroder and Hunt (1958), and Ross, Bierbrauer, and Hoffman (1976). A "Final Questionnaire" included a manipulation and suspicion check. The subject was taken to the rest room to provide a final urine specimen. Then, back in the experimental room, the subject was thoroughly debriefed and final heart rate and blood pressure measures were made. The subject was thanked, paid \$45, and sworn to secrecy.

RESULTS

Overview

The results are divided into the following sections: Manipulation Checks; Stress Response Comparisons between Baseline and During Group Pressures; Cohesiveness, Threat of Punishment for Non-conformity (TPN) and Offers of Reward for Conformity (ORC); Conformity Behavior; Differences in Stress Response among Experimental Conditions; Associations between Stress and Conformity; Cohesiveness Differences between Yielders and Non-yielders; Coping Behavior and Stress Indices; Conformity and Individual Differences; and Confirmation of Hypotheses. All statistical analyses used a standard alpha of 0.05 for the significance level.

There were 92 subjects run in the four conditions, but there were some missing data for some of the analyses. Because of missing questionnaire items

analyses of conformity by change of answers were based on 90 subjects, and analyses of conformity by change of confidence were based on 84 subjects. Urinary cortisol measures were based on 81 subjects. All other analyses were based on 92 subjects.

Manipulations Checks

Figure 3 presents the perceived cohesiveness reported for the four experimental conditions. An ANOVA comparing self report of cohesiveness revealed a significant cohesiveness manipulation (high versus low, $F_{1,88}=28.56$, $p<0.001$). Newman-Kuels post hoc analyses revealed that the High Cohesive/High TPN subjects reported greater attraction to the group than did all the other groups, and that the High Cohesiveness/Low TPN subjects reported greater attraction to the group than did both of the Low Cohesiveness conditions. Figure 4 presents the perceived TPN reported for the four experimental conditions. There was no main effect for the TPN manipulation (high versus low) but a significant Cohesiveness x TPN interaction ($F_{1,88}=4.19$, $p<.05$) with the means in the order: Low Cohesiveness/High TPN > High Cohesiveness/Low TPN > High Cohesiveness/High TPN > Low Cohesiveness/Low TPN. The results confirm that the cohesiveness manipulation was effective, but that the TPN manipulation was only effective for the two LC groups.

Stress Response Comparisons between baseline and during group pressure

In order to test the hypothesis that deviation from the group is stressful, stress response indices during baseline were compared with those during group pressure (cardiovascular measures) and after (mood and cardiovascular). It was hypothesized that deviation is associated with increased stress. Figures 5, 6, and 7 present the cardiovascular measures pre and during group pressures. Compared with baseline, all cardiovascular

measures were elevated significantly during group pressure: systolic ($t_{91}=3.88$, $p<.001$, see Figure 5), diastolic ($t_{91}=88.30$, $p<.0001$, see Figure 6) and heart rate ($t_{91}=6.42$, $p<.001$ see Figure 7). These cardiovascular changes indicating arousal are consistent with the hypothesis that deviation from the group is stressful.

After group pressure, subjects reported that their mood was significantly more hostile ($t_{88}=3.04$, $p<.01$, see Figure 8) and more anxious ($t_{88}=2.75$, $p<.01$, see Figure 9). These negative moods are consistent with both cardiovascular indicators of the stress response and with the hypothesis that deviation from the group is stressful.

Figure 10 presents the mean degree of symptoms reported (e.g., congestion, sweating). Subjects reported less symptoms after group pressure ($t_{91}=2.08$, $p<.05$). This finding is inconsistent with the hypothesis that deviation from the group is stressful.

Cohesiveness, TPN, ORC

In order to test the hypothesis that the greater the cohesiveness, the greater the threat of punishment for non-conformity and offers of reward for conformity, correlations were computed between perceived cohesiveness (pre- and post-group pressure) and self-report of perceived TPN and ORC. There were no significant correlations between the cohesiveness and self-reports of perceived TPN and ORC. This finding is inconsistent with the hypothesis that the greater the cohesiveness, the greater the TPN and ORC.

Conformity Behavior

Conformity was assessed by comparison of the Cognitive Style and Personality Questionnaire (CSPQ) completed at home with the same questionnaire completed in the experiment. Any changes of answers or changes in confidence

were attributed to the influence of the group. Therefore, degree of conformity was assessed by number of times, out of 18, the subject changed his or her answer from the mailed-in CSPQ to that of the group in the laboratory session. In addition, conformity pressure effects were assessed by changes pre- to post-conformity pressure exposure in reported degree of confidence in answers. Because of the non-normal, skewed distributions of conformity behaviors, non-parametric statistics were used to compare conditions (Kruskal-Wallis), and to calculate correlations (Spearman Rank Order).

Change in Answers Comparing CSPQ Completed at Home and in Experiment

The number of answers changed from home to the experiment was calculated for each subject. Groups were compared based on the number of answers changed. Figure 11 presents the mean rank of these averages among groups. A Kruskal-Wallis analysis of the number of answers changed to match the group revealed a significant difference among the groups (Chi Sq=8.17, $p < .05$). The average number of changed answers follows the order: HC/HT > HC/LT = LC/HT > LC/LT. The order represented in Figure 11 is consistent with the hypothesis that the greater the cohesiveness and TPN, the greater the conformity.

Effect of Cohesiveness on Numbers of Answers Changed. The number of answers changed was collapsed across the TPN condition and compared in the High versus Low cohesiveness conditions. If it is true that the greater the cohesiveness, the greater the conformity, then the High Cohesiveness condition should show greater numbers of answers changed compared with Low Cohesiveness. Figure 12 presents the mean rank of numbers of answers changed. High Cohesiveness subjects had significantly greater number of answers changed to match the group compared with Low Cohesiveness subjects (Chi Sq=4.00, $p < .05$).

Effect of TPN on Numbers of Answers Changed. The number of answers changed was collapsed across the cohesiveness condition and compared in the High versus Low TPN condition. If it is true that the greater the TPN, the greater the conformity, then the High TPN condition should show greater numbers of answers changed compared with Low TPN. Figure 13 presents the mean rank of numbers of answers changed. High TPN subjects had significantly greater numbers of answers changed to match the group compared with Low TPN subjects (Chi Sq=4.28, $p < .05$)

Change in Confidence Comparing CSPO Completed at Home and in Experiment

Loss and gain of confidence was calculated by subtracting the confidence reported at home from the confidence reported in the laboratory. The absolute value of the result was analyzed as the loss or gain in confidence. Groups were compared on the degree of confidence changed due to group pressure.

Loss of Confidence. Figures 14 and 15 present the average total loss of confidence by the group and the average loss of confidence on unchanged items, respectively. The cohesiveness condition had no significant effect on loss of confidence; however, increased TPN was associated with increased loss of confidence. Two-way ANOVA revealed a significant effect of the TPN condition on loss of confidence on all items ($F_{1,80}=4.57$, $p < .05$, see Figure 14) and on loss of confidence on unchanged items ($F_{1,80}=3.94$, $p < .05$, see Figure 15). These results support the hypothesis that the greater the TPN, the greater the conformity; however, they do not support the same relationship with cohesiveness. Non-parametric analyses yielded the same results as the ANOVAs. A Kruskal-Wallis comparison of rank mean scores revealed a significant difference among the conditions (Chi Sq=8.58, $p < .05$, see Figure 16).

Effect of TPN. Figures 17 and 18 reveal that, compared with Low TPN, High TPN showed a greater loss of confidence. High TPN subjects had significantly greater loss of confidence for total items (changed and unchanged) (Chi Sq=6.28, $p < .05$, see Figure 17) and for answers unchanged by the group (Chi Sq=5.03, $p < .05$, see Figure 18) compared with Low TPN subjects.

Effect of Cohesiveness. There were no significant associations between Cohesiveness and loss of confidence.

Summary of Conformity Behaviors

An analysis of the number of items changed supports the hypothesis that the greater is the cohesiveness and TPN, the greater is the conformity behavior. An analysis of the loss of confidence data also supports the hypothesis that TPN, but not cohesiveness, increases conformity.

Differences among Conditions in Stress Response

Self-report of stress response was assessed by the Symptom/Emotion Checklist (S/E Checklist Pennebaker, 1982) and the Profile of Mood States, Bi-Polar Form (POMS, Lorr & McNair, 1988). The S/E Checklist consists of 12 items assessing current experience of common physical symptoms and five items assessing current emotion. Internal consistency analyses resulted in a mean alpha coefficient of +0.75. The POMS is a 72-item instrument developed to assess feelings and mood states, based on six bi-polar mood classifications. Several studies that verify the construct and criterion validity are reported in the manual, however, these data are based on the earlier mono-polar version. In addition, stress response was assessed by indices of sympathetic activation in urinary cortisol, and in cardiovascular measures of heart rate and blood pressure fluctuations.

Post-experiment POMS and Symptom/Emotions Checklist were analyzed by ANCOVA, using the first measure as a covariate. Post-experiment cortisol levels were analyzed by ANCOVA with the morning void levels as a covariate. Heart rate, systolic and diastolic blood pressure were analyzed using a repeated measures MANCOVA, and by ANCOVA on the averages during each of the phases of the experiment. The first measure or previous measure was used as a covariate for the analyses. An MRC was computed predicting conformity behavior (number of times yielding) from stress response indices (heart rate and systolic/diastolic blood pressure during the conformity pressures phase, cortisol level, pre-manipulation POMS and Symptom/Emotions Checklist).

Self-Report and Urinary Biochemical Indices of Stress

Self-Report of mood. High Cohesiveness was associated with relatively better mood both before and after the group pressure/conformity pressure situation. On the Agreeable-Hostile scale of the Profile of Moods States (POMS), there was a significant effect of cohesiveness before group pressure ($F_{1,85}=11.94$, $p<.001$, see Figure 19) and after group pressure/conformity pressures ($F_{1,88}=7.85$, $p<.01$, see Figure 20). The results were similar in the Elated-Depressed scales for before ($F_{1,85}=4.60$, $p<.05$, see Figure 21) and after ($F_{1,88}=6.00$, $p<.05$, see Figure 22) group pressure/conformity pressure. Newman-Keuls post hoc analyses revealed that the High Cohesiveness/High TPN subjects reported better mood (Agreeable-Hostile and Elated-Depressed) than did subjects in both the Low Cohesiveness conditions before group pressure. A similar pattern occurred in self-reports of Agreeable-Hostile mood after group pressure. However, in the Elated-Depressed scores, only the High Cohesiveness/High TPN condition differed significantly from the Low Cohesiveness/High TPN condition. Cohesiveness also significantly affected

Clearheaded-Confused scores on the post group/conformity pressures phase ($F_{1,88}=4.26$, $p<.05$, see Figure 23), with the High Cohesiveness condition reporting greater Clearheadedness.

That greater cohesiveness was associated with more positive mood before group pressure is not surprising. However, the continuance of more positive mood after group pressure is contrary to the hypothesis that increasing group cohesiveness increases the stress of deviation. Another unexpected finding is that greater TPN was associated with better reported mood after group pressure. An ANCOVA covarying pre-group pressure scores on the Agreeable-Hostile scale revealed a significant effect of TPN ($F_{1,84}=4.11$, $p<.05$, see Figure 20); the greater the TPN, the more agreeable the mood. This finding is certainly counterintuitive, where the more negative the description people call one, the better mood one reports.

Self-Reports of Symptoms. There were no significant differences in self-report of symptoms among the experimental conditions.

Urinary Cortisol. To minimize the circadian rhythm effect on cortisol analyses, subjects were separated into three-hour time blocks. Cortisol data were then analyzed as z-scores relative to the mean of the particular time period in which the subject was run. There were no differences in urinary cortisol among the groups.

Summary of Self-Report and Urinary Biochemical Indices of Stress

These results do not support the hypothesis that increasing cohesiveness and TPN increase the stress of deviating from the group. The surprising finding is that increasing cohesiveness and TPN appears to increase positive mood in deviation.

Differences Among Conditions in Cardiovascular Stress Indices
(systolic and diastolic blood pressure, and heart rate)

This section details comparisons of cardiovascular measures.

Cardiovascular measures are divided into three phases: baseline, during group pressure, after group pressure/conformity pressure. Three different procedures for comparisons are used. The first is a repeated measures analysis, covarying out average measures in the phase preceding the measure. The second is a comparison of changes from baseline to during group pressure, and from during to after group pressure/conformity pressure. The third is a MANOVA comparison of the average measures covarying the preceding phase's average or the immediately previous recorded measure.

There was a significant group x time interaction effect on diastolic measures during the group pressure phase, covarying the baseline average ($F_{18,528}=1.66$, $p<.05$, see Figure 24). Diastolic pressure after group pressure/conformity pressure also showed a group effect ($F_{3,87}=2.67$, $p<.05$, see Figure 24). However, this difference is difficult to interpret because of the difference in the baseline period. Figures 25 and 26 indicate that increased TPN is associated with increased heart rate measures after group pressure and conformity. There was a significant effect of TPN on the change in average heart rate during to after group pressure/conformity pressure ($F_{1,88}=5.69$, $p<.05$, see Figure 25), with the High TPN condition showing greater levels. There was also a significant TPN effect on after group pressure/conformity heart rate covarying for during group pressure such that High TPN was again associated with greater heart rate ($F_{1,87}=6.53$, $p<.05$, see Figure 26). The heart rate data support the hypothesis that the greater the TPN, the greater

the stress upon deviation, but only after conformity or non-conformity has already taken place.

MANCOVAS (covarying baseline) indicate similar effects of cohesiveness on cardiovascular measures taken after conformity took place. Figures 27 reveals a significant cohesiveness effect on diastolic pressure ($F_{1,87}=4.28$, $p<.05$) in the after group pressure/conformity pressure phase; High Cohesiveness was greater than Low.

Summary of the Cardiovascular Indices of Stress

These results support the notion that cohesiveness and TPN affect the stress of deviation, but only after the group pressure phase. The original hypothesis was that increasing cohesiveness and TPN would increase stress upon deviation (that is, during group pressure) and would, therefore, motivate or drive conformity behavior. It was not expected that effects of these variables would occur after conformity or non-conformity had already taken place.

Associations between Stress and Conformity

Across Conditions

This section details findings on the relationship between stress response (primarily cardiovascular indices of arousal) and conformity. There is support for the hypothesis that the greater the stress response upon deviation, the greater the conformity. This conclusion is evidenced by several correlations in cardiovascular response and conformity behavior as indexed by change or lack of change in answers and reported confidence.

Cardiovascular Response Correlations with Change in Answer

Average systolic blood pressure during the group pressure phase was positively correlated with number of items changed due to group influence

($r=+.19$, $p<.05$). Therefore, stress response as indexed by average systolic pressure was significantly associated with number of items changed due to group pressure. This results is as hypothesized.

Cardiovascular Response Correlations with Change in Confidence

There were several negative correlations between cardiovascular response and change in confidence. Before to during group pressure change in diastolic blood pressure was significantly negatively correlated with a general loss (on items both changed and not) of confidence ($r=-.29$, $p<.01$). Change in systolic pressure from before to during and average diastolic pressure during group pressure were negatively correlated with general gain in confidence ($r=-.21$, $p<.05$; $r=-.18$, $p<.050$). Thus, it appears that change in diastolic pressures is related to loss of confidence, whereas change in systolic pressure is related to gain in confidence. Both these relationships are negative. In contrast, the change from before to during group pressure in diastolic blood pressure was positively correlated with the number of items unchanged in answer and confidence level ($r=+.24$, $p<.01$). Thus, it appears that stress response as indexed by systolic blood pressure level is associated with number of items changed, but a change in diastolic blood pressure is associated with items unchanged.

Multiple Regression Correlation of Conformity from Mood

More negative mood appears to increase resistance to conformity pressures. Average diastolic pressure and pre- group pressure mood (Calm-Anxious) accounted for a significant amount of variance in gain of confidence in unchanged items ($R^2=.14$, $F_{2,77}=6.09$, $p<.01$). Correlations for gain of confidence with mood and diastolic pressure were both negative ($r=-.30$, $p<.01$; $r=-.21$, $p<.05$).

Comparisons of Yielders and Non-Yielders

For these series of unplanned analyses, the subject data were split based on the reasoning that there might be behavior differences between those who yielded or not and, therefore, there may be behavior-stress response differences. When a "Yielder" switches answers conformity occurs, but this conformity may be strengthened by a gain in confidence in the changed answer, or weakened by a loss of confidence in the changed answer. In contrast, a "Non-Yielder" shows no conformity by answers given, but may show some conformity by loss of confidence in original answer, or show "anti"-conformity by a gain in confidence in original opinion. Therefore, there are very different confidence changes that may take place between yielders and non-yielders, and stress responses may be differentially related.

Subjects who changed answers once or not at all are designated as "Non-yielders" (n=42) and those who changed answers more than once are designated as "Yielders" (n=48). This procedure follows from Asch's (1956) designation, and results in an approximate median split. This procedure separates out the response correlates of changing answers from those of losing or gaining confidence.

Stress Response Comparisons between Yielders and Non-yielders

Repeated measures analysis revealed several differences in cardiovascular response. During group pressure, compared with Non-yielders, Yielders show primarily elevated measures. Covarying out baseline readings, there was a significant group x time effect on systolic blood pressure ($F_{6,528}=3.87$, $p<.001$, see Figure 28). Analyses of the residuals of each time point (taking out the variance accounted for by the three baseline measures) revealed significant Yielder/Non-yielder differences at the first and last

timepoints under group pressure ($F_{1,88}=4.20$, $p<.05$; $F_{1,88}=6.93$, $p<.01$). After the conformity phase, and while covarying out the baseline, there was a significant group x time effect on systolic blood pressure ($F_{2,176}=3.81$, $p<.05$, see Figure 28) and diastolic blood pressure ($F_{2,176}=5.58$, $p<.01$, see Figure 29). Systolic and diastolic blood pressures after the group pressures/conformity pressure phase showed a significant group x time effect covarying out during group pressure measures ($F_{2,176}=3.81$, $p<.05$, see Figure 28; $F_{2,176}=5.58$, $p<.01$, see Figure 29). There was a significant main effect for group in heart rate after group pressure/conformity covarying the very last group pressure phase measure ($F_{1,87}=4.03$, $p<.05$, see Figure 30) where Yielders had elevated heart rate compared with Non-Yielders.

Summary Yielders Compared with Non-yielders

Compared with Non-yielders, yielders had primarily elevated levels of cardiovascular stress response during group pressure and after conformity or non-conformity. This finding supports the hypothesis that degree of stress response to deviation is associated with later conformity, but contradicts the hypothesis that conformity reduces the stress.

Stress Response in Non-Yielders

Non-yielders had a significant association between conformity behavior and stress response during group pressure and after conformity. Correlations between stress response during group pressure and change in confidence were negative, but with items unchanged the correlation was positive. Average diastolic pressure during group pressure was negatively correlated with confidence gain in original opinion ($r=-.28$, $p<.05$) and was positively correlated with number of items kept at the same confidence level ($r=+.27$, $p<.05$). Loss of confidence in original opinion was negatively correlated with

diastolic pressure change from baseline to during group pressure ($r = -.29$, $p < .05$). Non-yielders had associations between conformity behavior and stress response in the post-conformity phase, where resistance to group pressure was associated with greater response after non-conformity. Number of items at same confidence level was positively correlated with diastolic blood pressure after the group pressure/conformity pressure phase ($r = +.27$, $p < .05$). Gain in confidence in original opinion was positively correlated with an increase from during group pressure to after group pressure in diastolic ($r = +.30$, $p < .05$).

Stress Response in Yielders

Confidence gain in original opinion was negatively correlated with systolic blood pressure change from baseline to during group pressure ($r = -.26$, $p < .05$). Change in confidence (gain or loss) in changed answers were negatively correlated to change in several measures from baseline to during group pressure. Confidence gain in changed answers was negatively correlated with change in systolic blood pressure ($r = -.30$, $p < .05$). Confidence loss in changed answers were negatively correlated with change in systolic ($r = -.33$, $p < .01$) and diastolic blood pressure ($r = -.31$, $p < .05$).

In contrast, the number of items of unchanged answers and confidence had several positive correlations with baseline to during group pressure changes: systolic ($r = +.42$, $p < .01$), diastolic blood pressure ($r = +.43$, $p < .001$). Confidence gain in original opinion was negatively correlated with after group pressure/conformity phase average diastolic blood pressure ($r = -.27$, $p < .05$).

In sum, for yielders, greater stress response during group pressure was associated with greater numbers of unchanged answers, and fewer changes in confidence.

Summary of Stress Response in Yielders and Non-yielders

In general, Yielders appear to have had greater cardiovascular reactions to the group pressure situation, and cardiovascular measures had a greater number of associations with conformity behavior. These associations were concentrated within the during group pressure phase. In contrast, Non-yielders had fewer associations between stress response and conformity behavior; these associations appear balanced between the during group pressure and post-conformity phase.

Cohesiveness and Confidence Differences between Yielders and Non-yielders

As a further check on the relationship between cohesiveness and conformity, Yielders and Non-yielders were compared for reported attraction to the group. Compared with Non-yielders, Yielders had significantly greater self response of liking for the group before group pressure ($F_{1,88}=6.63$, $p<.05$, see Figure 31) and after ($F_{1,88}=5.04$, $p<.05$, see Figure 32). Compared with Non-yielders, Yielders also had significantly less confidence in their answers before group pressure ($F_{1,82}=3.92$, $p<.05$, see Figure 33) and after ($F_{1,86}=4.98$, $p<.05$, see Figure 34). These results support the hypothesis that increasing cohesiveness increases conformity, and are consistent with the established relationship between confidence and conformity.

Relationship between Conformity and Coping: Rejection, Underrecall,

Devaluation, and External Attribution

Based on Gormly's (1971) designations, coping strategies were analyzed for associations with conformity behavior. Coping by rejection indicates a rejection of the group as a valid comparison, devaluation indicates that the subject did not feel that the particular experimental situation had any personal significance, underrecall indicates that the subject remembers a

reduced degree of disagreement with the group. A fourth coping behavior, external attribution was added following from Tuddenham and McBride (1959). External attributions for behavior included beliefs that the exercise was too hard or that the subject was too tired to do a good job.

An MRC was computed predicting conformity behavior from degree of underrecalling, devaluation, rejection, and external attributions. Stress response as indexed by Symptom/Emotions Checklist also was predicted from degree of underrecalling, devaluation, rejection and external attributions as assessed by the final questionnaire. Rejection and external attributions together explained 16% of the variance in number of items changed due to group influence ($F_{2,87}=8.11$, $p<.001$). Number of items switched was negatively correlated with Rejection ($r=-.32$, $p<.001$) and was positively correlated with External Attribution ($r=+.22$, $p<.05$) and Underrecalling ($r=+.18$, $p<.05$). External Attributions explained 5% of the variance in loss of confidence in unchanged opinion ($F_{1,82}=4.52$, $p<.05$). There was no relationship between stress response as indexed by the Symptom/Emotion Questionnaire and coping behavior.

The amount of variance in conformity that was accounted for by the experimental conditions over the amount accounted for by individual differences variables was analyzed by MRC. There was no significant change in the R^2 when experimental condition variables were entered into the equation after individual differences variables.

Association between Individual Difference Variables and Conformity

An MRC was computed predicting conformity behavior (number of times yielding) from the following individual difference variables: from the CPI: Capacity for Status, Social Maturity, Norm-Favoring; from the WFOQ:

Competitiveness; from the SNI: Number of Roles; from the PILL: Symptom Reporting; from the INS: Individuation.

Norm Favoring scores as indexed by the CPI accounted for a significant amount of the variance in number of changed answers ($R^2=.05$, $F_{1,87}=4.12$, $p<.05$, raw score). Norm Favoring was significantly positively correlated with number of changed answers ($r=+.22$, $p<.05$, raw score).

The Pennebaker Index of Limbic Languidness accounted for a significant amount of variance in the gain of confidence in unchanged answers ($R^2=.05$, $F_{1,80}=4.04$, $p<.05$). The PILL scores and gain of confidence in unchanged answers were significantly positively correlated ($r=+.18$, $p<.05$).

Confirmation of Hypotheses

1. Deviation from the group is stressful.

This hypothesis was supported by increases in systolic and diastolic blood pressure and heart rate from before to during group pressures (see Figures 5-7). Furthermore, the findings of greater hostility and anxiousness after group pressure also support the hypothesis (see Figures 8 & 9). The hypothesis was contradicted by greater self-report of symptoms before compared with after group pressures (see Figure 10). Therefore, physiological and mood stress indices were consonant and confirmed that deviation from the group is stressful.

2. Conformity is a response made to reduce stress and conformity is accompanied by a reduction in stress.

This hypothesis was contradicted by analyses of cardiovascular responses comparing yielders and non-yielders in the post-conformity phase (see Figures 28-30). Yielders continued to have relatively higher stress response indices in the post-conformity period. It is possible that for Yielders the stress of

being a deviated continued to linger even after steps to eliminate the deviance by conformity.

3. The greater the initial stress experienced upon deviating, the more likely conformity will occur.

This hypothesis was strongly supported by comparisons of the cardiovascular response to group pressures of Yielders and Non-yielders (see Figures 28-30). Yielders had elevated cardiovascular responses during and after group pressure and conformity, and had more associations between cardiovascular responses and later conformity behavior.

4. The greater the degree of threats of punishment for non-conformity, the greater the stress upon deviation.

This hypothesis was supported by findings in the change from during to after group pressure heart rate (see Figure 25) and average heart rate after group pressure (see Figure 26). However, the original hypothesis referred to effects during group pressure, and those after conformity were not expected. This hypothesis was contradicted by the self-reported mood data, and was left unsupported by self-report of symptoms.

5. The greater the degree of threats of punishment for non-conformity, the greater the likelihood that a person will conform.

This hypothesis was supported by comparisons of conditions on both the number of changed answers and of loss of confidence (see Figures 13, 17, and 18).

6. Increased group cohesiveness is associated with increase in Offers of Reward for Conformity (ORC) and Threat of Punishment for Non-conformity (TPN).

There were no associations found between these variables in the

correlational analyses run. This hypothesis was not supported by correlations between perceived cohesiveness and ORC and TPN.

7. Increased group cohesiveness is associated with increased stress response upon deviation.

This hypothesis was supported by average diastolic blood pressure after the group pressure/conformity phase (see Figure 28), but was contradicted by mood analyses. However, as with the TPN variable, the original hypothesis referred to effects during group pressure, and those after conformity were not expected.

8. Increasing group cohesiveness increases conformity.

This hypothesis was supported by analyses of number of items changed due to group pressure (see Figure 12). It also was supported by findings that compared with Non-yielders, Yielders reported greater attraction to the group before and after group pressure (see Figures 32 and 33).

DISCUSSION

Hypotheses

This experiment was designed to investigate responses associated with non-conformity with a group. Specifically, the present experiment tested the hypothesis that increasing group cohesiveness and threat of punishment for non-conformity would increase the likelihood that a group member would show conformity behavior and show heightened stress responses in a deviate situation. In addition, coping and individual differences variables as affecting conformity were examined.

The majority of the hypotheses were confirmed. The increases in all cardiovascular measures and mood decrements from pre to during to post group pressures support the hypothesis that deviation from the group is stressful. The results also confirm that the greater the stress response of deviating, the greater the likelihood that a person will later conform to the group.

Increasing cohesiveness and the threat of punishment for non-conformity also increase the likelihood that a person will conform to the norm, by change in answers or by losing confidence in original answers. Greater cohesiveness was associated with positive mood before and after group pressures and conformity. It is possible that being put in an attractive group puts one in a good mood initially, that also bestows a protective effect on mood during group pressure. One surprising finding in the mood data was that subjects who were in the High TPN conditions reported more Agreeableness, and less Hostility after group pressure. This finding is difficult to explain except that the group phase may have been so unpleasant, that compared with that part of the experiment any situation made one more agreeable. Other surprising findings were in the data relevant to the hypothesis that increasing cohesiveness and TPN increase the stress upon deviating. This hypothesis was confirmed; however, the effects appeared primarily after conformity or non-conformity had taken place. This finding will be addressed in detail below.

In general, the results support the hypotheses that increasing cohesiveness and TPN increase conformity, that deviation is stressful, and that a relatively greater stress response to group pressure is associated with greater conformity. However, there was only weak evidence that cohesiveness and TPN affect conformity through a stress-reduction mechanism. The difficulty lies in the findings that: 1) there was no association between

cohesiveness and ORC and TPN, and 2) the association between cohesiveness and TPN and stress response occurred primarily after conformity/non-conformity had already taken place, and 3) relative to Non-yielders, Yielders did not show less of a stress response after conformity. Possibilities for these findings are presented below.

It is possible that the questionnaire used to assess ORC and TPN were not truly tapping these social forces. It is also possible that even though future face-to-face group interaction was expected, ORC and TPN social forces were not strongly operative in this contrived group situation. Another possibility is suggested by the Cohesiveness x TPN interaction effect on perceived TPN where Low Cohesiveness/High TPN > High Cohesiveness/Low TPN > High Cohesiveness/High TPN > Low Cohesiveness/Low TPN. In the experiment, cohesiveness was manipulated first, then TPN perception was manipulated. It appears likely that in this situation, cohesiveness modulates the perceived TPN instead of increasing it. Therefore, the relationship between cohesiveness and TPN and ORC remain in question.

The set up of the experimental procedure may underlie the lack of association between cohesiveness, TPN, and stress response during group pressure, and the association found after group pressure when conformity or non-conformity had already taken place. In most conformity paradigms, the experimental situation requires subjects simultaneously to realize deviance and to choose between the group answer and their own. In the present experiment, while undergoing group pressure, that is, realization of deviance, subjects were unaware that they would later be asked to make a choice again between the group's and their original answer. The effects of cohesiveness and TPN may operate only when subjects perceive that they must make a choice,

or when they anticipate consequences for conformity or non-conformity. Cohesiveness and TPN forces may not be inherently operative in situations where a person is simply different.

The finding that Yielders do not decrease stress response after conformity also may be a result of the experimental procedure. After the conformity phase, subjects were still unsure about the consequences of their conformity/non-conformity (that is, whether or not they were rejected or would be interacting with the particular group). The continued elevation of stress response in Yielders then may be either a lingering stress response, aftereffects of group pressure, or anticipatory stress in awaiting rejection or inclusion in the group.

Another explanation for the increased stress response in Yielders may be found in the idea of the "costs of coping" (Cohen, 1980; Cohen, Evans, Stokols, & Krantz, 1986). The concept is that coping behaviors that are effective in reducing a stressor may be detrimental to a person in other ways. In the present experiment, a Yielder may reduce stress upon deviating by reducing deviation, that is by conforming. The "cost" involved may be lowered self-esteem at having "caved in" to the group, or uneasiness or guilt feelings at having perceived one way, yet reporting another. Therefore, even though the deviation from the group is removed, a person may still show a stress response because of what he or she had to do to accomplish conformity.

The feeling of regret may be reflected in the increased stress response after the decision to conform. Festinger (1964) found that for a brief time after making an irrevocable choice that subjects showed evidence of regret. When subjects were asked (within four minutes of the original decision) to reevaluate their attraction their choice, they showed less attraction than

they initially reported before the choice was made. Festinger (1964) interpreted these findings as evidence that after a choice, the dissonance between the negative aspects of the choice and having made the choice become more salient, and regret results. In the present experiment, Yielders may show elevated stress response indices as a reflection of the regret at having conformed to the group.

In sum, the findings confirm the separate associations of social force variables and conformity and stress response and conformity. The underlying mechanisms linking all three, however, remain to be determined.

Comparison of Cardiovascular Stress Responses in Yielders and Non-Yielders

In examining the cardiovascular data, the most striking difference between Yielders and Non-yielders was the immediate increase in blood pressure measures in Yielders under group pressure. At the time subjects realized their deviance, they were unaware that they would be asked to choose their answer again. Based on this difference in response to merely being different, it may be that regardless of the situation, those who have relatively greater stress response to simply being different will later choose to conform to the group.

Relevant to this finding is the concept of "construal" proposed by Ross and Nisbett (1991, 1992) as a mechanism to reconcile personality theory with social psychological theory. Construal refers to the notion that an individual is influenced by a situational forces depending upon the construal (i.e., perception, understanding) of the situation. One might propose that those who eventually yielded a greater number of times, construed or perceived of the initial deviant position as relatively more threatening or negative. Therefore, a stress response was elevated and later the subject showed

conformity behavior. In comparison, those highly resistant to group pressure, did not regard simple deviance as threatening or negative. Accompanying responses were, therefore, not as great as for Yielders. The individual differences in construal of deviance remains to be investigated.

Another interesting point is that for Yielders and Non-yielders, both an increase or decrease in confidence was associated with a decreased stress response during group pressure phase, whereas the number of items unchanged in answer and confidence level was associated with an increased stress response. Although the finding that both an increase and decrease in confidence results in a decrease in stress response may seem counter-intuitive, one can reason how both can reduce stress. Reporting confidence level allows one to "hedge" a little. For one who has changed answers, a loss of confidence can be thought of as a compromise. Even in changing answers to match the group, one can retain a semblance of original opinion by expressing doubt. This reaction reduces the dissonance between the cognitions "I saw x" and "I reported Y" with "but I am not sure this is really the correct answer." In contrast, a gain in confidence in the changed opinion reaffirms the reason for switching answers.

For Non-yielders, a gain in confidence reaffirms the reason for keeping one's opinion. In contrast, a loss in confidence may reduce the dissonance between the cognitions "I want to be part of the group" and "I acted in a way to separate myself from the group" with "but I am not so different from the group because I'm not that sure of the answer anymore." Because the reduction in stress response associated with changes in confidence occurred when the subject realized deviance, and before he or she was asked to publically state answers, a key assumption to this explanation is that the above "reasoning"

occurs when one first encounters differences with the group. That is, people on some level automatically and privately make the judgment of whether or not to agree with the group and how confident they believe in that judgment. This assumption remains to be investigated.

Individual Differences and Coping

The findings of associations between coping behavior and individual differences and conformity are generally as expected from the previous literature. The coping behavior of rejection was found to be negatively correlated with conformity. This finding is consistent with the study by Festinger, Gerard, Hymovitch, Kelley and Raven (1952) which found that deviates reject the group before the group rejects them. Future investigations should examine at what point an individual may reject a group and exactly how this action may affect the stress response of that person. Also, the finding that Norm Favoring (from the California Psychological Inventory) was positively correlated with conformity fits the notion that conformity is related to motivation to following the norm.

Applications

This study adds to the growing literature linking social forces and dynamics to physiological and psychophysiological phenomena. The experiment verified that cohesiveness and the consequences of non-conformity do affect conformity to the group. The experiment also added more indices of stress response (urinary biochemicals and cardiovascular) that may be studied in the group situation.

Cohesiveness and Crew Selection

The general findings of increased cohesiveness and threat of punishment for non-conformity may be applied to astronaut crew composition. However,

there is one caveat: More research must be done before implementing these findings in long duration space mission operations. It is important to define the concrete limits and modulators before extending or generalizing from these laboratory findings. For example, the space habitat engenders variables that may modify interpersonal relations in general. Variables certain to affect interpersonal dynamics include time (anticipated versus chronic social interaction), physical environment (familiar versus isolated, confined, dangerous, microgravity), and, of course, consequences involved (short term, perhaps monetary versus survivability). An astronaut crew on a space mission already has a history of interaction and can be assured of future long term interaction. The effect of history and anticipation of group interaction has been shown to affect conformity processes (Julian, Regula, & Hollander, 1968; Hollander, Julian, & Haaland, 1965; Crowne & Liverant, 1963; Kiesler, 1963; Kiesler & Corbin, 1965). Therefore, more research is needed on the basic findings, as well as on how these findings may be modified in the space environment.

Mission planners may choose to select, compose, and train for cohesive crews simply for the positive mood that the situation may nurture. Mission planners may choose cohesive crews in order to increase compliance with exercise regimen or regulations regarding public and private areas in the habitat. The utility of this approach is, of course, dependent on the group as a whole establishing a constructive group norm. While a significant proportion of the the astronaut pool may be pilots and part of a highly cohesive group already, the norms established in that group may be detrimental to the mission (e.g., displaying overly individualistic actions that may be at odds with the crews' goals and actions).

In addition to possible interventions to increase cohesiveness of crews pre-launch, changes in group cohesiveness throughout the mission should be expected. Psychological experiments in the SEALAB indicated that performance on the mission may have significant effects on cohesiveness (Bakeman & Helmreich, 1975). In addition, Radloff & Helmreich (1968) reported that under the SEALAB conditions of extreme crowding, high levels of perceived danger and stress, that groups became more cohesive. Therefore, the dynamic nature of group cohesiveness during the mission should be recognized.

Stress Response and Social Situations

The results of the experiment also support the notion that there exists a relationship between a person's behavior and his or her hidden reaction to a "precursor" situation. In this experiment, cardiovascular responses to group pressure (being different) were significantly related with later conformity to the group. This finding of the link between stress response and group dynamics and later social behavior can be used in at least two ways. First, within the field of medical psychology, the findings suggest that certain stress associated diseases may be induced by elevated sympathetic arousal to chronic, subtle, social phenomena. Much of the stress-illness research uses potent stressors such as outright interpersonal confrontation or pain. The fact that, in this experiment, there were reliable sympathetic elevations in such a subtle stressor as "being different" in a minimally social group suggests that for some people low level, subtle, but pervasive social circumstances may be important in the etiology of diseases. This viewpoint fits well with the person-environment theory where the roots of illness lie in an interaction of the two. While in a non-deviating role, Yielders do not exhibit sympathetic arousal. However, within the situation of

group deviance, these elevations, relative to non-yielders, do occur. It is possible that individual difference factors in stress reaction become more important in disease etiology in particular circumstances.

A second way to apply the general principle of the stress response-social behavior link may be in astronaut crew selection and training. Placing candidates into general "precursor" social situations (perhaps with potential crewmates under consideration) may provide insight into future behavior within the crew group. This method of selection is less subject to social desirability confounds, however, it may possibly engender more interpretation difficulties. The general principle may be useful and must be tested for efficacy against more traditional methods of selection. The method also may be useful to monitor progress in group dynamics training and to judge compatibility through examination of psychophysiological reactions to interaction with potential crewmates.

Future Research

In one sense the biggest contribution of this research is a simple conformity paradigm in which cohesiveness can be effectively manipulated and group dynamics forces can be studied. The results of the study suggest several experiments that may use this paradigm. First, a more careful and sophisticated examination of psychophysiological reaction in the different phases of the experiment should be carried out. Second, the findings should be tested in varying group situations (e.g., composition, relative competence) and stimulus attributes. Third, reactions to group pressure should be tested for significant associations with social behaviors other than conformity, such as leadership potential and competence in group task performance. Fourth, a

study examining reactions to group situations in relationship to illnesses should be undertaken.

The present experiment provides a new way to examine classical questions of group dynamics and a different way to examine current problems relevant to psychology and health.

FIGURES

	High Cohesiveness	Low Cohesiveness
High Threat of Punishment for Non- conformity (TPN)	Mutually preferred, Compatible Non-conformers called incompetent, cold, irrational, etc. Rejection n=25	Mutually non-preferred, Marginally compatible Non-conformers called incompetent, cold, irrational, etc. Rejection n=21
Low Threat of Punishment for Non- conformity (TPN)	Mutually preferred, Compatible Non-conformers called creative, logical, moderate, etc. No Rejection n=23	Mutually non-preferred, Marginally compatible Non-conformers called creative, logical, moderate, etc. No Rejection n=24

Figure 1: Independent Variables and Manipulations

★ First Series of Picture Descriptions
(Completed at home)

EXPERIMENT TIMELINE

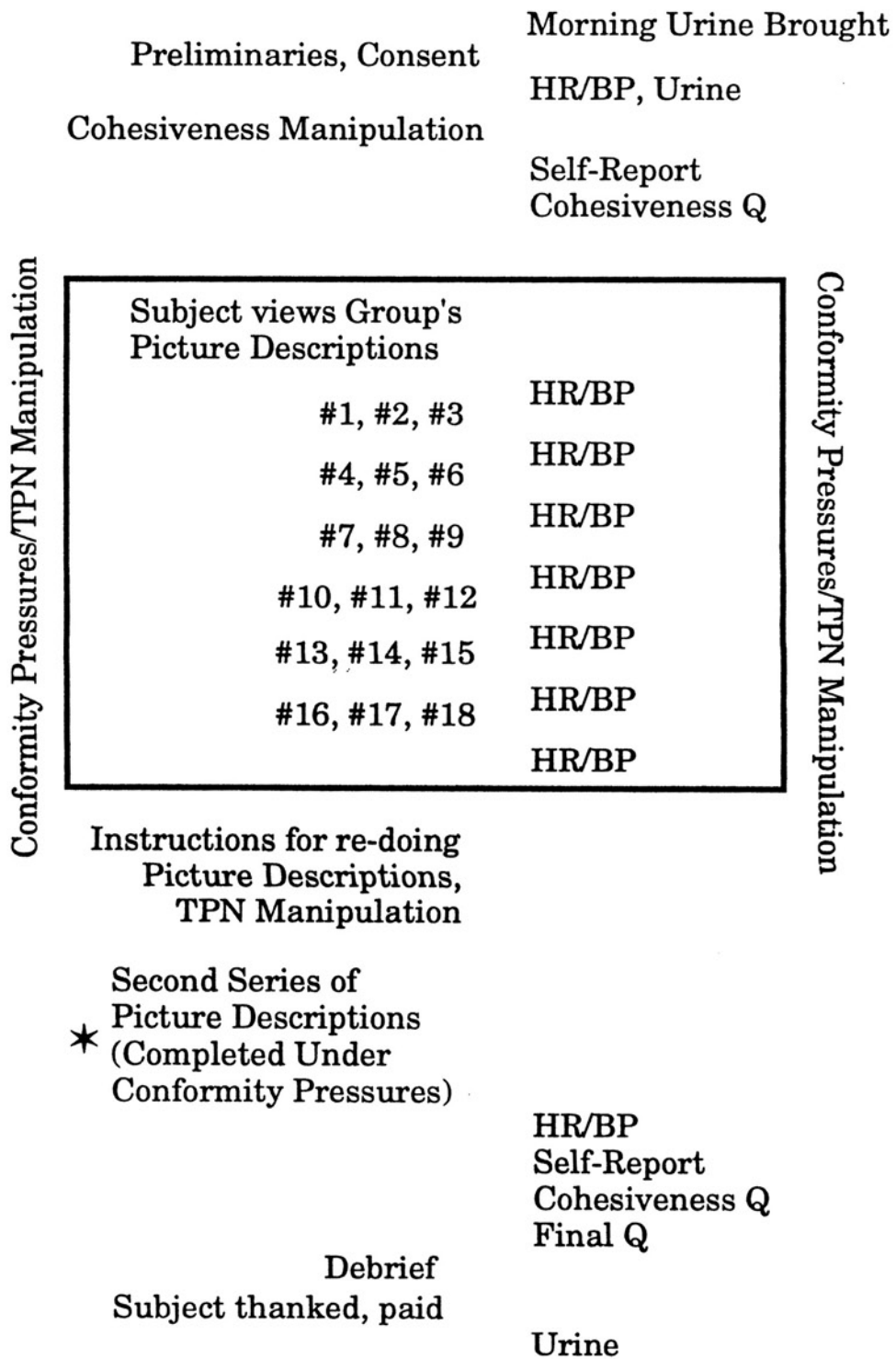


Figure 2: Summary Timeline of Procedure

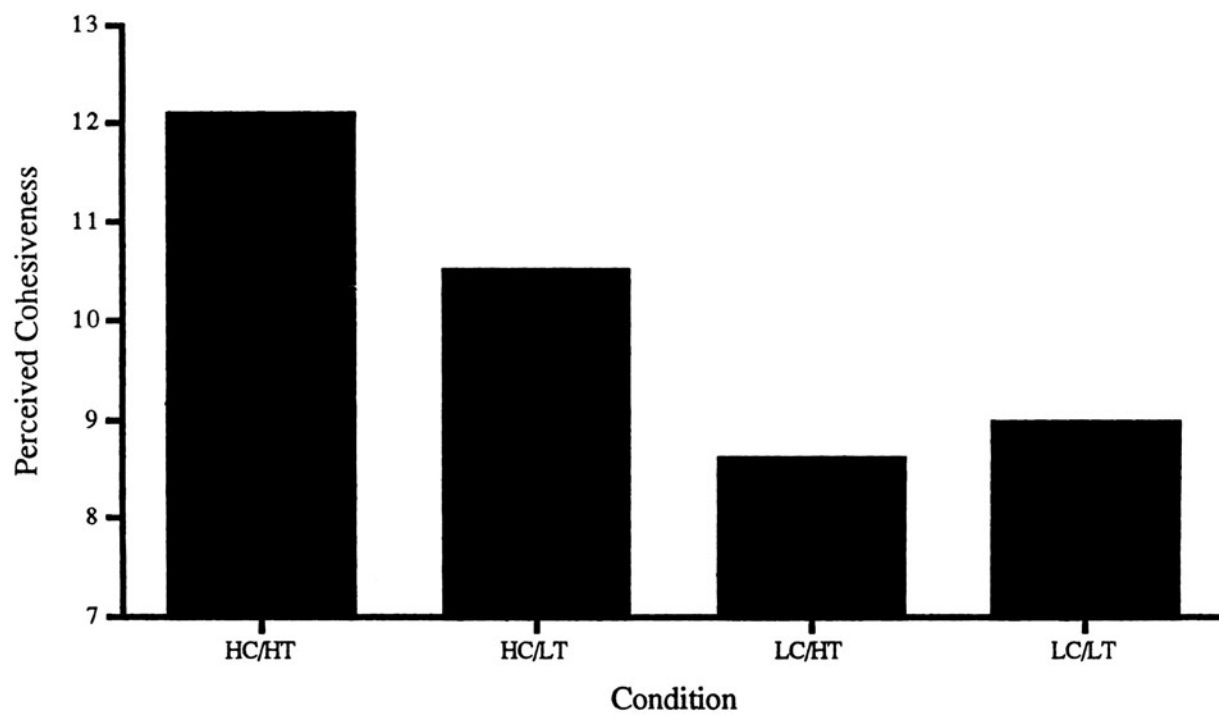


Figure 3: Self-Report of Cohesiveness by Group

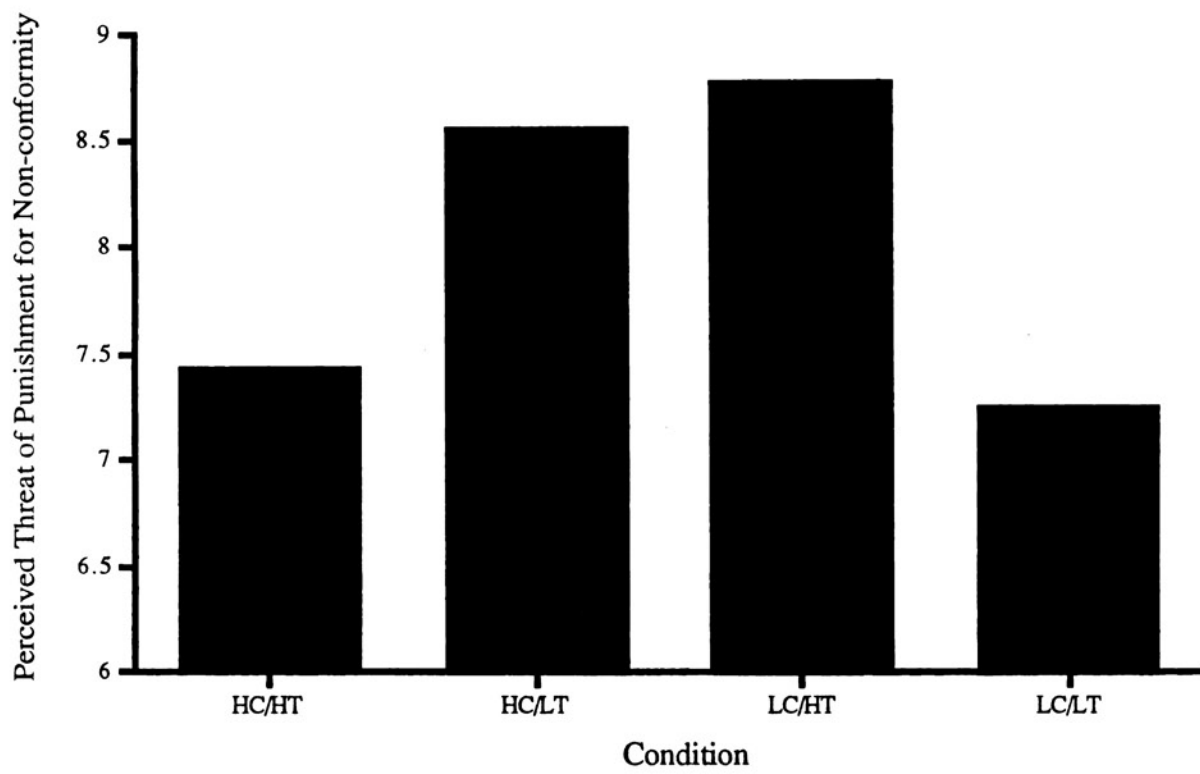


Figure 4: Self-Report of TPN by Group

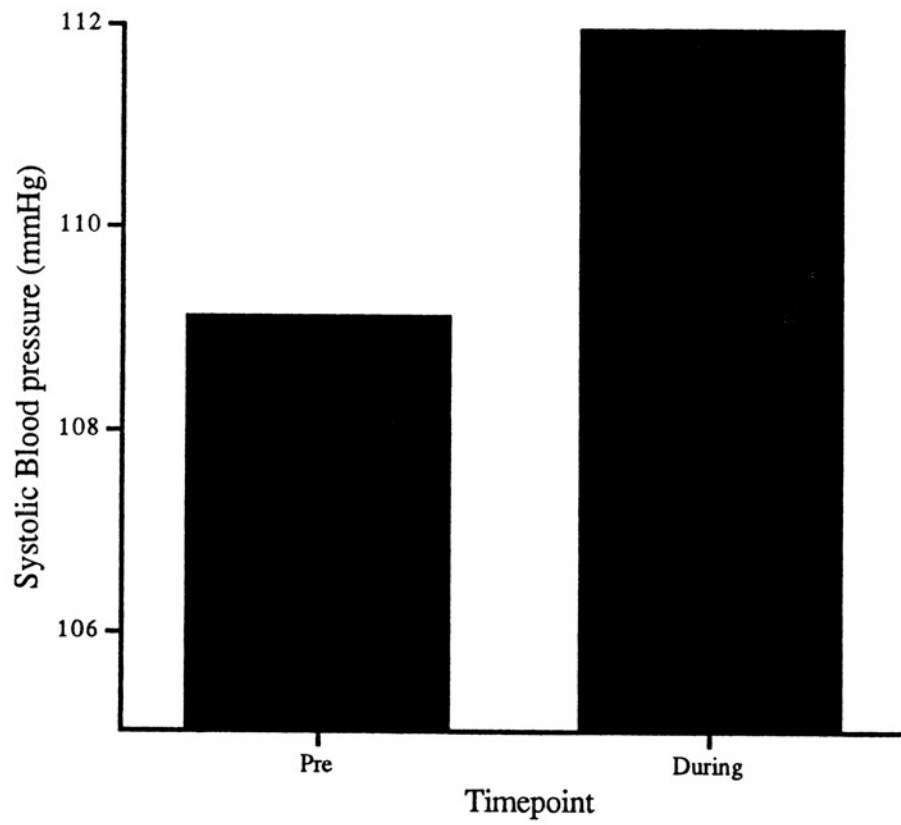


Figure 5: Pre vs During Group Pressure Systolic Blood Pressure

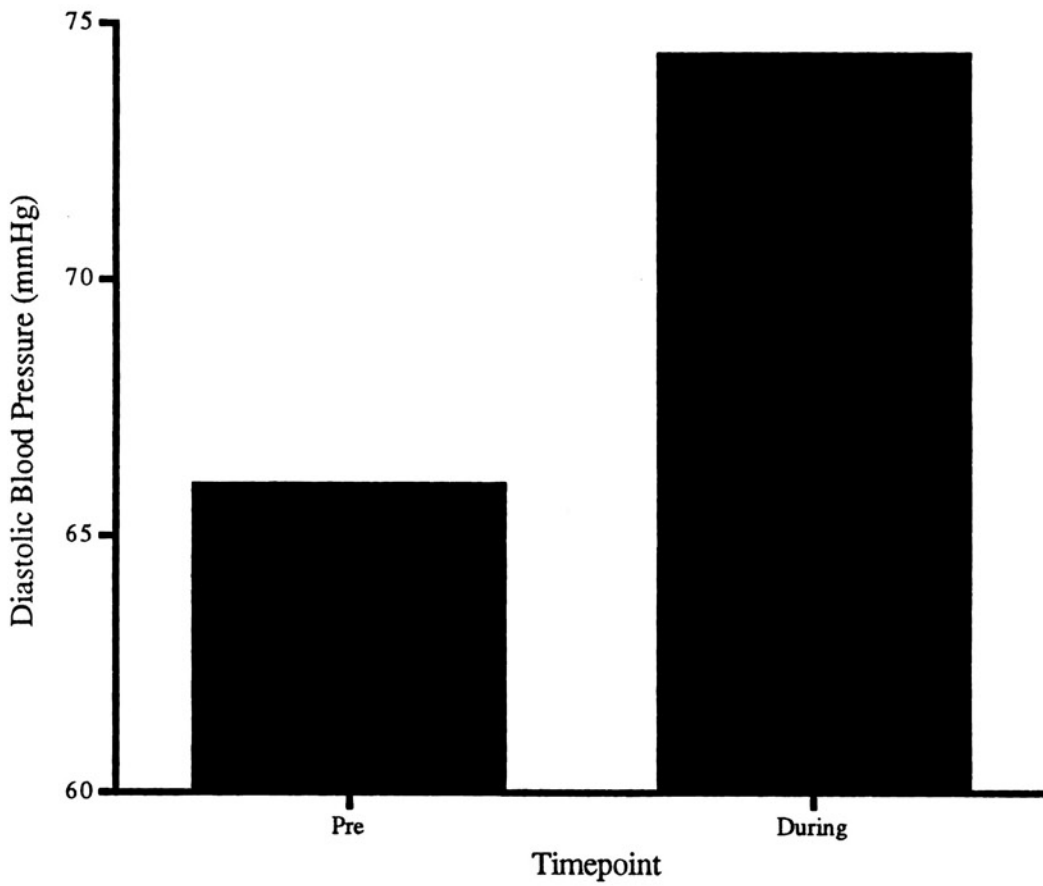


Figure 6: Pre vs During Diastolic Blood Pressure

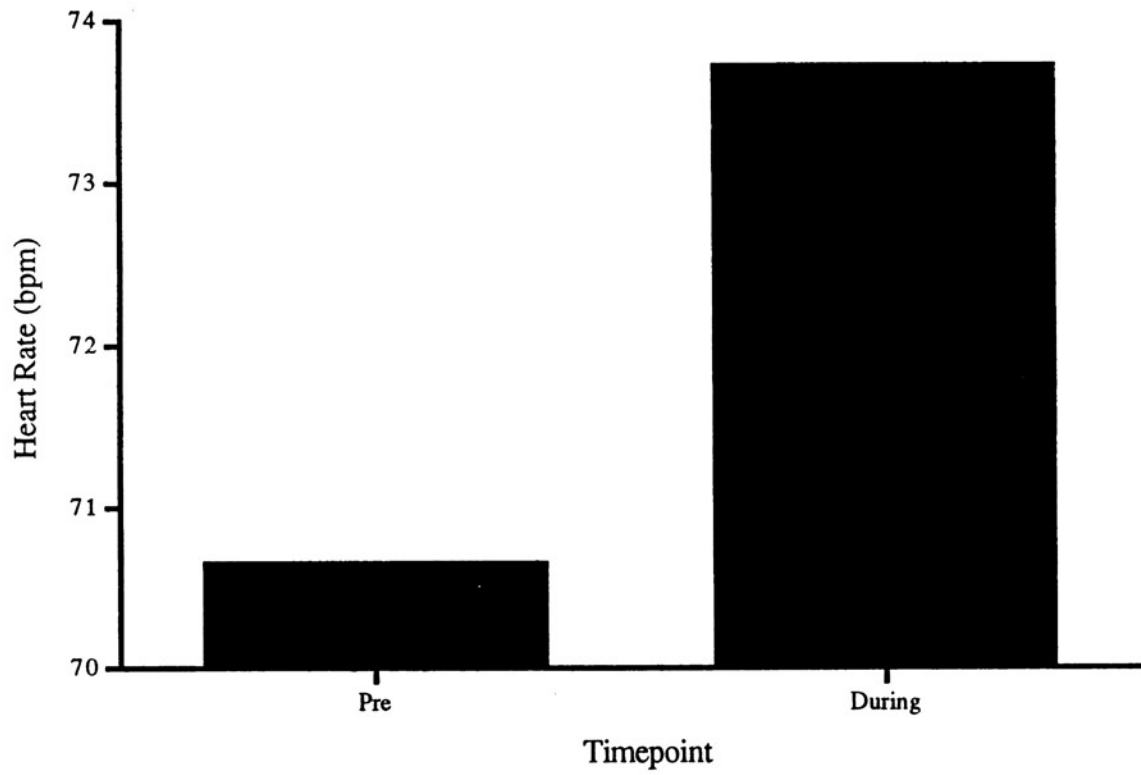


Figure 7: Pre vs During Group Pressure Heart Rate

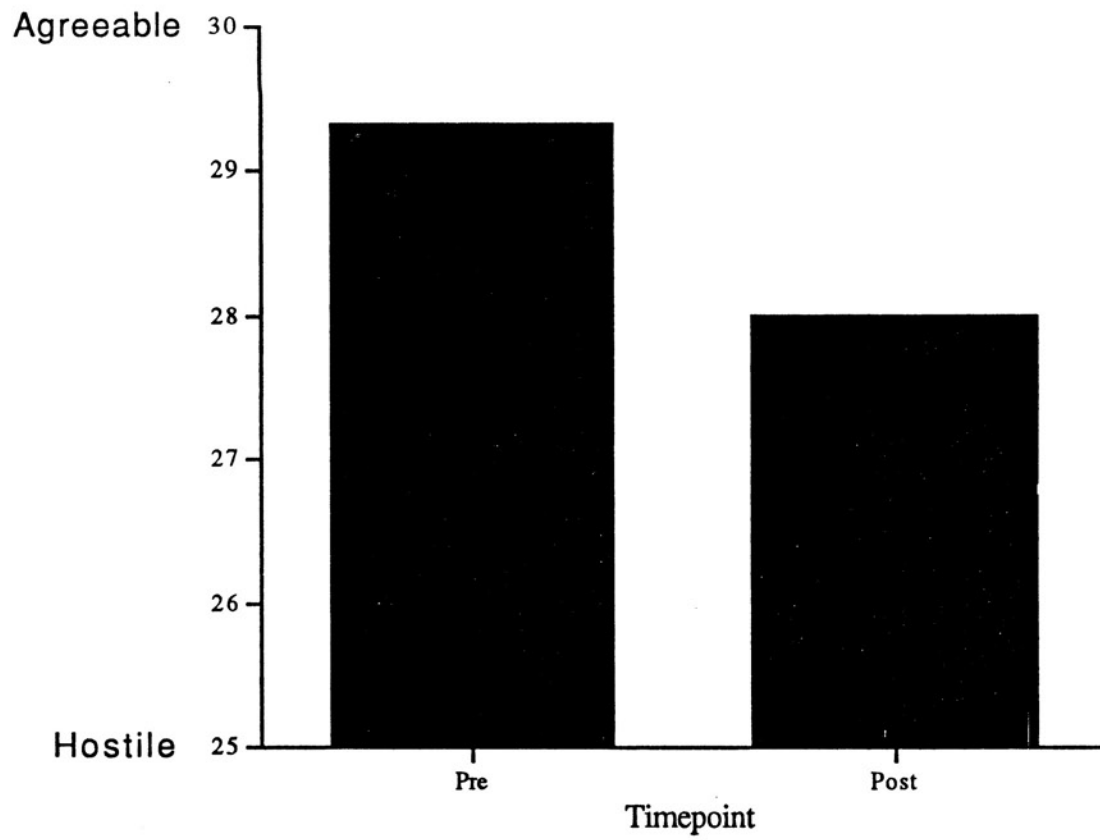


Figure 8: Pre vs Post Group Pressure Agreeable-Hostile Mood

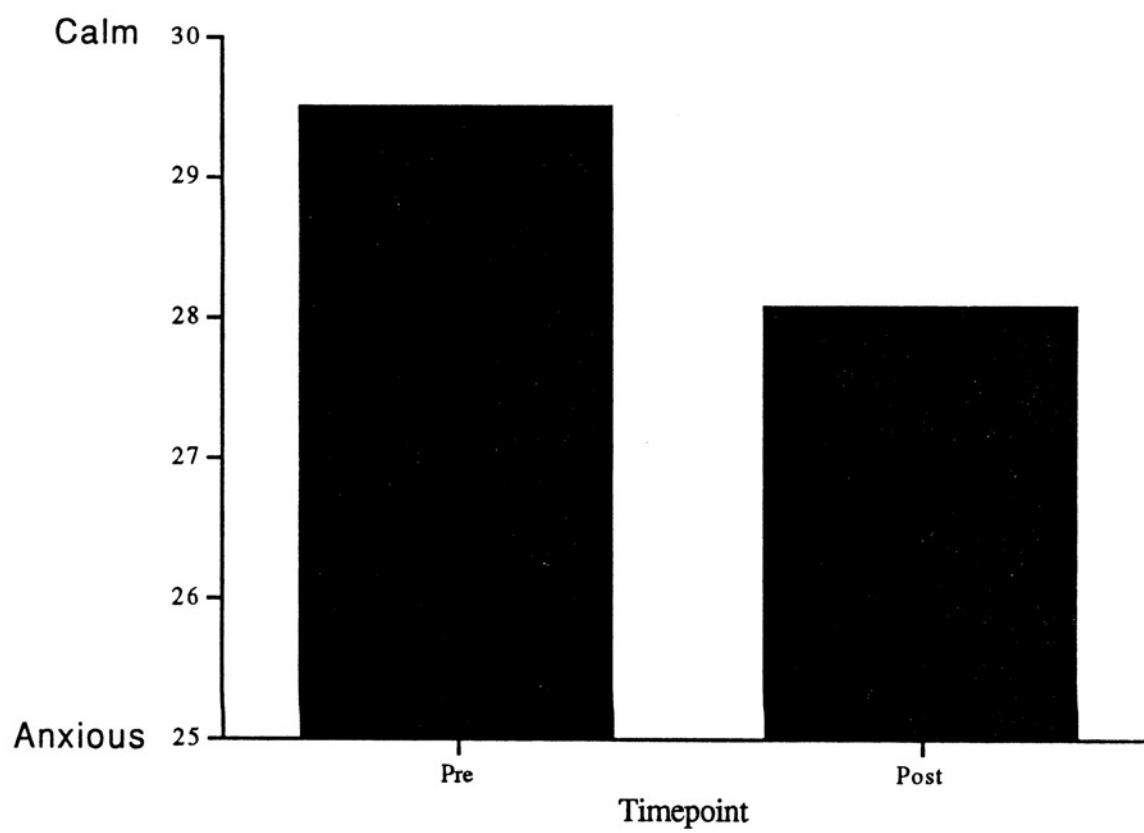


Figure 9: Pre vs Post Group Pressure Calm-Anxious Mood

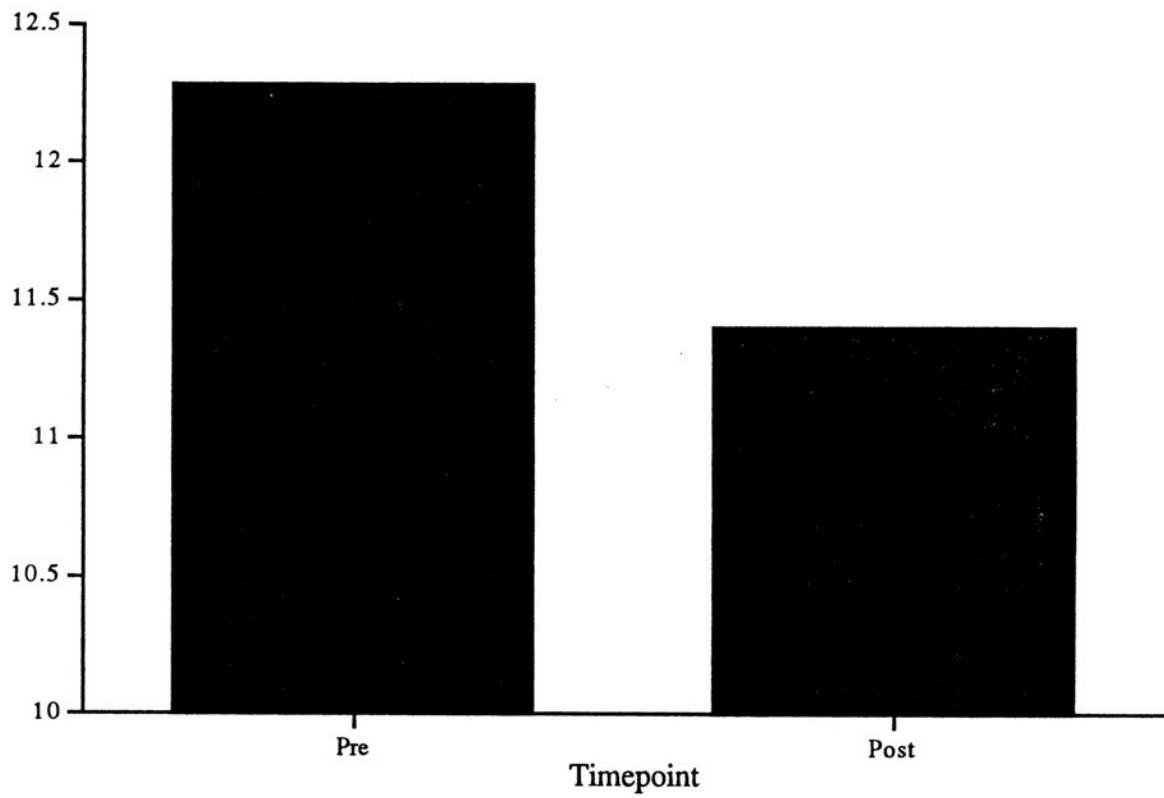


Figure 10: Pre vs Post Group Pressure Self-Report of Symptoms/Emotions

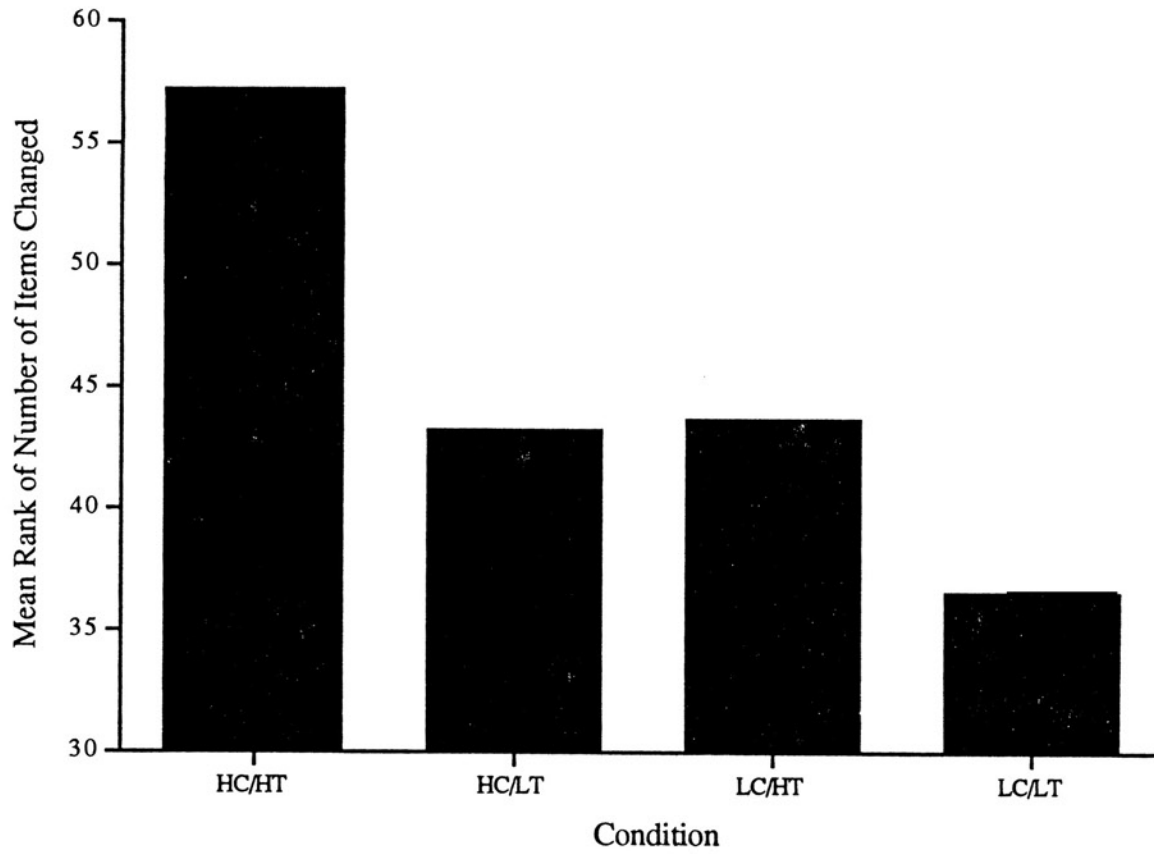


Figure 11: Number of Items Changed due to Group Influence by Condition

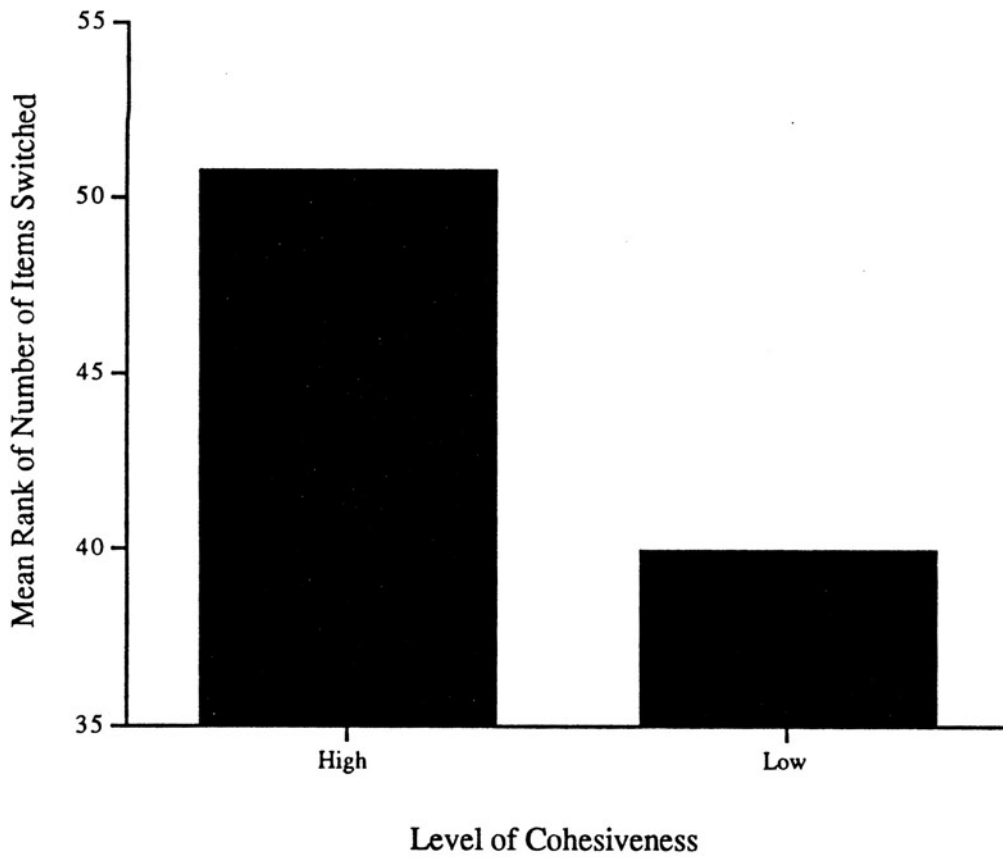


Figure 12: Number of Items Changed due to Group Pressure, by Level of Cohesiveness

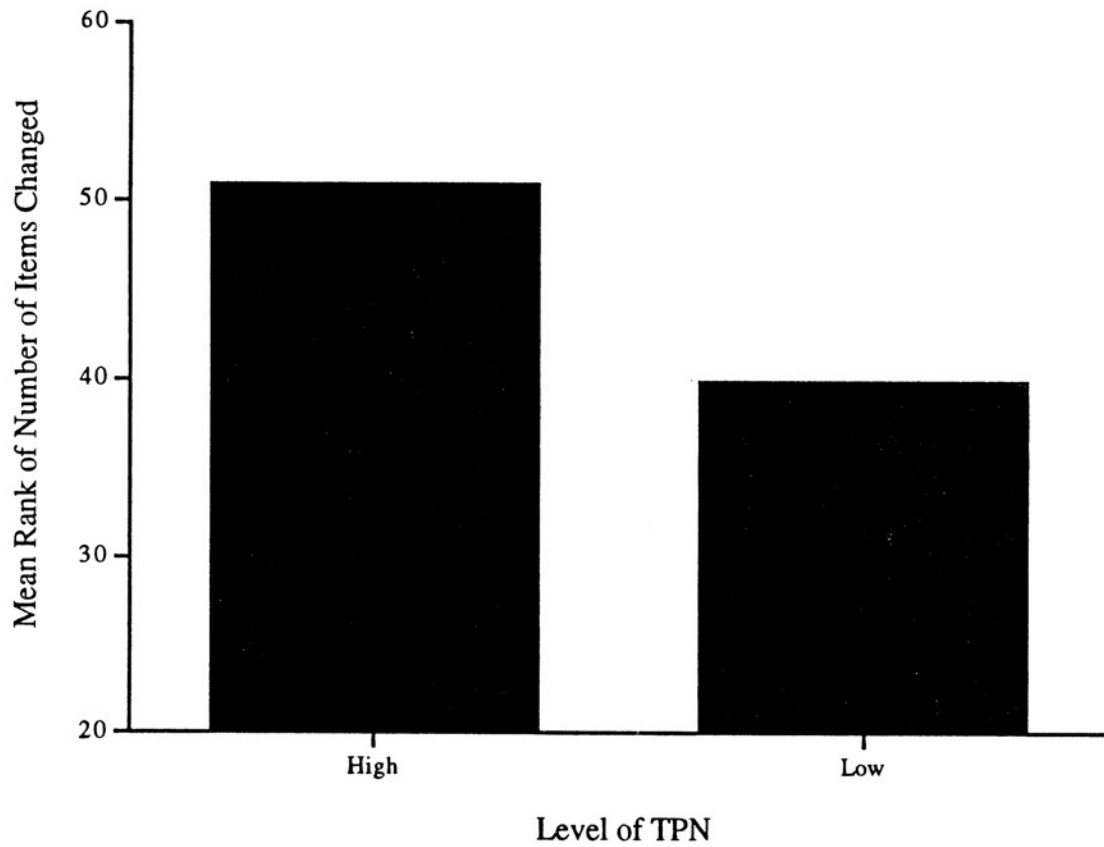


Figure 13: Number of Items Changed due to Group Pressure, by Level of TPN

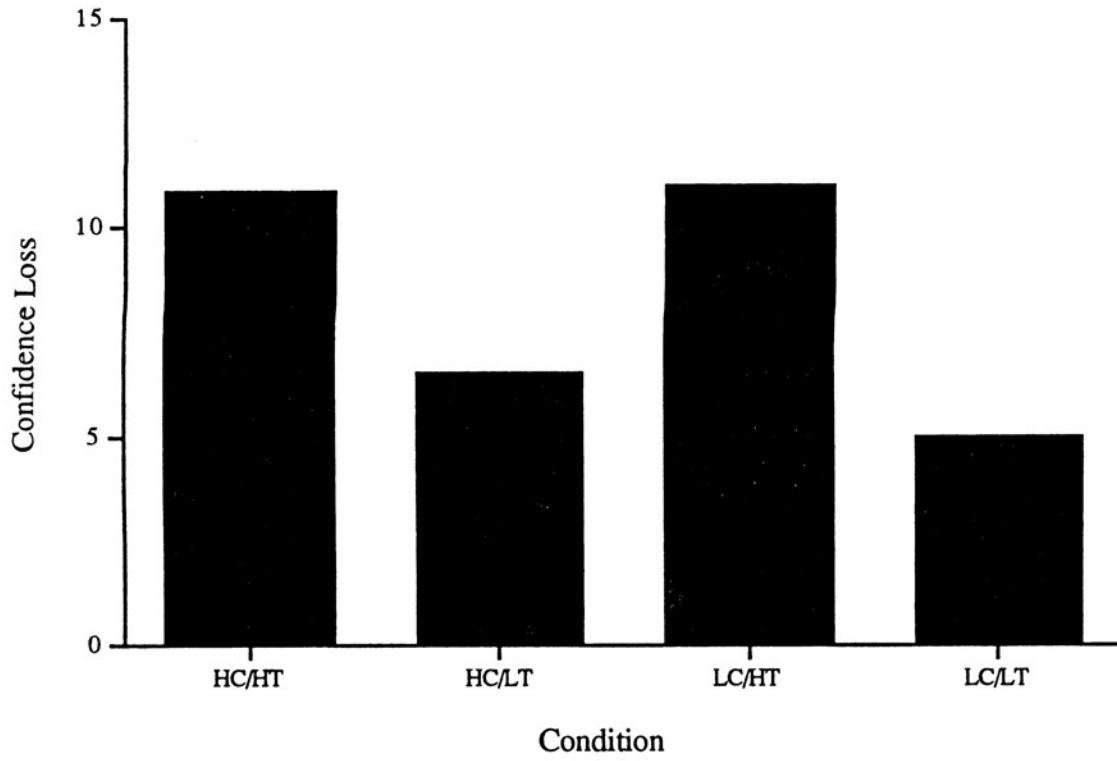


Figure 14: General Loss of Confidence by Condition

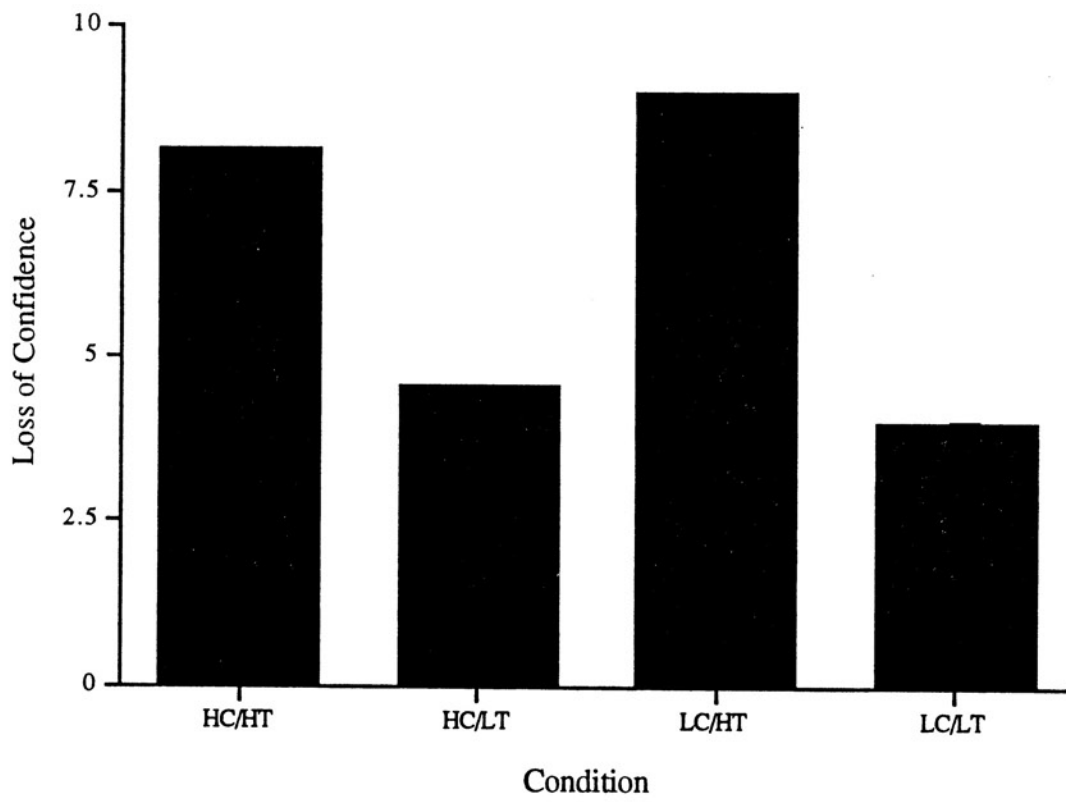


Figure 15: Loss of Confidence in Unchanged Items by Condition

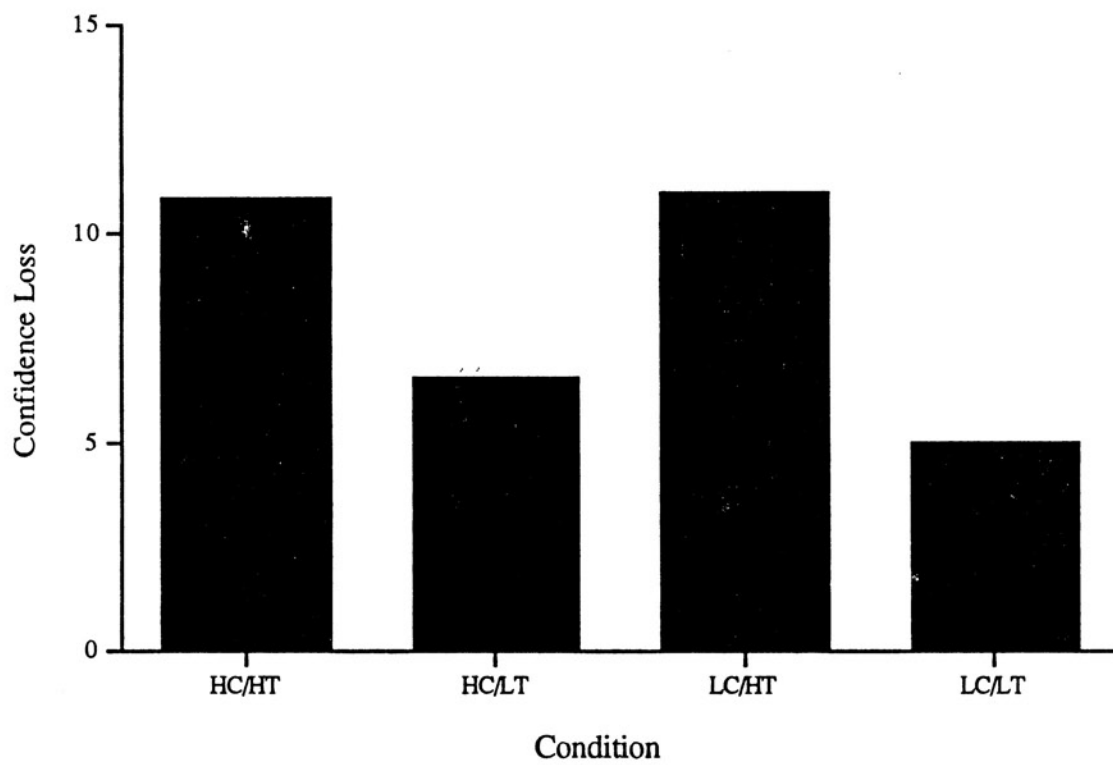


Figure 16: General Loss of Confidence by Condition

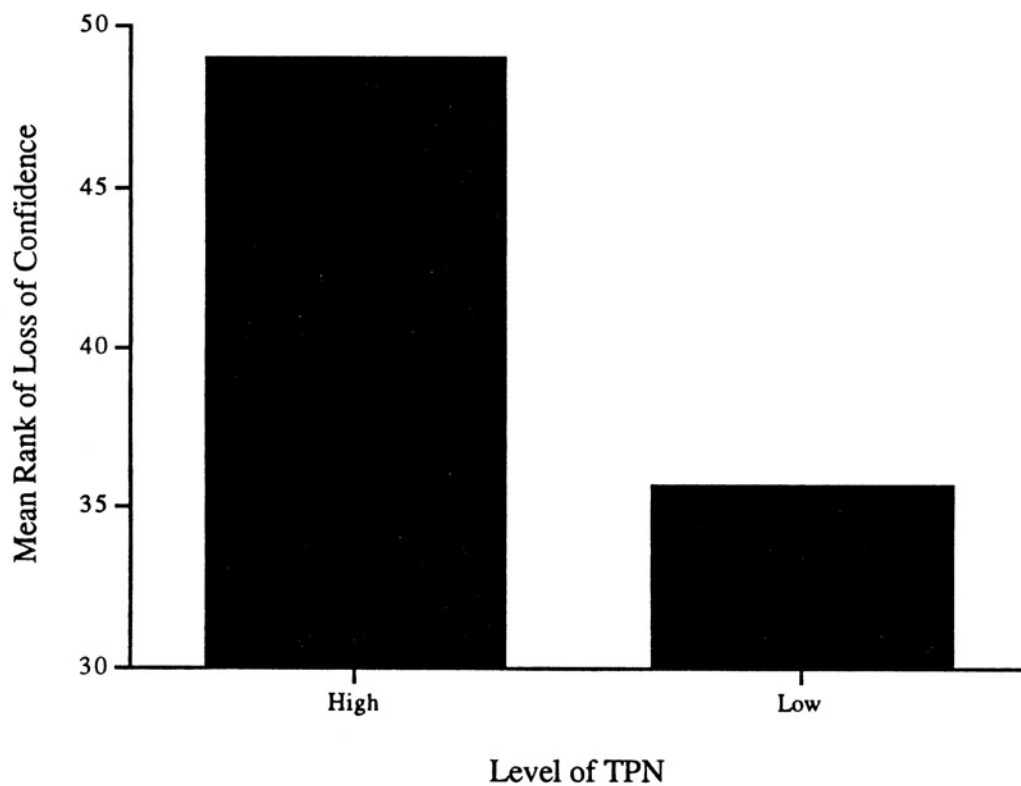


Figure 17: General Loss of Confidence by Level of TPN

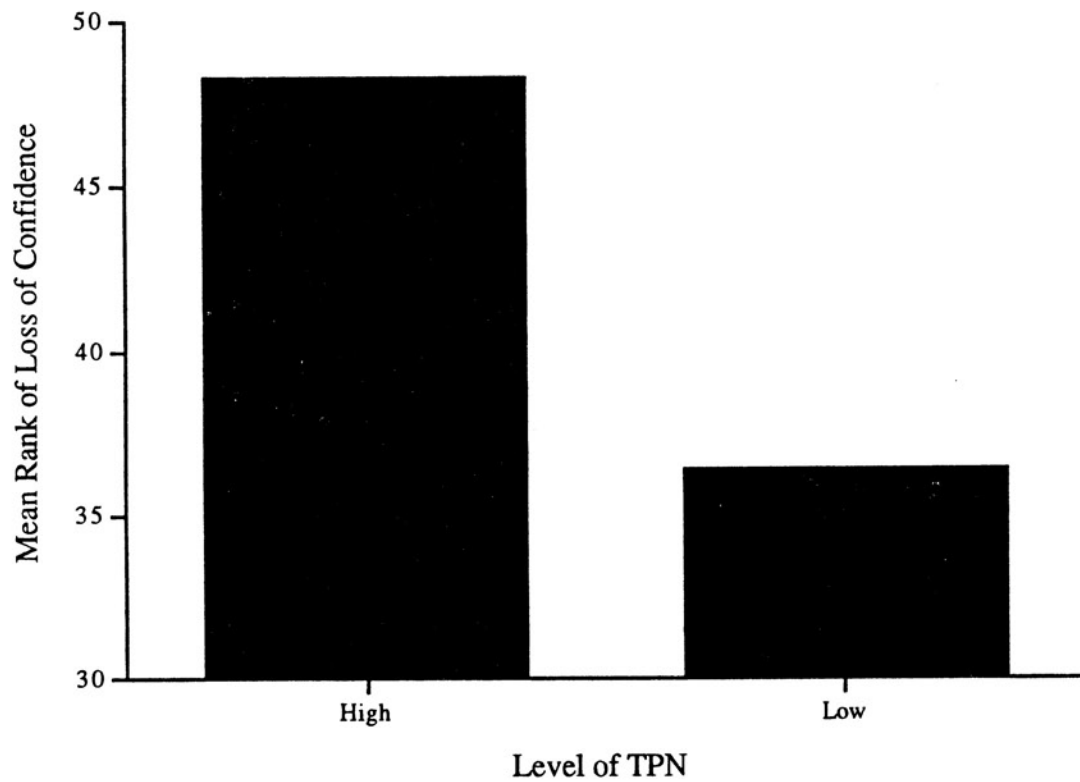


Figure 18: Loss of Confidence in Unchanged Items, by Level of TPN

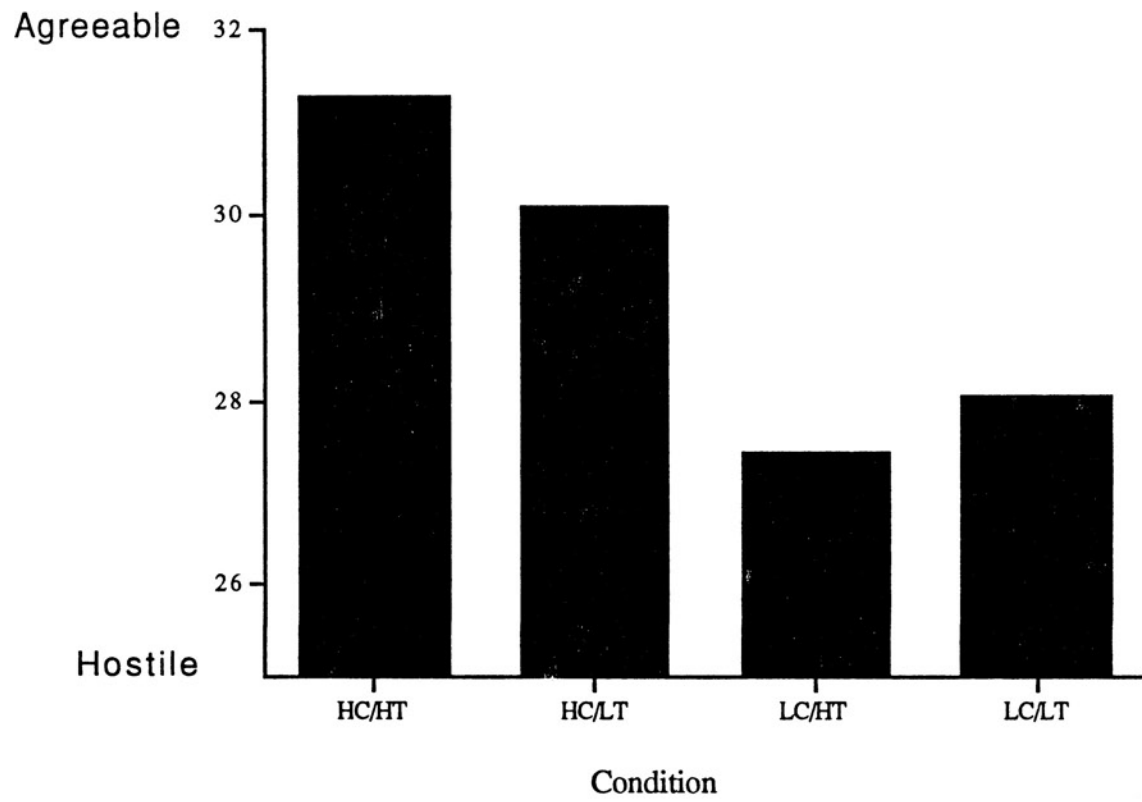


Figure 19: Pre Group Pressure Mood Agreeable-Hostile

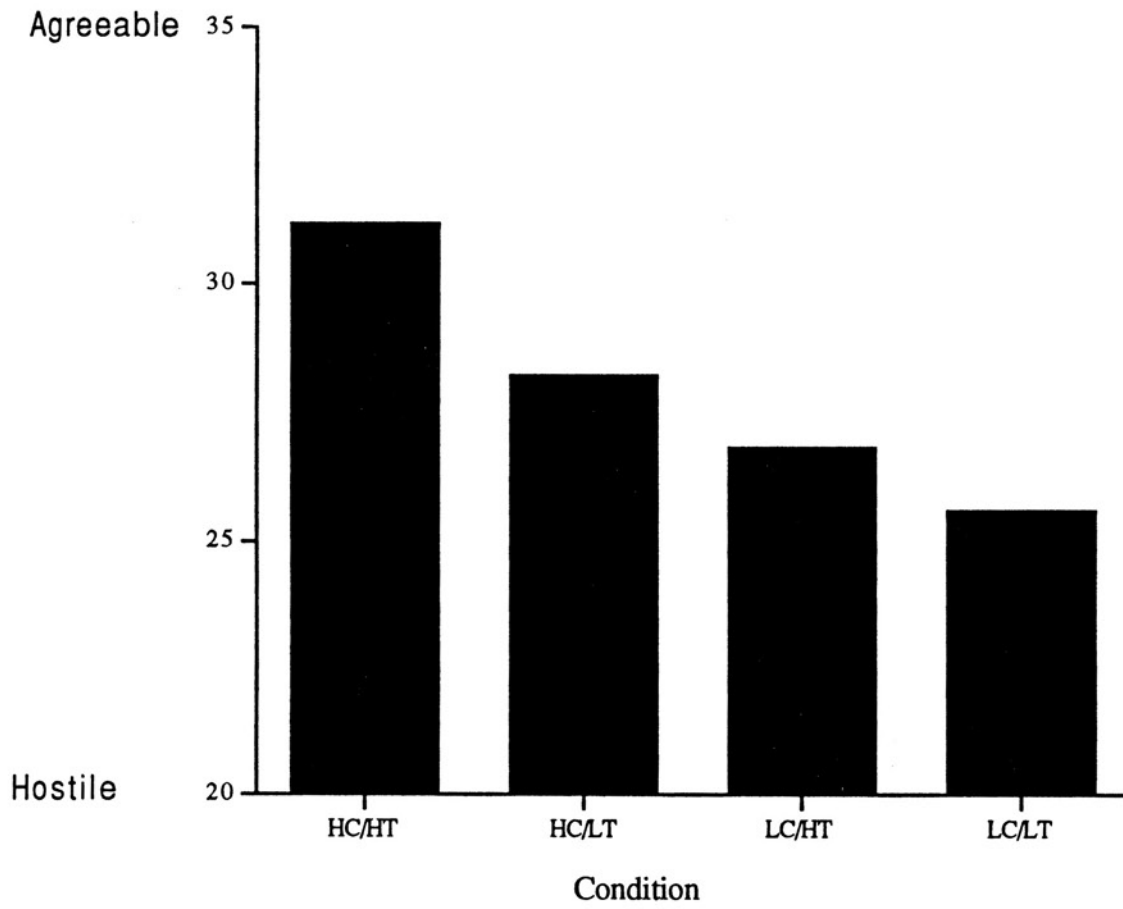


Figure 20: Post Group Pressure Mood Agreeable-Hostile

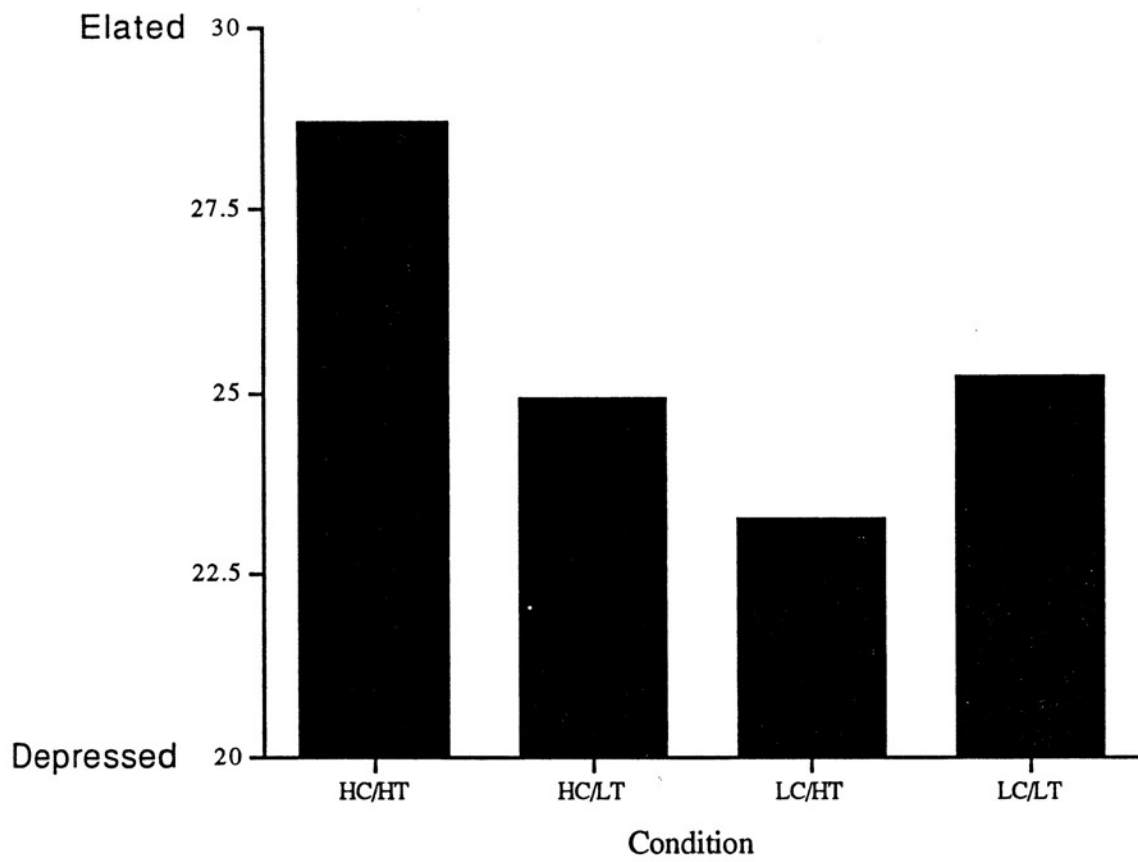


Figure 21: Pre Group Pressure Mood Elated-Depressed

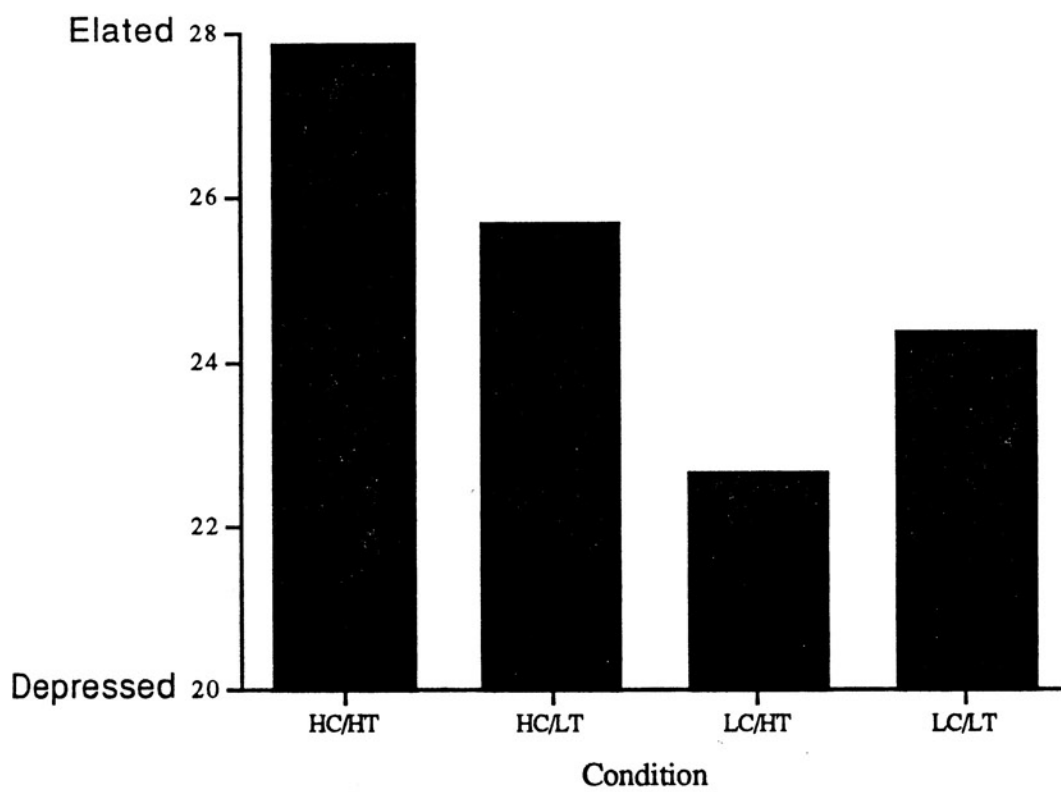


Figure 22: Post Group Pressure Mood Elated-Depressed

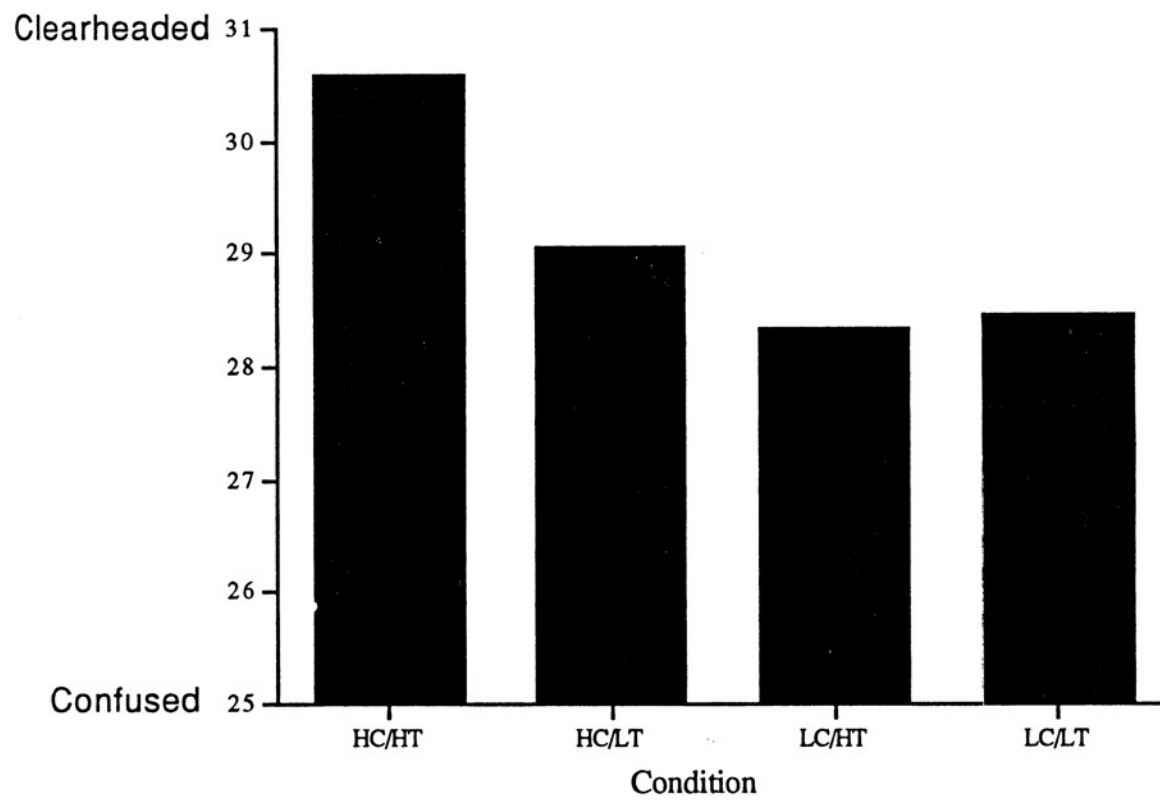


Figure 23: Post Group Pressure Mood Clearheaded-Confused

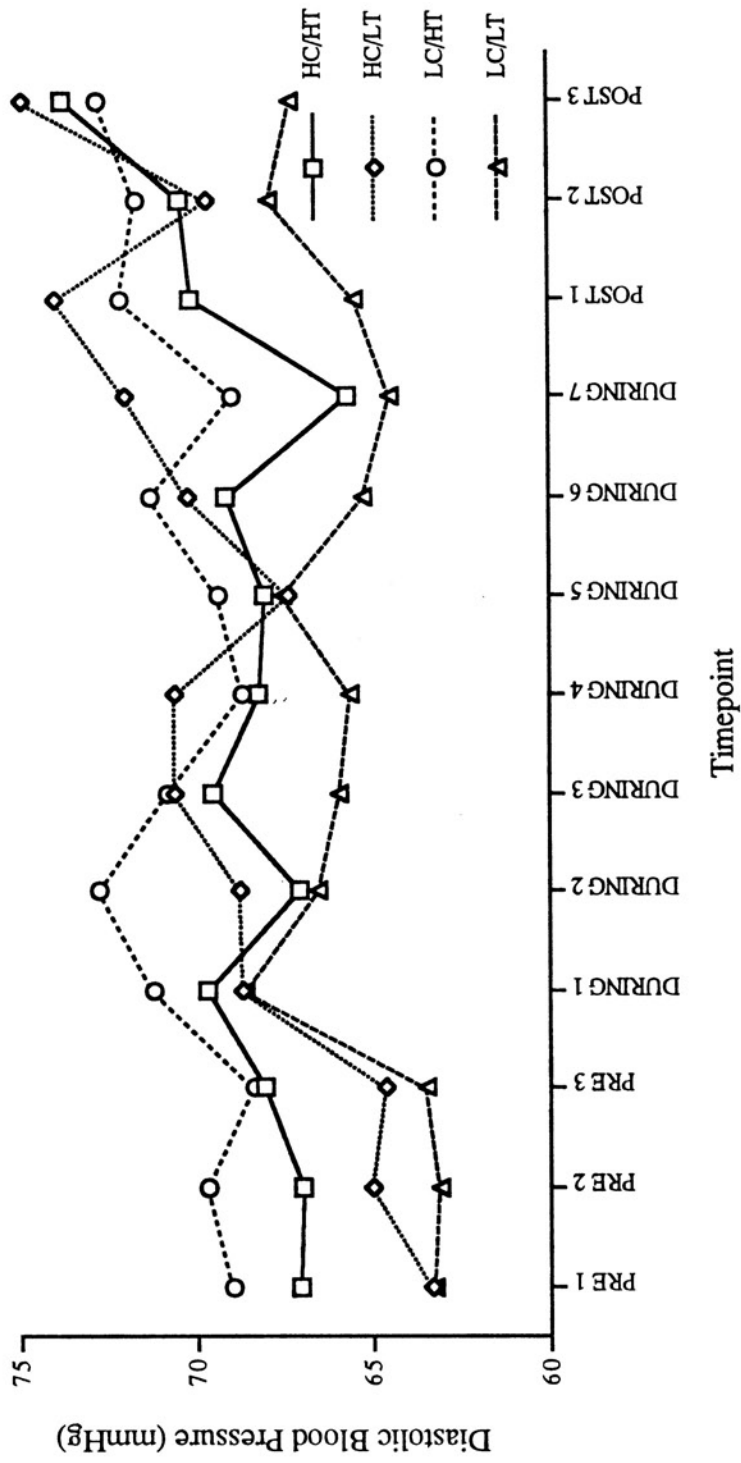


Figure 24: Diastolic Blood Pressure Across Session by Condition

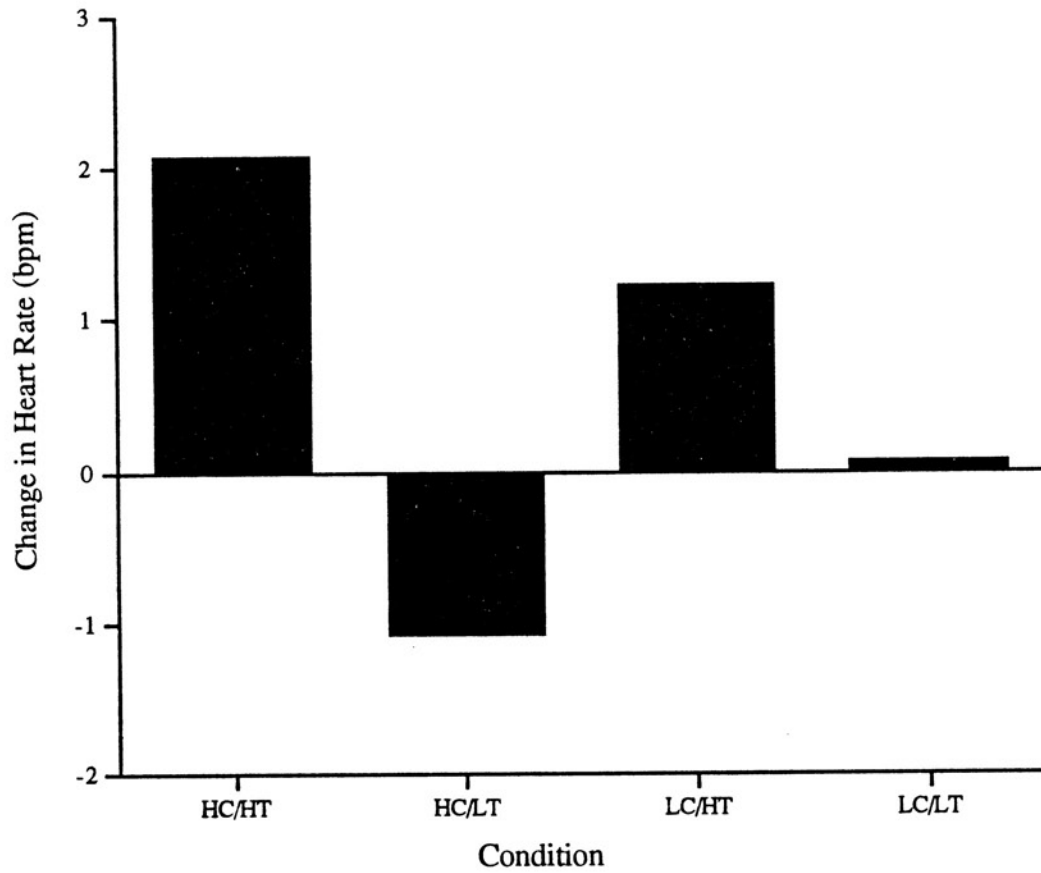


Figure 25: During to Post Group Pressure Change in Heart Rate

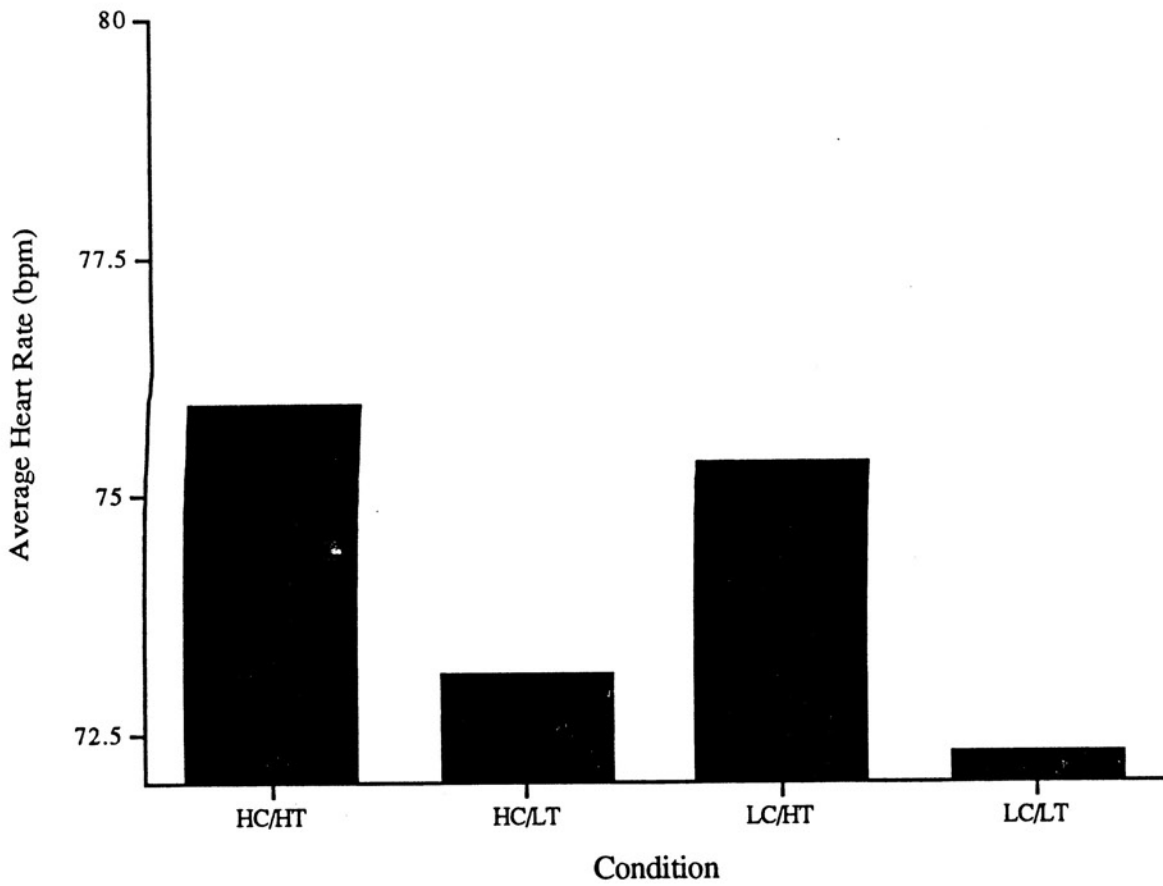


Figure 26: Average Heart Rate Post Group Pressure by Condition

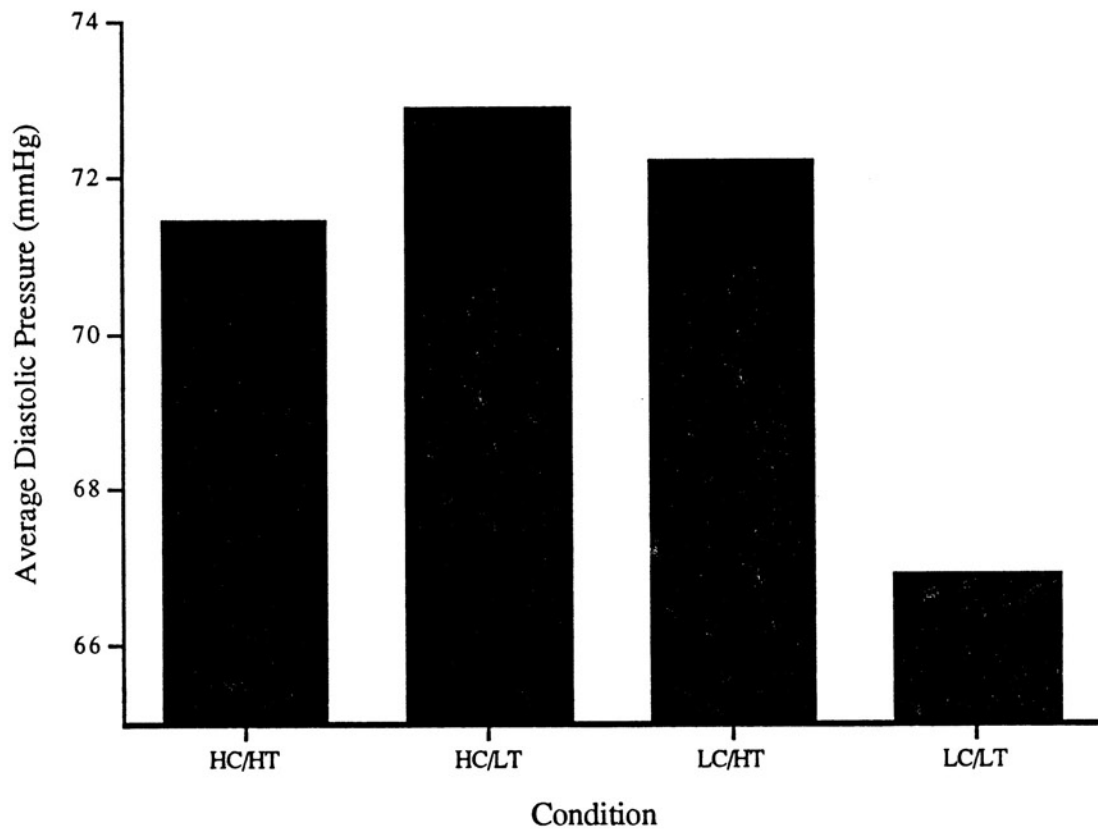


Figure 27: Average Post Group Pressure Diastolic Blood Pressure by Condition

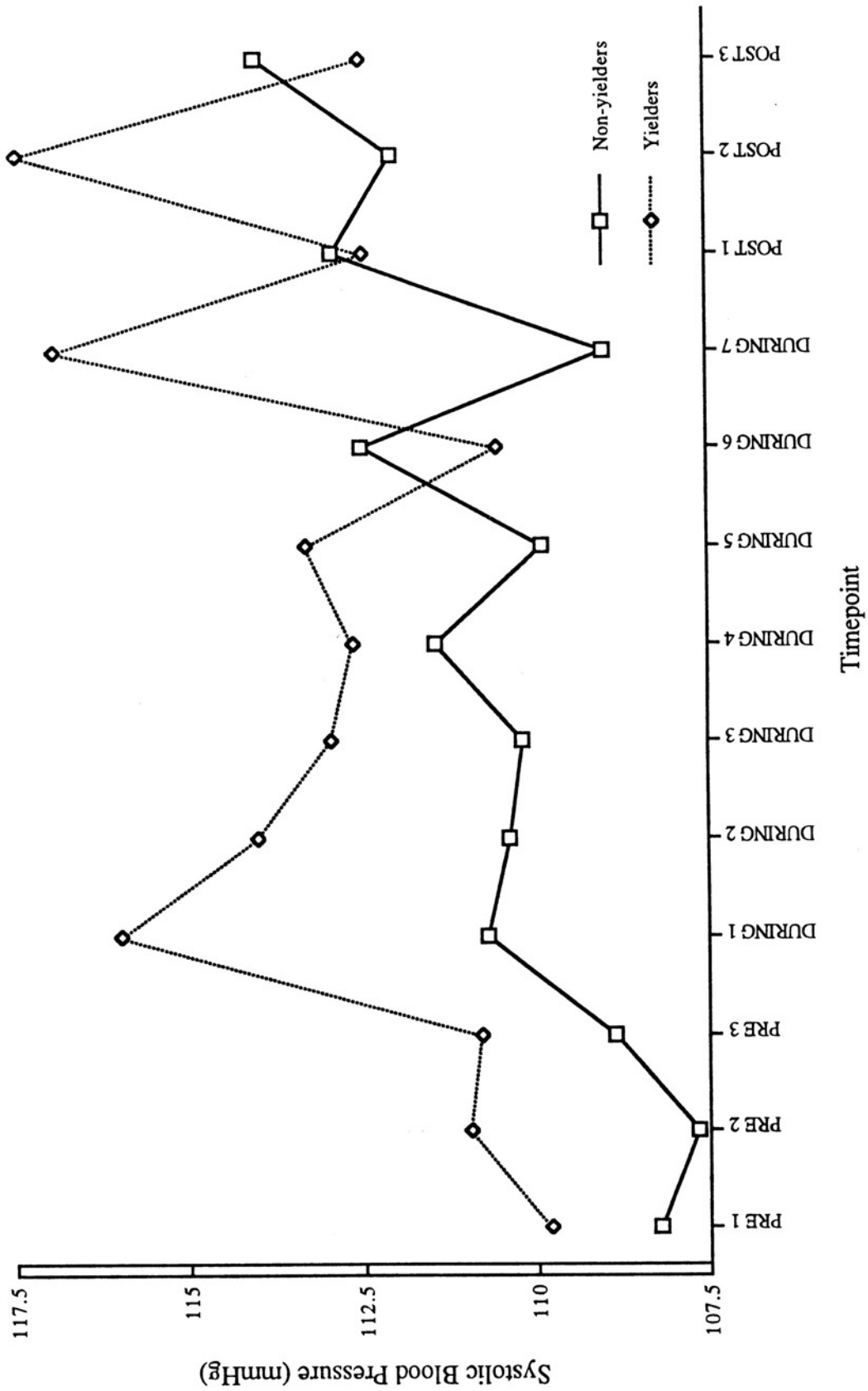


Figure 28: Systolic Blood Pressure Across Session, Yielders vs Non-yielders

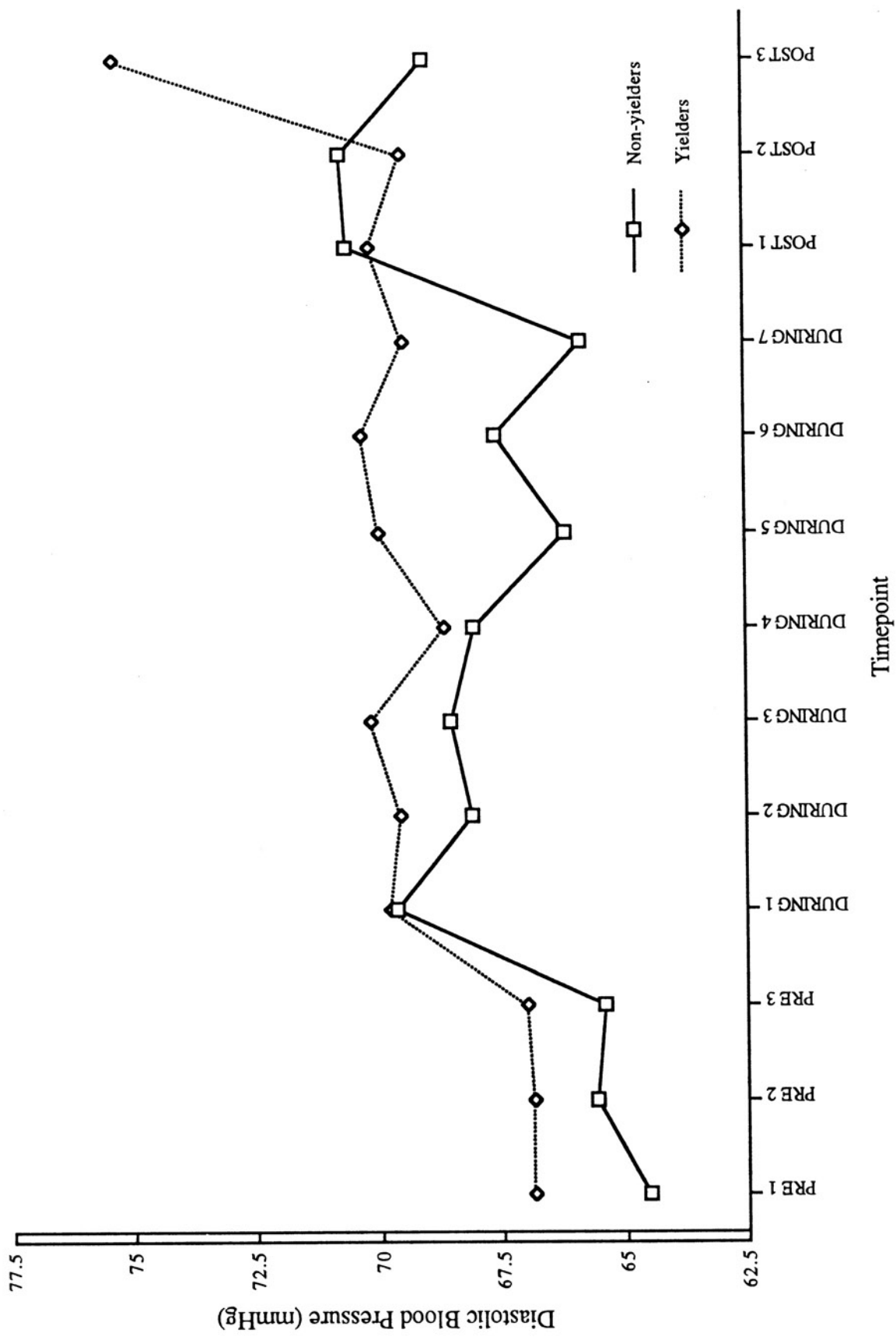


Figure 29: Diastolic Blood Pressure Across Session, Yielders vs Non-yielders

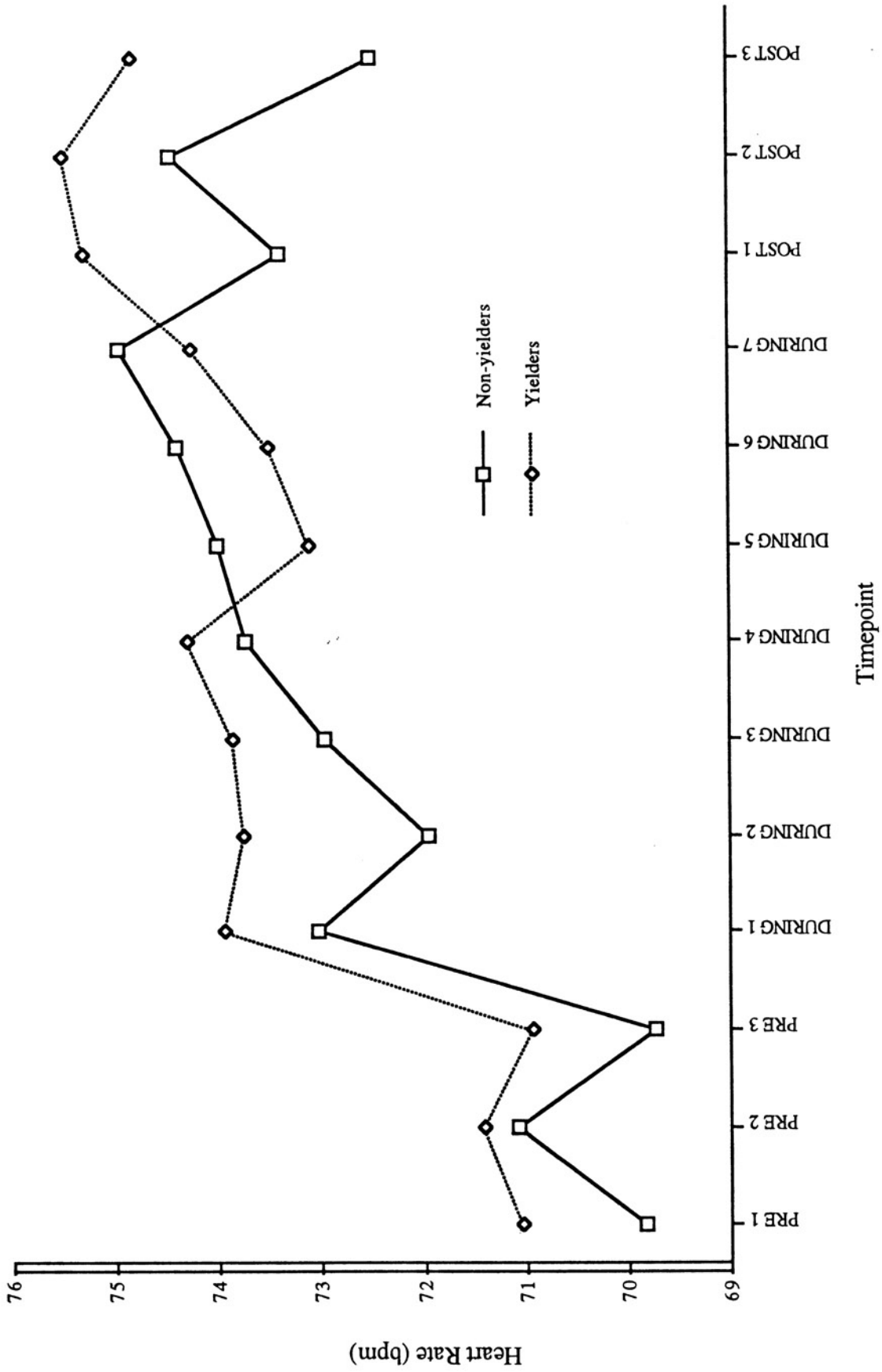


Figure 30: Heart Rate Across Session, Yielders vs Non-yielders

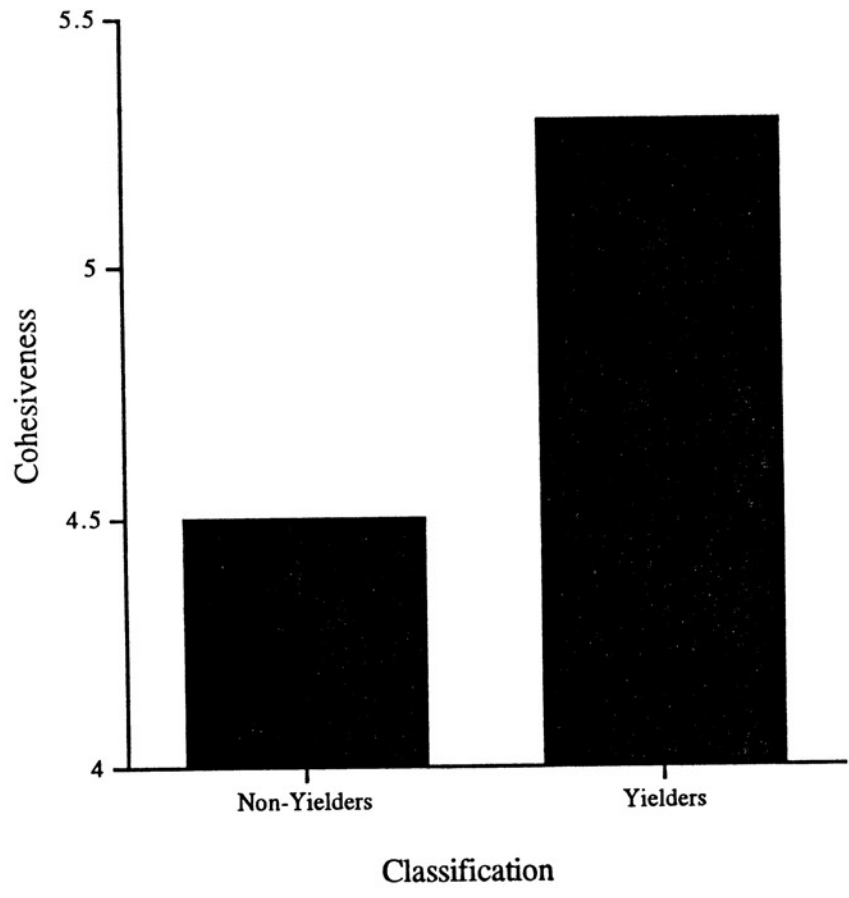


Figure 31: Self-Report of Cohesiveness Pre Group Pressure

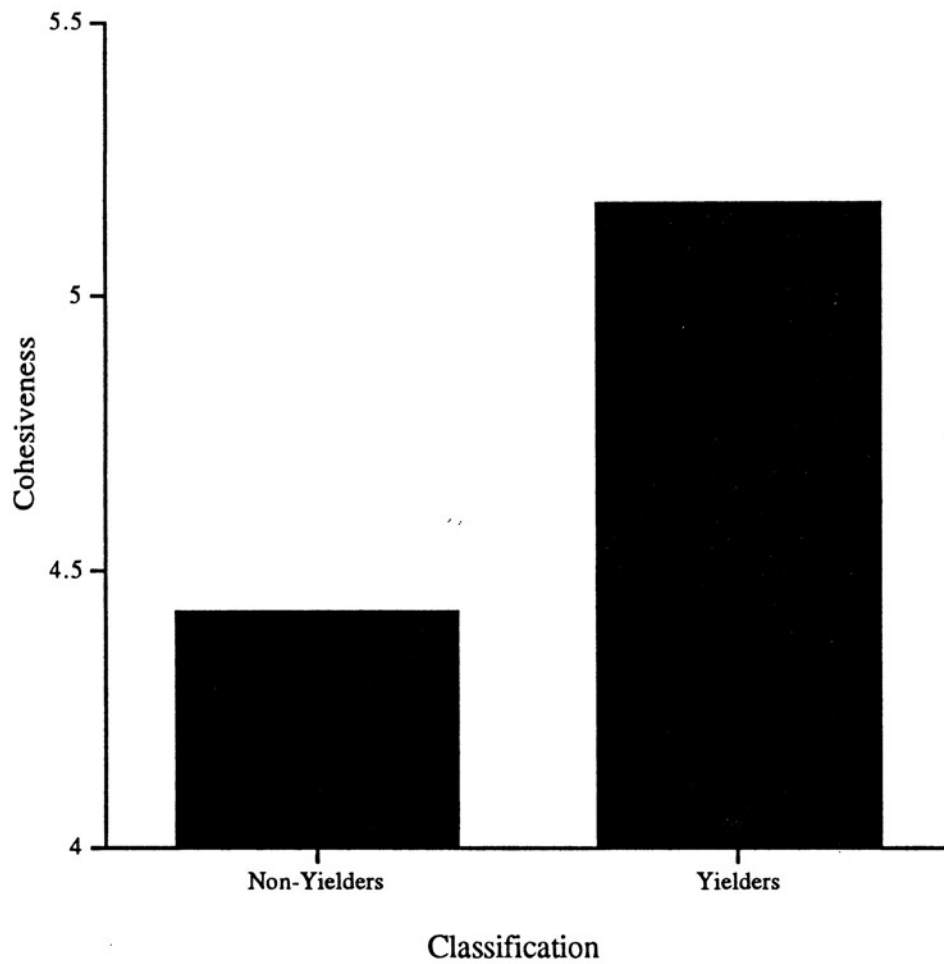


Figure 32: Self-Report of Cohesiveness Post Group Pressure

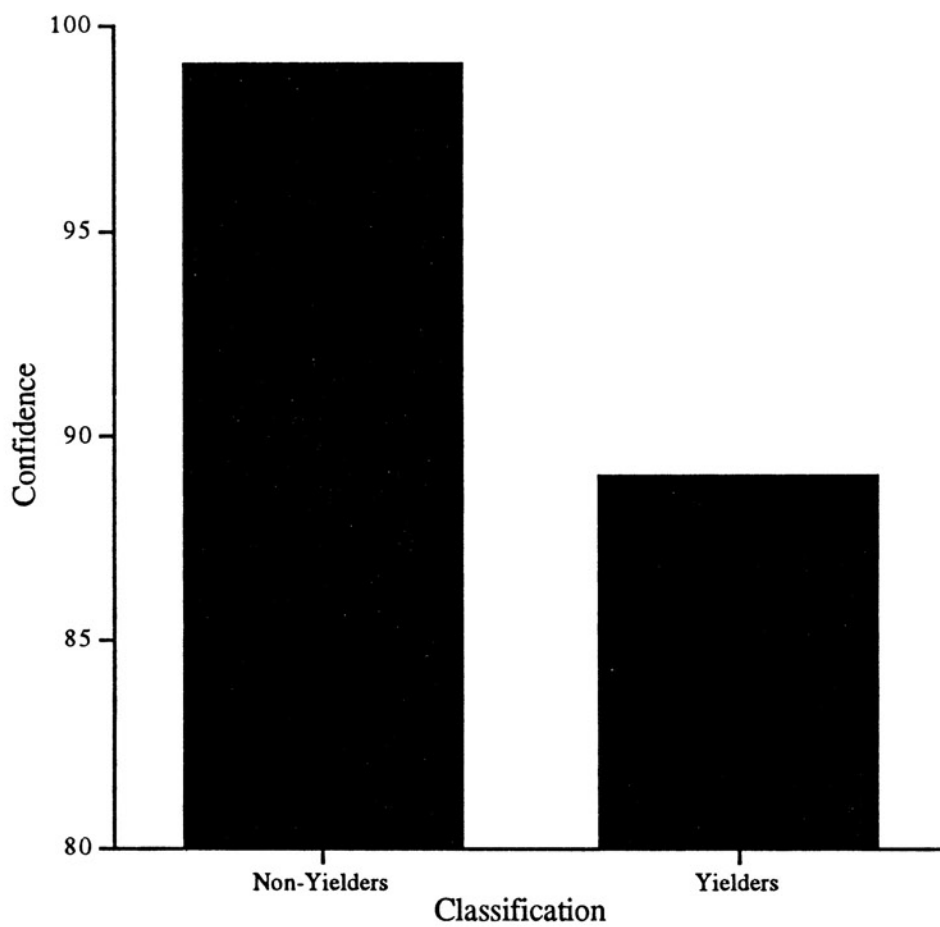


Figure 33: Self-Report of Confidence Pre Group Pressure

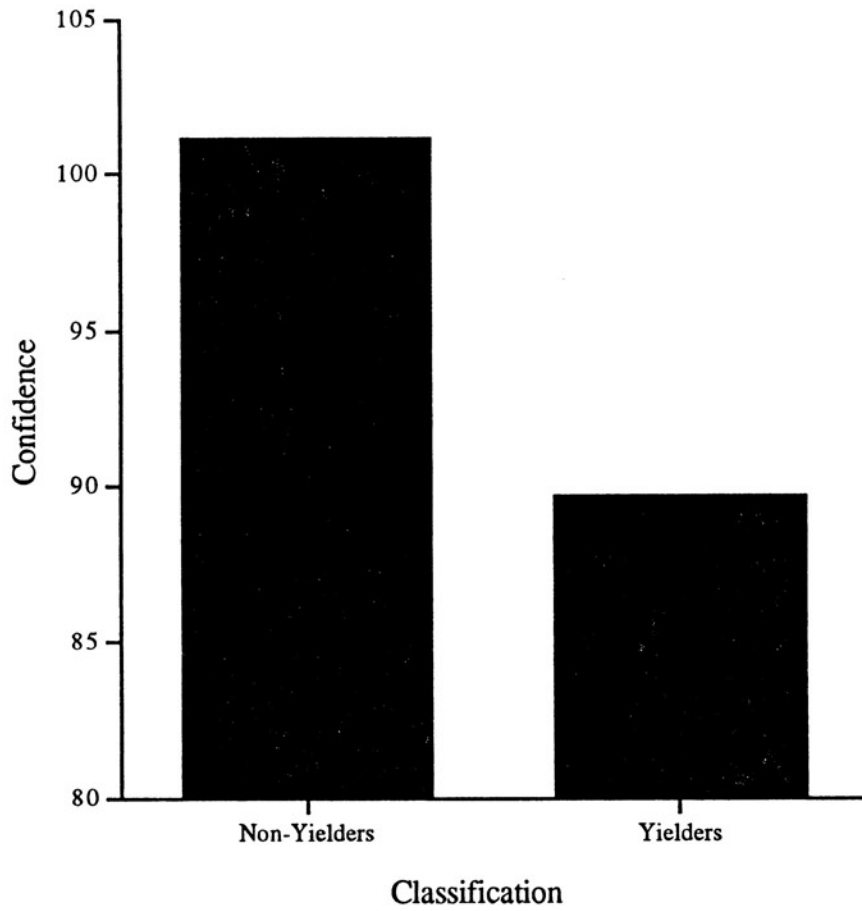


Figure 34: Self-Report of Confidence Post Group Pressure

APPENDIX I: PHONE SCREEN

1. Telephone Script
2. Screening Sheet

Telephone Script.

Hi, this is Lisa from USUHS calling back about the Cognitive Styles and Personality study for which you left your name and number. Are you still interested in participating?

Ok, let me give you a little more information about the study. We are interested in how a person's cognitive processes interact with certain personality variables, and also how these cognitive processes affect how others will see his or her personality. An example would be the famous partially filled glass of water. If two people were to look at the same glass and one sees it as half full while the other sees it as half empty, most would say that the first person was an optimist and the second was a pessimist. If we then brought those two people into the laboratory and gave them psychological questionnaires, we might find that, according to these measures, the first does show optimistic tendencies, whereas the second tends toward pessimism. This is a simple example of what we are interested in studying. We will have groups of subjects complete several types of simple cognitive and personality questionnaires, and take simple physiological measurements. There are two sessions. The first is individual, that is each subject comes to the laboratory alone where we will take individual cognitive and personality measures. Once everyone in your group has gone through the individual session, the second is the group session where we will gather data generated by your group's interaction while solving a problem. The first step is to send you a packet of questionnaires to fill out at home. You will have a week to complete the forms and mail them back to us. Filling them out should take roughly an hour and a half. Please fill these questionnaires out alone. After we receive the forms, we'll contact you to schedule your laboratory time. Because physiological variables, or bodily state, can affect cognitive process and behavior, we will be taking simple physiological measures-- that is we will ask you for urine samples and will

measure heart rate and blood pressure during the session. In addition, we'll ask you to bring in a urine sample from your first morning void of the morning of the experiment. We'll send you a cup to collect the urine and simple directions with the questionnaires. None of these measures are uncomfortable. This first individual session takes about two hours, and you will be paid \$20. However, the second group discussion session is a half an hour and you will be paid \$25 if you are able to participate.

Are you still interested in the study?

The experimenter will continue with-

OK, you will be receiving in the mail a packet of questionnaires and forms as well as instructions how to fill them out. So you can collect your first void of urine in the morning of the experiment, there also will be a cup and lid, just like you would get from the doctor's office. Please give me a call as soon as you receive them so that I know that you received them and so that I can address any questions that you might have in answering them. Please mail back the materials in the postage paid envelope within a week. Of course, keep the cup for urine collection on the morning of the experiment, and bring the sample with you to the study session.

Do you have any questions?

Phone Screen Questions

Screening Questions

1. What is your name?
2. What is your home telephone number?
3. What is your work telephone number?
4. What is your age?
5. Are you a University employee?
6. Are you currently active duty military?
7. Do you have any major health problems?
8. Do you have any physical disabilities?
9. Are you on any medications?
10. Have you ever been diagnosed with a learning or reading disorder?
11. Have you ever been diagnosed with a visual disorder?
12. Have you ever participated as a subject in another study at USUHS or at another University? (Describe)

Biographical Information Questions

- favorite color? season of the year? ice cream flavor? birthday? pets?
- dream vacation spot? states lived in? morning/afternoon/evening/night person?
- Where born? liberal, conservative, or moderate? age? occupation?
- highest level of schooling? hobbies? religion? car? favorite books?
- favorite movies? countries visited? Republican, Democrat, Independent, or other?
13. What would be the most convenient time of the day to come in for the experiment?
 14. What would be the best day of the week for you?
 15. When and at what number would be the best time to call you back?
 16. SCHEDULED INITIAL INDIVIDUAL SESSION, DATE/TIME:
 17. ADDRESS TO MAIL QUESTIONNAIRES:

APPENDIX II: COGNITIVE STYLE AND PERSONALITY QUESTIONNAIRE

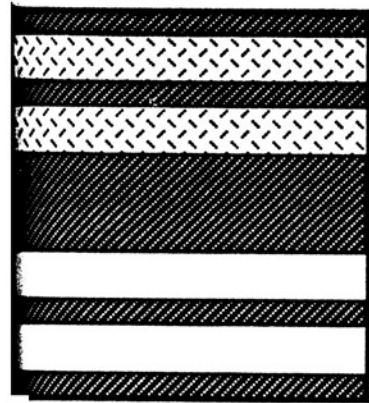
Cognitive Style and Personality Questionnaire

Directions:

1. This questionnaire has 18 pictures for you to judge.
2. Next to each picture are two different descriptions of the picture. In the example below, the two different picture descriptions are "4 Rows" and "2 Pairs of 2 Rows."
3. Below each picture description, write down a word that fits a person who would choose each description as the best way to describe the picture. In the example below, "stylish" might be a way to describe a person who would choose "4 Rows" and "personable" might describe a person who would choose "2 Pairs of 2 Rows." Use the list of personality characteristics attached to this questionnaire or you can come up with your own.
4. Then, mark the box next to the picture description that YOU believe is the best description of the picture.
5. Next, circle a number from 1-7 to indicate how confident you are about your choice.

EXAMPLE:

	WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC	CHECK THE BEST PICTURE DESCRIPTION	RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE											
	<table border="1"> <tr> <td>4 Rows</td> <td><input type="checkbox"/></td> <td rowspan="2">Not at all confident</td> <td rowspan="2">1 2 3 4 5 6 7 Extremely confident</td> </tr> <tr> <td>stylish</td> <td><input type="checkbox"/></td> </tr> </table> <table border="1"> <tr> <td>2 Pairs of 2 Rows</td> <td><input checked="" type="checkbox"/></td> <td rowspan="2">Not at all confident</td> <td rowspan="2">1 2 3 4 5 6 7 Extremely confident</td> </tr> <tr> <td>Personable</td> <td><input type="checkbox"/></td> </tr> </table>	4 Rows	<input type="checkbox"/>	Not at all confident	1 2 3 4 5 6 7 Extremely confident	stylish	<input type="checkbox"/>	2 Pairs of 2 Rows	<input checked="" type="checkbox"/>	Not at all confident	1 2 3 4 5 6 7 Extremely confident	Personable	<input type="checkbox"/>	
4 Rows	<input type="checkbox"/>	Not at all confident	1 2 3 4 5 6 7 Extremely confident											
stylish	<input type="checkbox"/>													
2 Pairs of 2 Rows	<input checked="" type="checkbox"/>	Not at all confident	1 2 3 4 5 6 7 Extremely confident											
Personable	<input type="checkbox"/>													



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

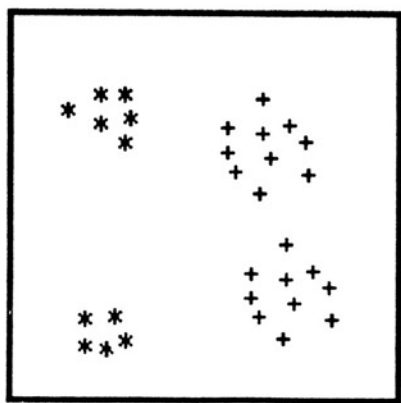
2 Pairs of 2 Stripes	
12 Stripes	

CHECK THE BEST PICTURE DESCRIPTION

<input type="checkbox"/>
<input type="checkbox"/>

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

Not at all confident 1 2 3 4 5 6 7 Extremely confident



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

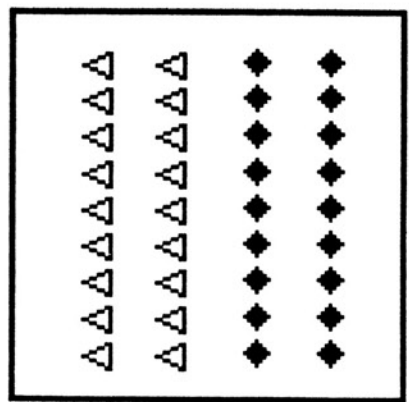
2 Stars	
4 Groups	

CHECK THE BEST PICTURE DESCRIPTION

<input type="checkbox"/>
<input type="checkbox"/>

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

Not at all confident 1 2 3 4 5 6 7 Extremely confident



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows	
3 Columns	

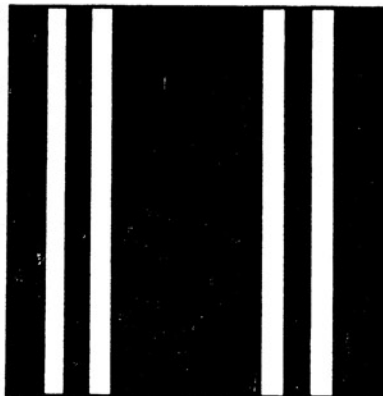
CHECK THE BEST PICTURE DESCRIPTION

<input type="checkbox"/>
<input type="checkbox"/>

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

Not at all confident 1 2 3 4 5 6 7 Extremely confident

4



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stripes

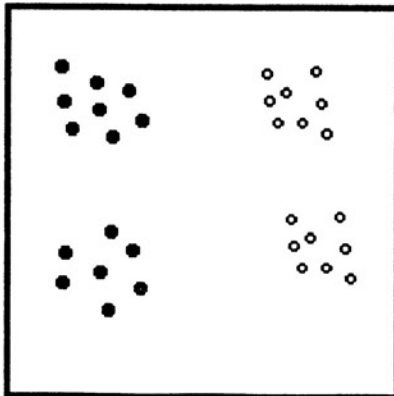
2 Pairs of Stripes

CHECK THE BEST PICTURE DESCRIPTION

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

Not at all confident 1 2 3 4 5 6 7 Extremely confident

5



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups

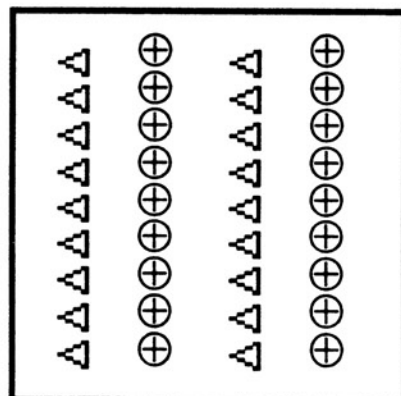
20 Dots

CHECK THE BEST PICTURE DESCRIPTION

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

Not at all confident 1 2 3 4 5 6 7 Extremely confident

6



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Rows

2 Pairs of 2 Rows

CHECK THE BEST PICTURE DESCRIPTION

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

Not at all confident 1 2 3 4 5 6 7 Extremely confident

CHECK THE BEST PICTURE DESCRIPTION

WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes

15 Stripes

Not at all confident 1 2 3 4 5 6 7 Extremely confident

CHECK THE BEST PICTURE DESCRIPTION

WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Marks

4 Groups

Not at all confident 1 2 3 4 5 6 7 Extremely confident

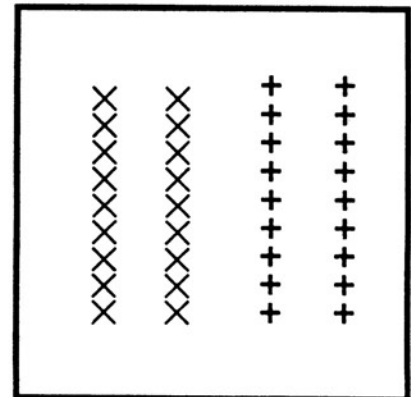
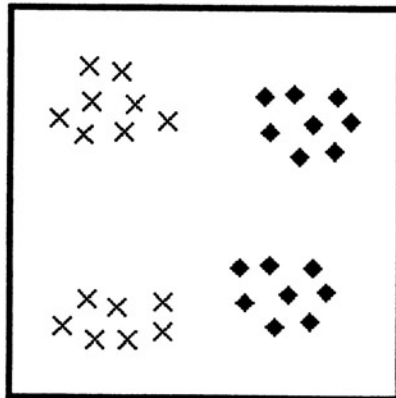
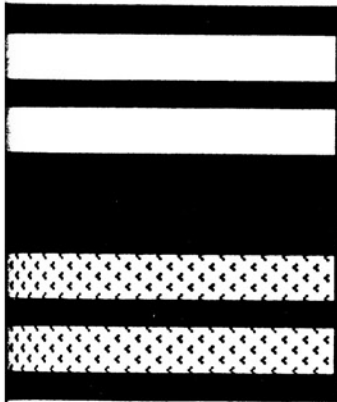
CHECK THE BEST PICTURE DESCRIPTION

WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows

6 Columns

Not at all confident 1 2 3 4 5 6 7 Extremely confident

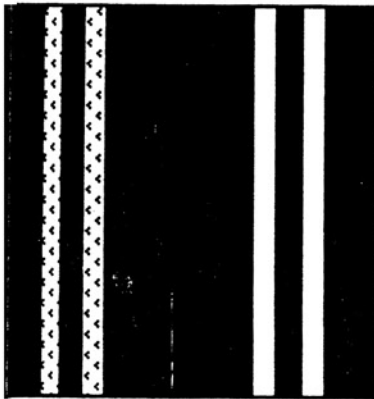


7

8

9

10



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

12 Stripes

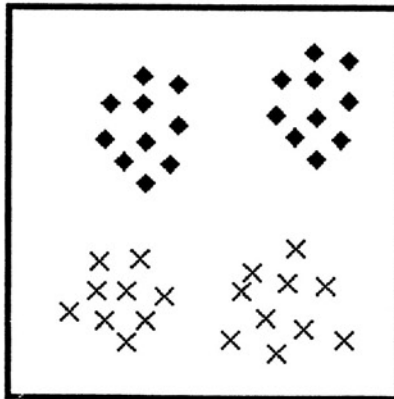
2 Pairs of Stripes

CHECK THE BEST PICTURE DESCRIPTION

Not at all confident 1 2 3 4 5 6 7 Extremely confident

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

11



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups

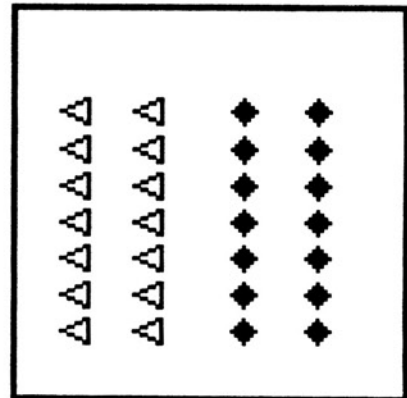
2 Marks

CHECK THE BEST PICTURE DESCRIPTION

Not at all confident 1 2 3 4 5 6 7 Extremely confident

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

12



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Columns

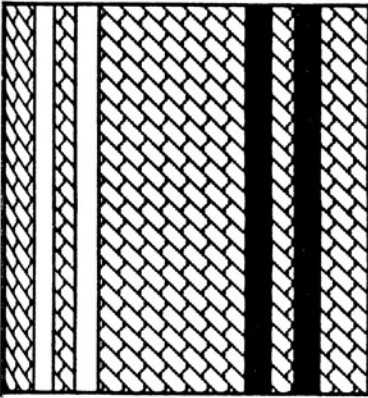
2 Pairs of Rows

CHECK THE BEST PICTURE DESCRIPTION

Not at all confident 1 2 3 4 5 6 7 Extremely confident

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

13



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes	
14 Stripes	

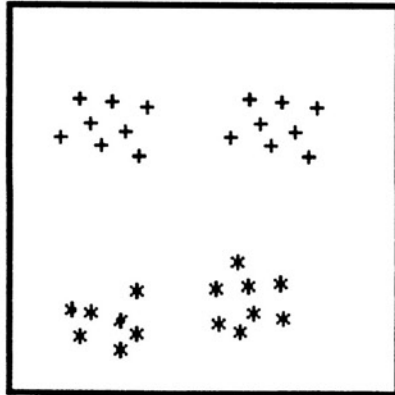
CHECK THE BEST PICTURE DESCRIPTION

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

Not at all confident 1 2 3 4 5 6 7 Extremely confident

14



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stars	
4 Groups	

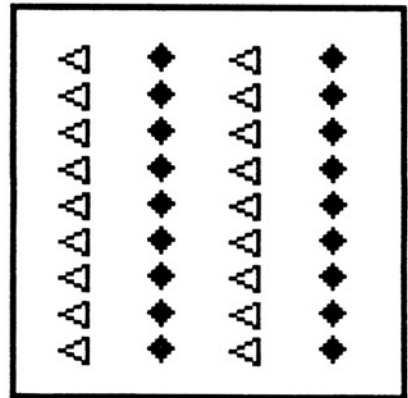
CHECK THE BEST PICTURE DESCRIPTION

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

Not at all confident 1 2 3 4 5 6 7 Extremely confident

15



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

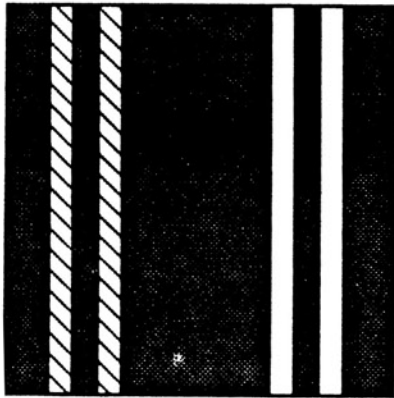
2 Pairs of 2 Rows	
9 Columns	

CHECK THE BEST PICTURE DESCRIPTION

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

Not at all confident 1 2 3 4 5 6 7 Extremely confident



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

5 Stripes	
2 Pairs of Stripes	

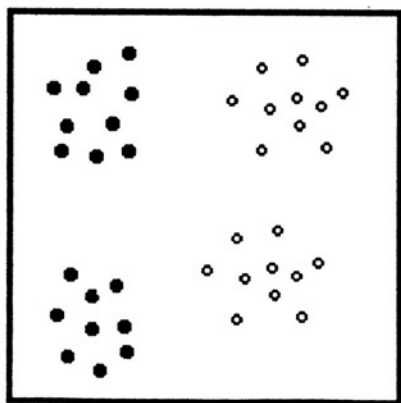
CHECK THE BEST PICTURE DESCRIPTION

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

Not at all confident 1 2 3 4 5 6 7 Extremely confident

16



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups	
10 Dots	

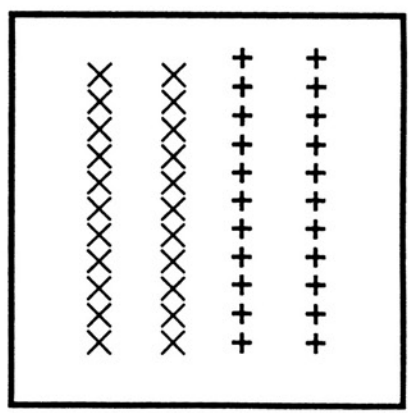
CHECK THE BEST PICTURE DESCRIPTION

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

Not at all confident 1 2 3 4 5 6 7 Extremely confident

17



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

7 Columns	
2 Pairs of Rows	

CHECK THE BEST PICTURE DESCRIPTION

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

RATE HOW CONFIDENT YOU FEEL THAT THIS IS THE BEST DESCRIPTION FOR THE PICTURE

Not at all confident 1 2 3 4 5 6 7 Extremely confident

18

able	charming	cynical
absent-minded	cheerful	daredevil
abusive	childish	daring
accommodating	choosy	daydreamer
accurate	civil	deceitful
active	clean	decent
admirable	clean-cut	deceptive
adventurous	clear-headed	decided
aggressive	clever	decisive
agreeable	clownish	definite
aimless	clumsy	deliberate
alert	cold	demanding
ambitious	comical	dependable
amiable	companionable	dependent
amusing	competent	depressed
angry	complaining	dignified
annoying	composed	diligent
antisocial	compromising	dim-witted
anxious	compulsive	direct
appealing	conceited	disagreeable
appreciative	confident	disciplined
argumentative	conforming	discontented
artistic	conformist	discourteous
attentive	congenial	discreet
authoritative	conscientious	discriminating
average	conservative	dishonest
bashful	considerate	dishonorable
belligerent	consistent	dislikable
blunt	constructive	disobedient
boastful	conventional	disrespectful
boisterous	convincing	dissatisfied
bold	cool	distrustful
boring	cool-headed	disturbed
bossy	cooperative	dominating
bragging	cordial	domineering
bright	courageous	down-hearted
brilliant	courteous	dull
broad-minded	cowardly	dumb
calm	crafty	eager
candid	creative	earnest
capable	critical	easygoing
careful	crude	eccentric
careless	cruel	educated
casual	cultured	efficient
cautious	cunning	egotistical
changeable	curious	emotional

energetic
enterprising
entertaining
enthusiastic
envious
ethical
excitable
excited
experienced
extravagant
exuberant
fair
fashionable
fault-finding
fearful
fickle
finicky
foolhardy
foolish
forceful
forgetful
forgiving
formal
forward
frank
friendly
frivolous
frustrated
generous
gentle
gloomy
good
good-humored
good-natured
good-tempered
gossipy
graceful
gracious
grateful
greedy
grouchy
gullible
happy
hard-hearted
headstrong
healthy

heartless
helpful
helpless
hesitant
high-spirited
high-strung
honest
honorable
hopeful
hostile
hot-headed
hot-tempered
humble
humorless
humorous
hypochondriac
idealistic
illogical
ill-mannered
ill-tempered
imaginative
immature
immodest
impolite
impractical
impressionable
impulsive
inaccurate
inattentive
incompetent
inconsistent
indecisive
independent
indifferent
individualistic
industrious
inefficient
inexperienced
informal
ingenious
inhibited
initiative
innocent
inoffensive
inquisitive
insecure

insincere
insolent
inspiring
insulting
intellectual
intelligent
interesting
intolerant
inventive
irrational
irreligious
irresponsible
irritable
irritating
jealous
jumpy
kind
kindly
kind-hearted
lazy
level-headed
liar
lifeless
light-hearted
likable
listless
literary
lively
logical
lonely
lonesome
loud-mouthed
loyal
lucky
maladjusted
malicious
mannered
materialistic
mathematical
mature
mean
meddlesome
mediocre
meditative
meek
melancholy

messy	overcritical	realistic
methodical	oversensitive	fearless
meticulous	painstaking	reasonable
middleclass	passive	rebellious
misfit	patient	reckless
moderate	perceptive	refined
modern	perfectionistic	relaxed
modest	persistent	reliable
moody	persuasive	religious
moral	pessimistic	resentful
moralistic	petty	reserved
naive	philosophical	resigned
narrow-minded	phony	resourceful
neat	pleasant	respectable
neglectful	pleasing	respectful
negligent	poised	responsible
nervous	polite	restless
neurotic	pompous	righteous
nice	popular	romantic
noisy	positive	rude
nonchalant	possessive	sad
nonconfident	practical	sarcastic
nonconforming	precise	satirical
noninquisitive	predictable	scheming
normal	prejudiced	scientific
nosey	preoccupied	scolding
obedient	prideful	scornful
objective	productive	selfish
obliging	profane	self-assured
obnoxious	proficient	self-centered
observant	progressive	self-conceited
obstinate	prompt	self-concerned
offensive	proud	self-confident
old-fashioned	prudent	self-conscious
open-minded	punctual	self-contented
opinionated	purposeful	self-controlled
opportunist	purposeless	self-critical
optimist	quarrelsome	self-disciplined
orderly	quick	self-possessed
ordinary	quick-witted	self-reliant
original	quiet	self-righteous
outgoing	radical	self-satisfied
outspoken	rad	self-sufficient
outstanding	rash	sensible
overcautious	rational	sensitive
overconfident	realist	secure

sentimental	tactless	unfriendly
serious	talented	ungraceful
shallow	talkative	ungracious
sharp-witted	temperamental	ungrateful
short-tempered	temperate	unhappy
showy	tender	unhealthy
shrewd	tense	unimaginative
shy	theatrical	unindustrious
silent	thorough	uninquisitive
silly	thoughtful	uninspiring
sincere	thoughtless	unintellectual
skeptical	thrifty	unintelligent
skilled	tidy	uninteresting
skillful	timid	unkind
sloppy	tiresome	unkindly
sly	tolerant	unlucky
smart	touchy	unmethodical
smug	tough	unobliging
snobbish	troubled	unobservant
sociable	troublesome	unoriginal
social	trustful	unpleasant
soft-hearted	trusting	unpleasing
soft-spoken	trustworthy	unpoised
solemn	truthful	unpopular
sophisticated	ultra-critical	unpredictable
spendthrift	unaccommodating	unproductive
spirited	unadventurous	unpunctual
spiteful	unagreeable	unreasonable
sportsmanlike	unappealing	unreliable
squeamish	unappreciative	unromantic
stern	unattentive	unruly
stingy	uncivil	unselfish
strict	uncompromising	unskilled
strong-minded	uncongenial	unsociable
stubborn	unconventional	unsocial
studious	uncultured	unsophisticated
stupid	undecided	unsporting
suave	underhanded	unsportsmanlike
submissive	understanding	unstudious
subtle	unemotional	unsympathetic
superficial	unenterprising	unsystematic
superstitious	unentertaining	untidy
suspicious	unenthusiastic	untiring
sympathetic	unethical	untrustworthy
systematic	unfair	untruthful
tactful	unforgiving	unwise

upright
vain
venturesome
versatile
vigorous
vivacious
vulgar
warm
warm-hearted
wasteful
weak
well-bred
well-mannered
well-read
well-spoken
wholesome
wise
wishy-washy
withdrawing
withdrawn
witty
wordy
worrier
worrying

APPENDIX III: POTENTIAL GROUP MEMBER PREFERENCE QUESTIONNAIRE

LIST B- RANK EACH PERSON- USE THE LAST ROW

LIST B- Subject Designation	B1	B2	B3	B4	B5
AGE	45	39	34	25	21
BIRTHDAY	13-Jul	19-Oct	10-May	27-Apr	13-Apr
BIRTHPLACE	Philippines	Baltimore	Bronx	San Diego, CA	La Jolla, CA
OCCUPATION	Homemaker	Computers/Gov't worker	Budget Analyst	Aerobics Instructor	Prison Guard
SCHOOLING	BSN	grad school	BBA	BS	high school
STATES LIVED	NY, PA, DC	MD, OH, IL	NY, NJ, DC	CA, NY, VA, MD	MD, VA
COUNTRIES VISITED	Canada, Philippines, Mexico, Columbia, Aruba, Virgin Isl., Bahamas, Japan, Hong Kong		Greece, Turkey, Italy, Canada	Canada, Cayman Islands, Mexico	France, Germany
FAVORITE VACATION SPOT	Cancun	Tahiti	Hawaii	Hawaii	Cayman Isl.
MORNING/AFTERNOON/EVENING/NIGHT	morning	afternoon/evening	morning	morning	night
LIBERAL/CONSERVATIVE/MODERATE	moderate	liberal	moderate	liberal	moderate
REPUBLICAN/DEMOCRAT/INDEPENDENT	Democrat	Democrat	Independent	Democrat	Independent
RELIGION	Roman Catholic	None	Methodist	Jewish	Wiccan
PETS	dog	cat	none	none	jet black cat and iguana named Spot
CAR	Fleetwood Cadillac	Mercury Tracer	minivan	Toyota Celica	Nissan 300ZX
FAVORITE COLOR	cherise	blue	red	Fuchsia	jet black
FAVORITE SEASON	summer	spring	spring	spring	cold winter
FAVORITE ICE CREAM	butter pecan	praline	vanilla	mocha chocolate chip	heavenly hash
FAVORITE BOOKS	biographies	sci-fi	spy novels, science fiction	mysteries, Stephen King, romance	Chilton's, sport magazines
FAVORITE MOVIES	musicals	trashy	action adventure	The Changeling, Breakfast Club, Waynes World, Terms of Endearment, Driving Miss Daisy	Space Balls, Caddyshack, Slap Shot
HOBBIES	aerobics	bridge, music, videotapes	sports	skiing, exercise, music, crafts	yachting
RANK EACH PERSON IN LIST B from 1 (most preferred) to 5 (least preferred)	XXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXX

RANK EACH PERSON- USE THE LAST ROW

LIST C- RANK EACH PERSON- USE THE LAST ROW

LIST C- Subject Designation	C1	C2	C3	C4	C5
AGE	31	19	23	29	44
BIRTHDAY	22-May	24-Sep	2-Jan	13-Feb	February
BIRTHPLACE	Norway, ME	NYC	Dearborn, MI	Caracas, Venezuela	NY
OCCUPATION	Grad Fellow	Homemaker	Medical Assistant	Postdoc	Biochemist
SCHOOLING	MA	High School	some college	Ph.D.	college
STATES LIVED	ME, MA, CT, DE, MD	NY, MD	HI, MI, MD	CA, D.C.	NY, CN, OH, MD
COUNTRIES VISITED	Antarctica, S. Korea, New Zealand, Australia, Canada, Sweden, Norway, Denmark, W. Germany, Switzerland, France, Spain	Italy	Caribbean Islands	Venezuela, Peru, Mexico, England, Italy, France, Spain, Greece, Switzerland	Canada, Bermuda, Caribbean Is
FAVORITE VACATION SPOT	Coast of Maine in summer/late spring	deserted island- with no telephone	Tahiti	beach	Caribbean Is
MORNING/AFTERNOON/EVENING/NIGHT	morning	morning	Afternoon	evening	morning
LIBERAL/CONSERVATIVE/MODERATE	moderate	conservative	liberal	liberal	liberal
REPUBLICAN/DEMOCRAT/INDEPENDENT	independent	Republican	Democrat	Social Democrat	democrat
RELIGION	agnostic/aetheist	Roman Catholic	Baptist	Catholic	aetheist
PETS	3 cats and tribble	fish	cat, dog, fish	cat	cat
CAR	Ford Festiva	Chevy Broughm	N/A	Mazda	Subaru
FAVORITE COLOR	blue	brown	Green	green	blue
FAVORITE SEASON	winter	fall	fall	summer	spring
FAVORITE ICE CREAM	heavenly hash	chocolate	mint	pralines n' cream	chocolate (any variation)
FAVORITE BOOKS	science fiction	mysteries	Gone with the Wind	Blasco Ibauez, La Montana Magica, Eva Luna	Legs and All, Chimera, Maximum Bob, Damage, The Lord Peter Wimsey mystery series by Dorothy Sayers, Marge Piercy books, Hemmingway, Fowles, Willa Cather
FAVORITE MOVIES	Clint Eastwood, John Wayne, Star Trek I, II, III, V	action, drama	Young Frankenstein	Silence of the Lambs, Like Water for Chocolate	The Great Zeigfield, Lawrence of Arabia, Invasion of the Body Snatchers (both old and new), Dracula (early 1980's with Frank Langela, Sea of Love, Crying Game, League of their Own, Desperately Seeking Susan, Dead Again
HOBBIES	amateur radio, photography, graphic arts, baseball cards, etc.	Painting, Interior Decorating	films	sailing, scuba, diving, photography, cooking, hiking, embroidery, reading	biking
RANK EACH PERSON IN LIST C (from 1 (most preferred) to 5 (least preferred))	XXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXX

RANK EACH PERSON- USE THE LAST ROW

LIST D- RANK EACH PERSON- USE THE LAST ROW

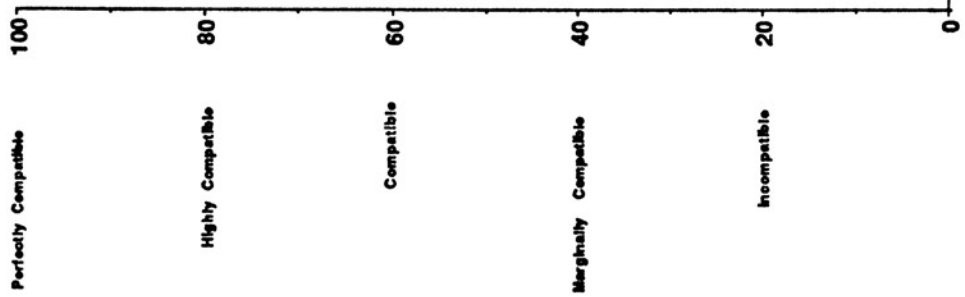
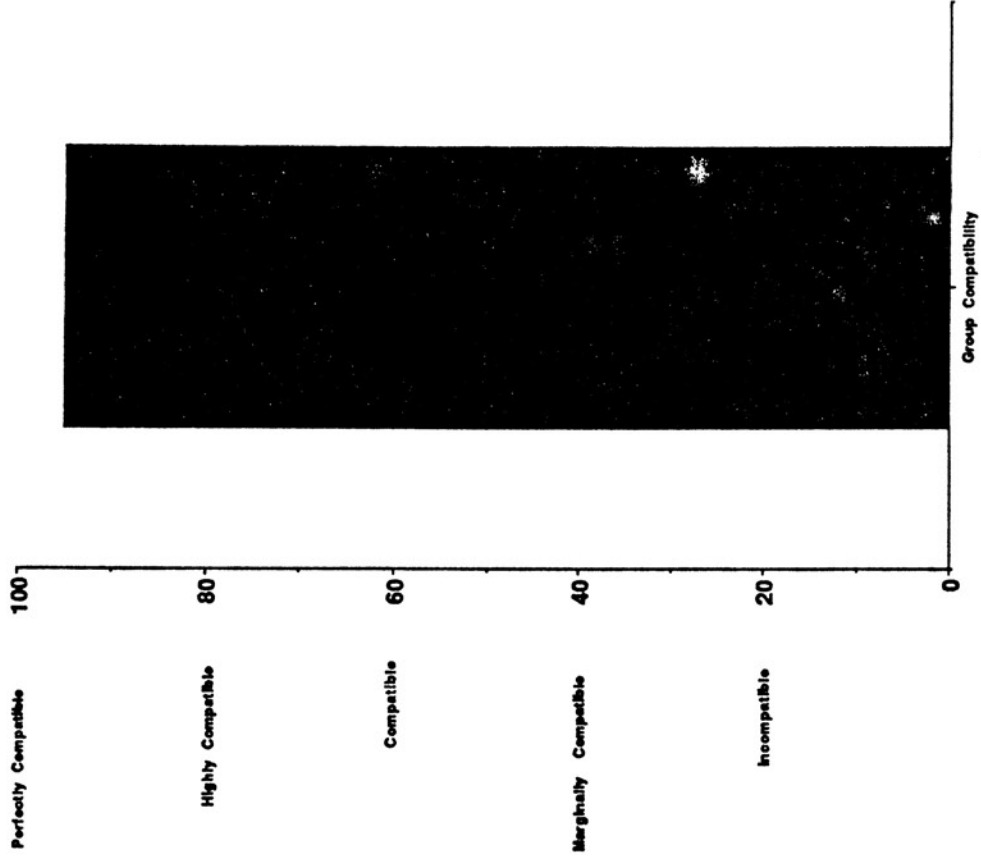
LIST D- Subject Designation	D1	D2	D3	D4	D5
AGE	23	31	23	23	39
BIRTHDAY	2-Jun	18-Jan	30-Apr	30-Jun	9-Aug
BIRTHPLACE	Hospital	NY	MD	Kalamazoo, MI	Newark, NJ
OCCUPATION	Research Assistant	Mom	Teacher	Student	Lawyer
SCHOOLING	some grad courses	grad school	MA	college	MBA
STATES LIVED	MD	PA, NY, NJ, MD	MD	MI, MD	NJ, NY, CA, PA, MD
COUNTRIES VISITED	England, Canada	England, Germany, Luxembourg, Italy, France, Austria, Japan, Philippines, China, Canada, Mexico	None	Canada	Canada, England, Scotland, France, Italy, Spain, Sweden, Germany, Austria, Yugoslavia, Greece, Netherlands, Denmark, Switzerland, Australia, New Zealand
FAVORITE VACATION SPOT	Alaskan Cruise	some tropical island	Australia	Micronesia	Vail
MORNING/AFTERNOON/EVENING/NIGHT	evening	evening	night	morning	morning
LIBERAL/CONSERVATIVE/MODERATE	moderate	moderate	moderate	liberal	liberal
REPUBLICAN/DEMOCRAT/INDEPENDENT	Republican	Independent	Democrat	Democrat	Democrat
RELIGION	Christian	Roman Catholic	unaffiliated	Unitarian	Jewish
PETS	none	toddler	2 cats	fish	dog
CAR	truck	Pontiac 6000LE	Pulsar NX	Ford Ranger	Tercel
FAVORITE COLOR	black	purple	purple	blue	black
FAVORITE SEASON	fall	fall	spring	fall	summer
FAVORITE ICE CREAM	Haagen Das Rum Raisin	jamoca almond fudge	chocolate marshmallow	N/A	coffee
FAVORITE BOOKS	Bible, science fiction	More than Human, A Tale of Two Cities, Til We Have Faces, What Men Live By, Chronicles of Pyrdain	Danielle Steel books	N/A	Zen and the Art of Archery, Over the Edge, Arrowsmith, Babbitt
FAVORITE MOVIES	Beauty and the Beast, Casablanca	Star Wars, Charlie Chaplin movies, Beauty and the Beast	Grease, Urban Cowboy	N/A	Butch Cassidy and the Sundance Kid, Vanishing Point, The Way We Were
HOBBIES	ceramics, ballroom dancing	sci-fi, music	listening to music	exercise, skiing, diving, music	music, art, racquetball, hiking, tennis
RANK EACH PERSON IN LIST D	XXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXX
from 1 (most preferred) to 5 (least preferred)					

RANK EACH PERSON- USE THE LAST ROW

APPENDIX IV: STIMULI MANIPULATING COHESIVENESS

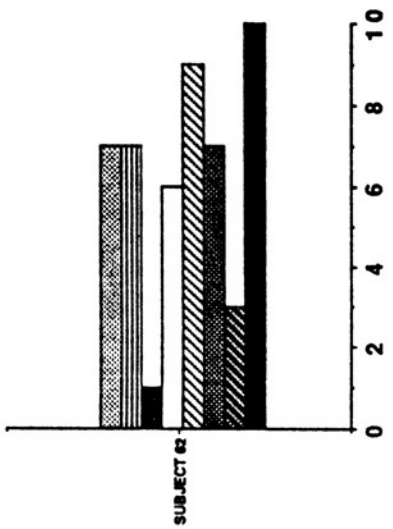
1. High Cohesiveness Stimuli
2. Low Cohesiveness Stimuli

Predicted Compatibility

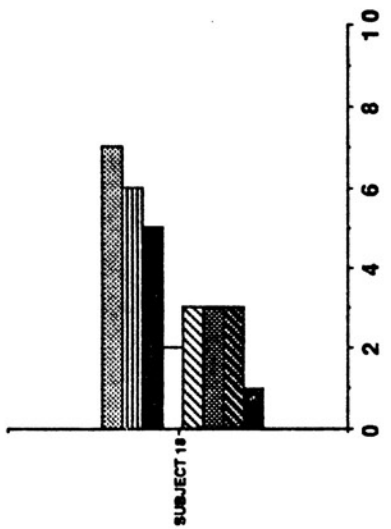


Group Compatibility

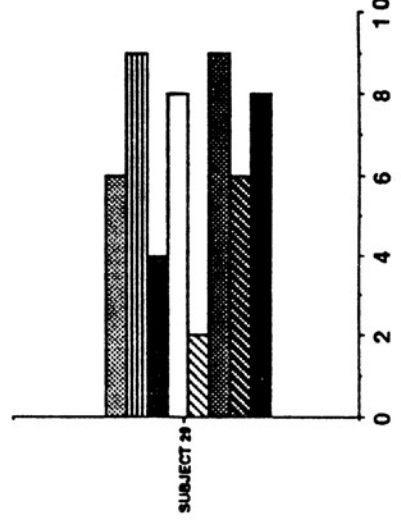
- ORDER
- PUNCTUALITY
- CURIOSITY
- LOGIC
- PRACTICALITY
- CAUTION
- AMBITION
- OPTIMISM



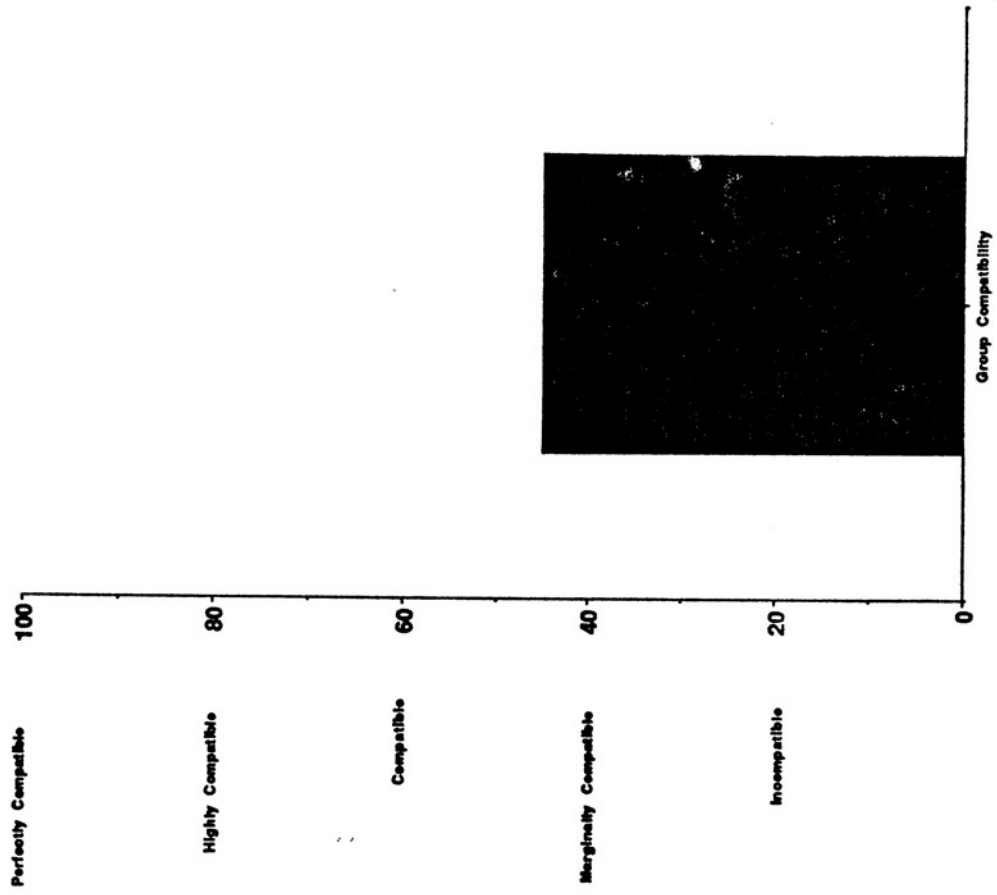
- ORDER
- PUNCTUALITY
- CURIOSITY
- LOGIC
- PRACTICALITY
- CAUTION
- AMBITION
- OPTIMISM



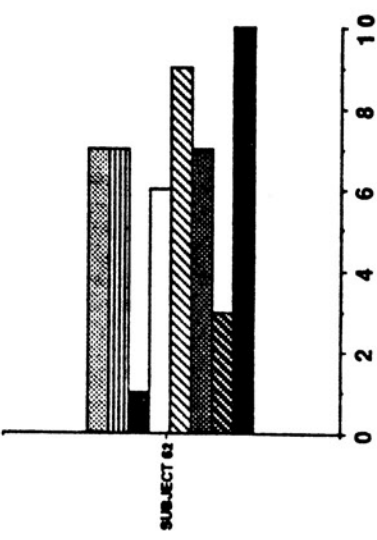
- ORDER
- PUNCTUALITY
- CURIOSITY
- LOGIC
- PRACTICALITY
- CAUTION
- AMBITION
- OPTIMISM



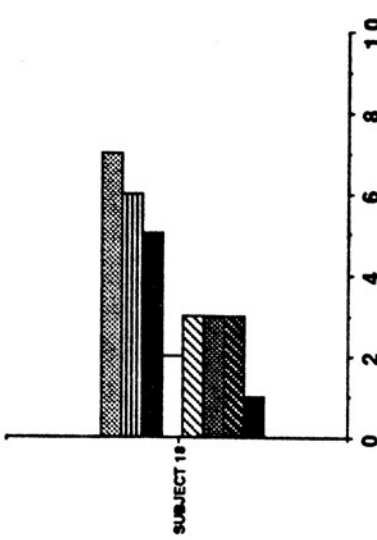
Predicted Compatibility



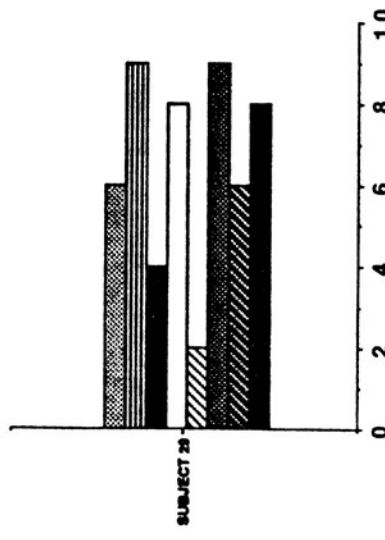
- ORDER
- PUNCTUALITY
- CURIOSITY
- LOGIC
- PRACTICALITY
- CAUTION
- AMBITION
- OPTIMISM



- ORDER
- PUNCTUALITY
- CURIOSITY
- LOGIC
- PRACTICALITY
- CAUTION
- AMBITION
- OPTIMISM



- ORDER
- PUNCTUALITY
- CURIOSITY
- LOGIC
- PRACTICALITY
- CAUTION
- AMBITION
- OPTIMISM



APPENDIX V: STIMULI MANIPULATING THREAT OF PUNISHMENT

1. High TPN Stimuli
2. Low TPN Stimuli

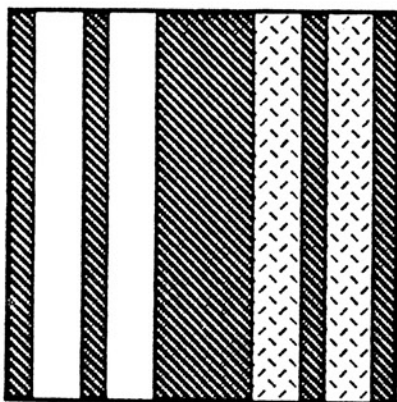
PERSON A

PERSON B

PERSON C

PERSON D

1

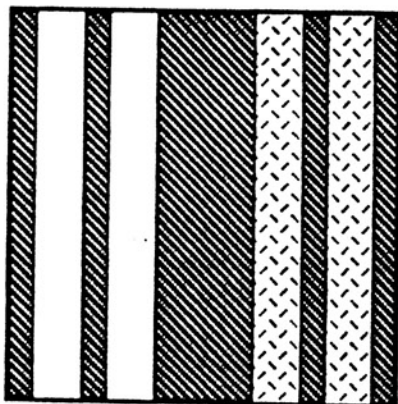


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Stripes
<i>tactful</i>
12 Stripes
<i>orderly</i>

CHECK THE BEST PICTURE DESCRIPTION

1

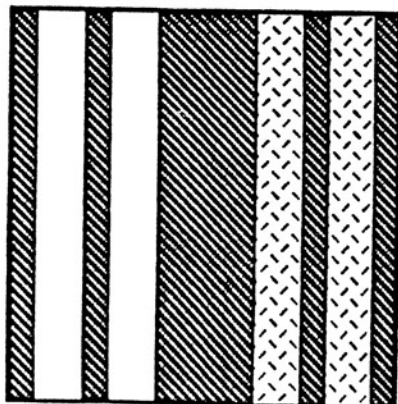


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Stripes
<i>optimistic</i>
12 Stripes
<i>high-strung</i>

CHECK THE BEST PICTURE DESCRIPTION

1



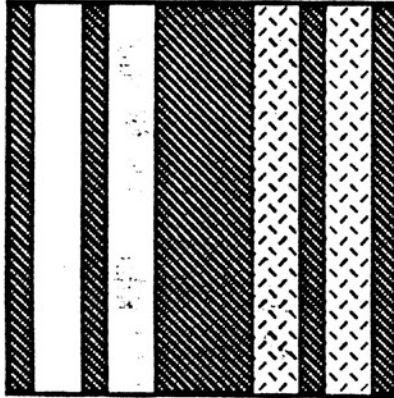
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Stripes
<i>able</i>
12 Stripes
<i>venturing</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON A

1



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

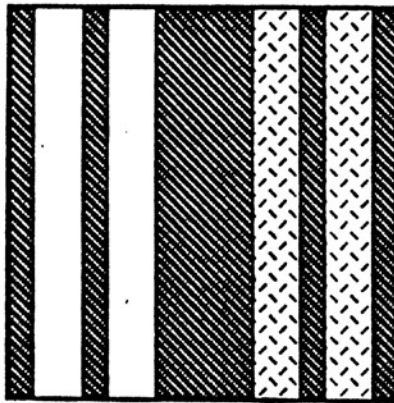
2 Pairs of 2 Stripes
<i>orderly</i>

12 Stripes
<i>tactful</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON B

1



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

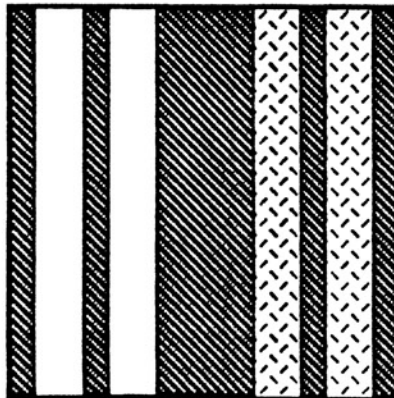
2 Pairs of 2 Stripes
<i>high strung</i>

12 Stripes
<i>optimistic</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON C

1



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Stripes
<i>untiring</i>

12 Stripes
<i>able</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON D

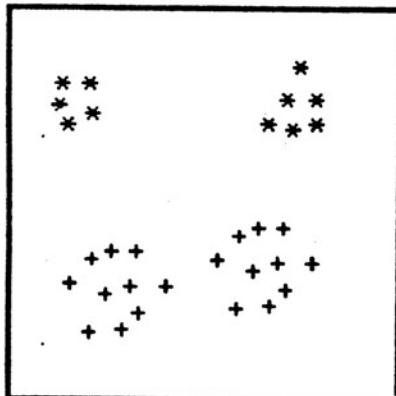
PERSON A

PERSON B

PERSON C

PERSON D

2



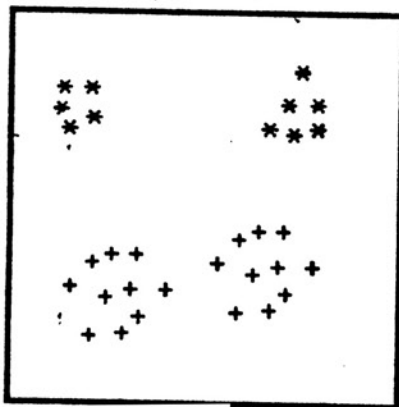
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Stars
<i>jumpy</i>

4 Groups
<i>interesting</i>

CHECK THE BEST PICTURE DESCRIPTION

2



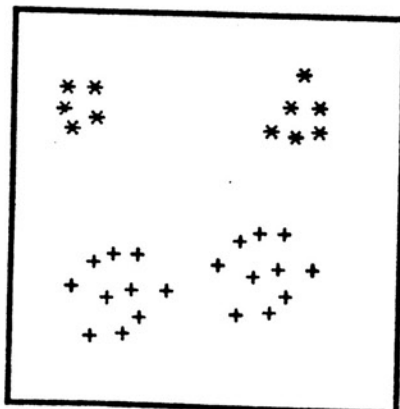
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Stars
<i>outgoing</i>

4 Groups
<i>cool-headed</i>

CHECK THE BEST PICTURE DESCRIPTION

2



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Stars
<i>nervous</i>

4 Groups
<i>skilled</i>

CHECK THE BEST PICTURE DESCRIPTION

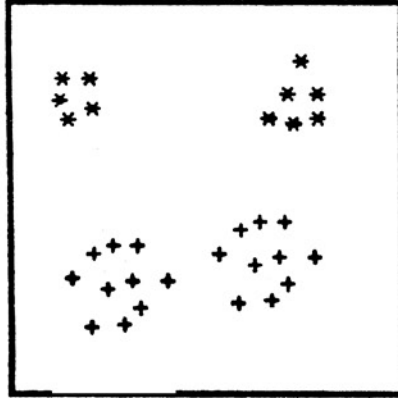
PERSON A

PERSON B

PERSON C

PERSON D

2



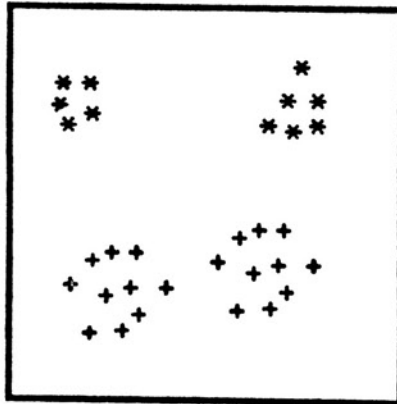
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Stars
<i>skilled</i>

4 Groups
<i>nervous</i>

CHECK THE BEST PICTURE DESCRIPTION

2



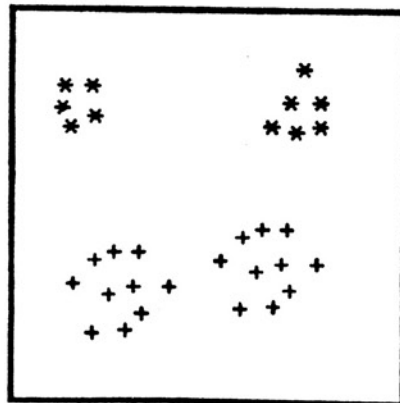
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Stars
<i>cool-headed</i>

4 Groups
<i>outgoing</i>

CHECK THE BEST PICTURE DESCRIPTION

2



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Stars
<i>interesting</i>

4 Groups
<i>jumpy</i>

CHECK THE BEST PICTURE DESCRIPTION

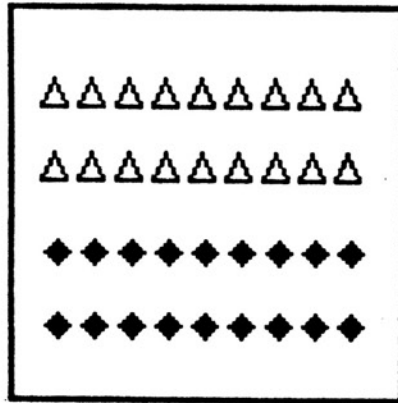
PERSON A

PERSON B

PERSON C

PERSON D

3



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows

naive

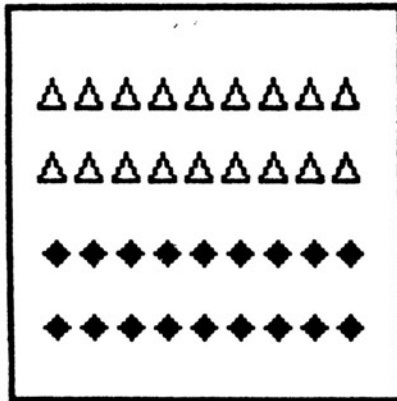
3 Columns

meditative

CHECK THE BEST PICTURE DESCRIPTION



3



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows

uncultured

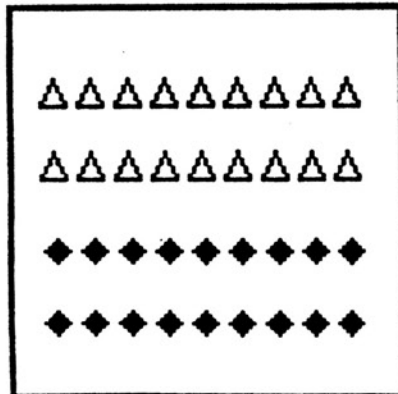
3 Columns

good humored

CHECK THE BEST PICTURE DESCRIPTION



3



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows

meek

3 Columns

interesting

CHECK THE BEST PICTURE DESCRIPTION



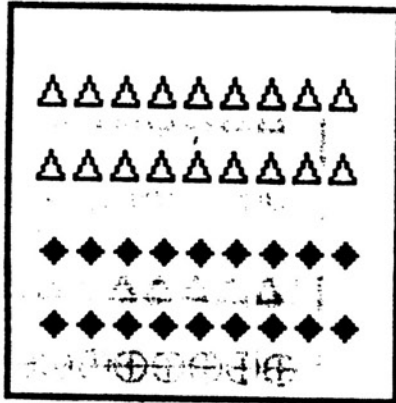
PERSON A

PERSON B

PERSON C

PERSON D

3



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows

meditative

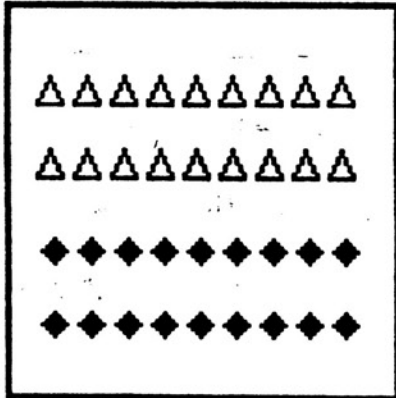
3 Columns

naive

CHECK THE BEST PICTURE DESCRIPTION



3



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows

good-humoured

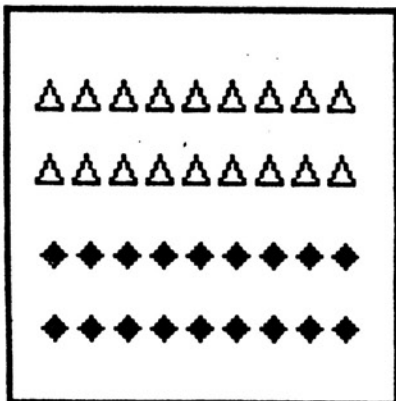
3 Columns

uncultured

CHECK THE BEST PICTURE DESCRIPTION



3



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows

interesting

3 Columns

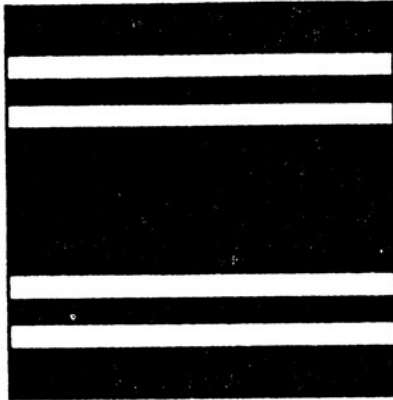
meek

CHECK THE BEST PICTURE DESCRIPTION



PERSON A

4



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

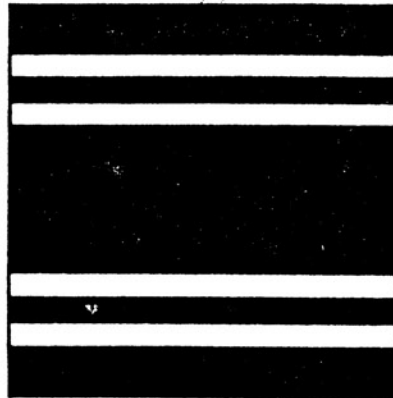
15 Stripes
<i>witty</i>

2 Pairs of Stripes
<i>un-systematic</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON B

4



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

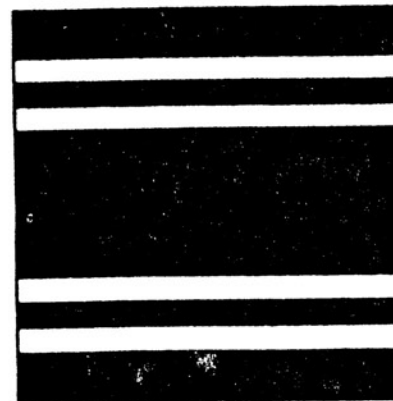
15 Stripes
<i>un-methodical</i>

2 Pairs of Stripes
<i>foreign</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON C

4



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stripes
<i>perceptive</i>

2 Pairs of Stripes
<i>pre-occupied</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON D

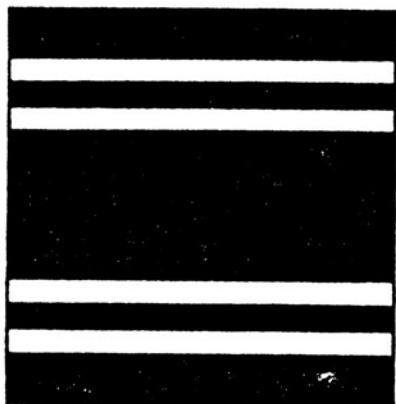
PERSON A

PERSON B

PERSON C

PERSON D

4



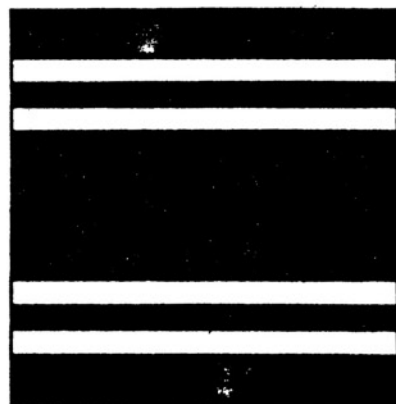
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stripes
<i>pre-occupied</i>

2 Pairs of Stripes
<i>perceptive</i>

CHECK THE BEST PICTURE DESCRIPTION

4



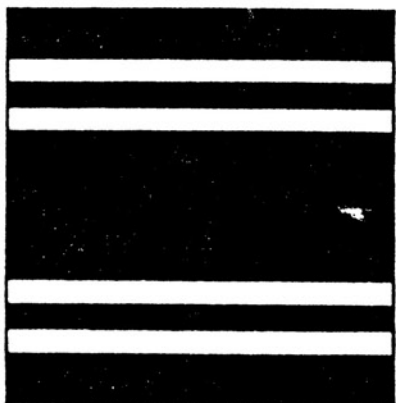
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stripes
<i>Foreign</i>

2 Pairs of Stripes
<i>unmethodical</i>

CHECK THE BEST PICTURE DESCRIPTION

4



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stripes
<i>un-systematic</i>

2 Pairs of Stripes
<i>Witty</i>

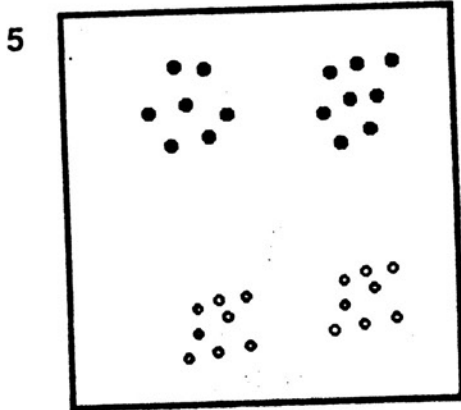
CHECK THE BEST PICTURE DESCRIPTION

PERSON A

PERSON B

PERSON C

PERSON D

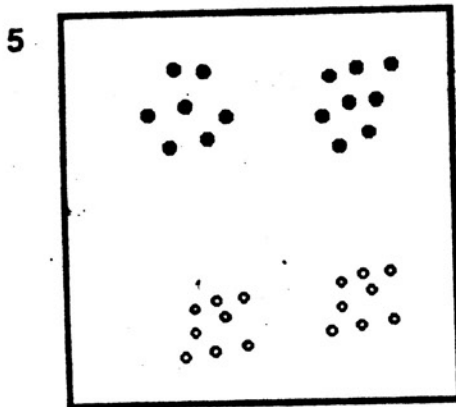


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>in a hen five</i>

20 Dots
<i>thorough</i>

CHECK THE BEST PICTURE DESCRIPTION

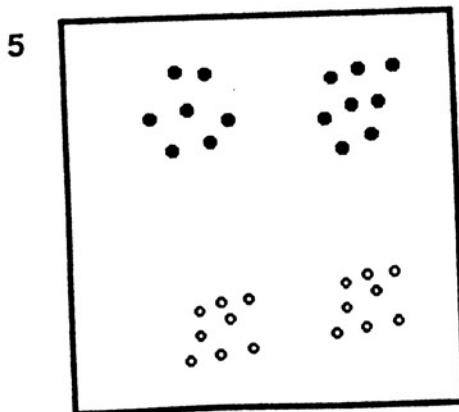


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>absent-minded</i>

20 Dots
<i>curious</i>

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>flexible</i>

20 Dots
<i>faddish</i>

CHECK THE BEST PICTURE DESCRIPTION

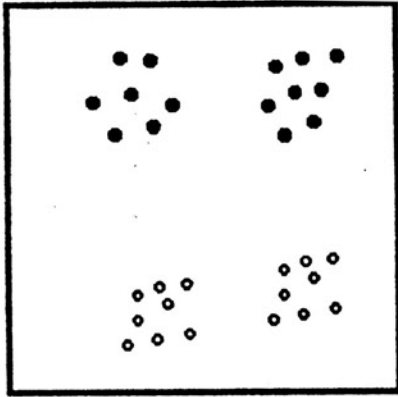
PERSON A

PERSON B

PERSON C

PERSON D

5



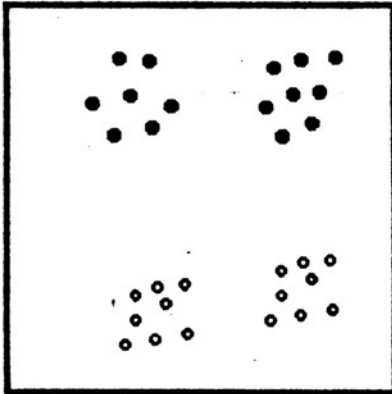
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>thorough</i>

20 Dots
<i>inattentive</i>

CHECK THE BEST PICTURE DESCRIPTION

5



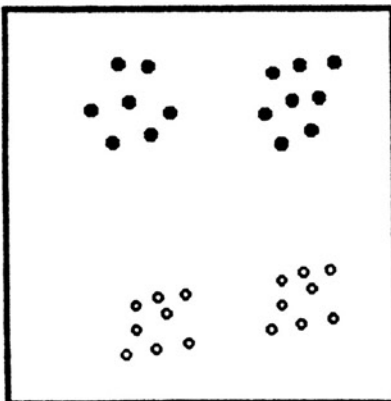
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>curious</i>

20 Dots
<i>absent-minded</i>

CHECK THE BEST PICTURE DESCRIPTION

5



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>fastidious</i>

20 Dots
<i>flexible</i>

CHECK THE BEST PICTURE DESCRIPTION

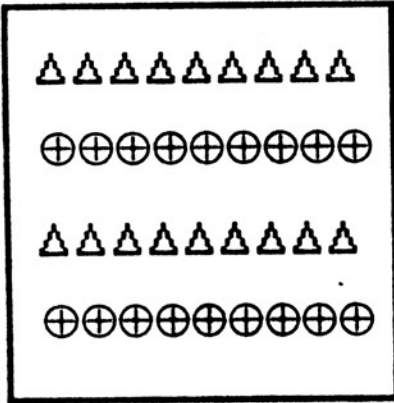
PERSON A

PERSON B

PERSON C

PERSON D

6



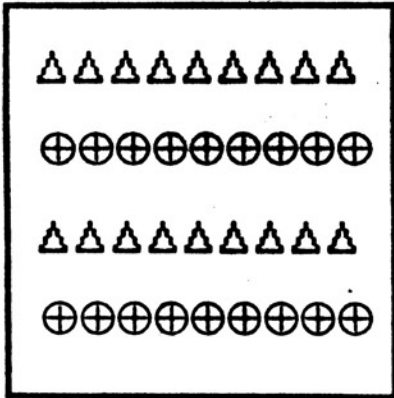
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Rows
<i>upright</i>

2 Pairs of 2 Rows
<i>cooperative</i>

CHECK THE BEST PICTURE DESCRIPTION

6



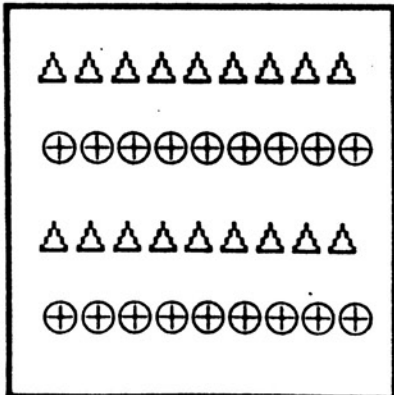
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Rows
<i>reckless</i>

2 Pairs of 2 Rows
<i>well-mannered</i>

CHECK THE BEST PICTURE DESCRIPTION

6



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Rows
<i>moody</i>

2 Pairs of 2 Rows
<i>observant</i>

CHECK THE BEST PICTURE DESCRIPTION

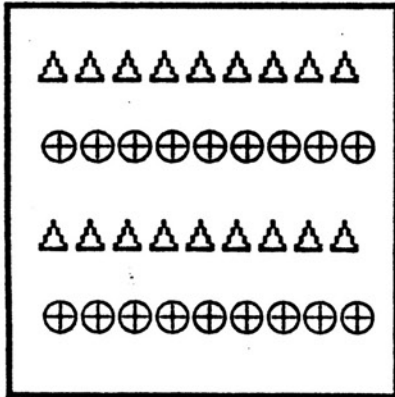
PERSON A

PERSON B

PERSON C

PERSON D

6



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Rows

observant

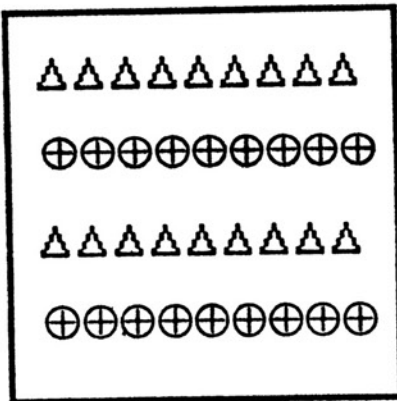
2 Pairs of 2 Rows

moody

CHECK THE BEST PICTURE DESCRIPTION



6



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Rows

well-mannered

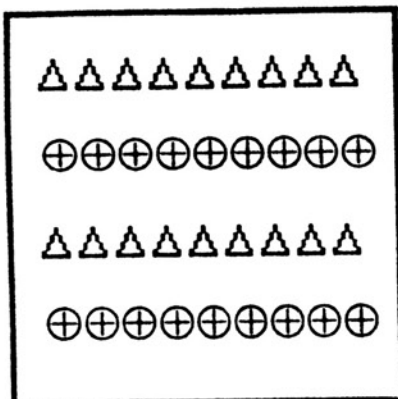
2 Pairs of 2 Rows

reckless

CHECK THE BEST PICTURE DESCRIPTION



6



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Rows

cooperative

2 Pairs of 2 Rows

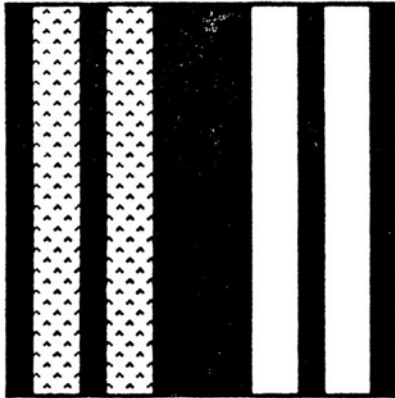
upright

CHECK THE BEST PICTURE DESCRIPTION



PERSON A

7



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

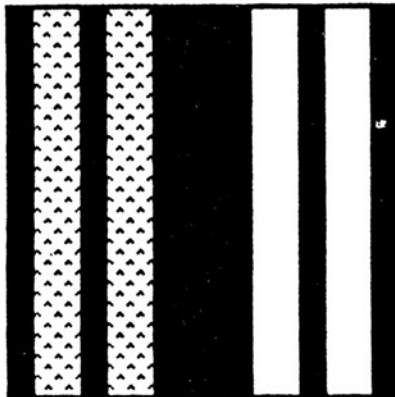
2 Pairs of Stripes
<i>gullible</i>

15 Stripes
<i>methodical</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON B

7



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

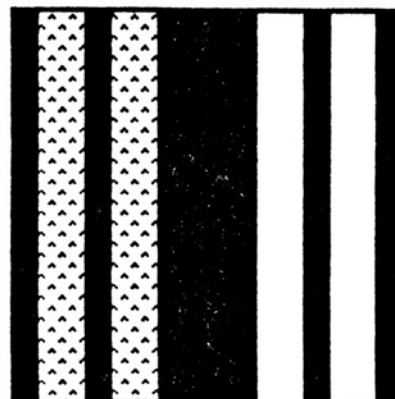
2 Pairs of Stripes
<i>disinterested</i>

15 Stripes
<i>direct</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON C

7



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>strange</i>

15 Stripes
<i>precise</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON D

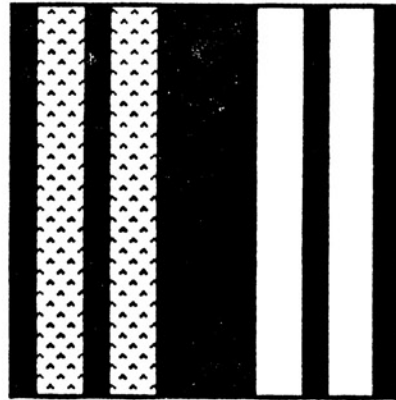
PERSON A

PERSON B

PERSON C

PERSON D

7



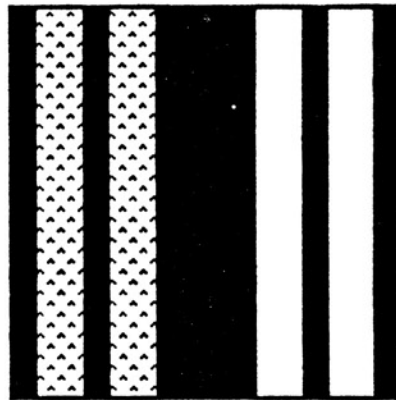
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>methodical</i>

15 Stripes
<i>gullible</i>

CHECK THE BEST PICTURE DESCRIPTION

7



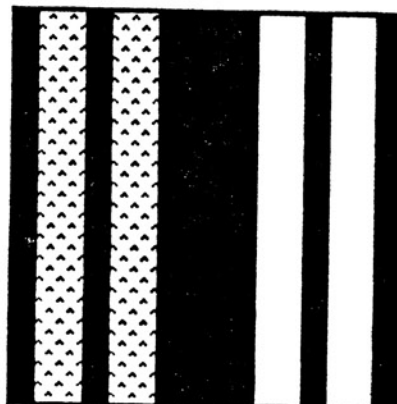
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>direct</i>

15 Stripes
<i>disinterested</i>

CHECK THE BEST PICTURE DESCRIPTION

7



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>precise</i>

15 Stripes
<i>strange</i>

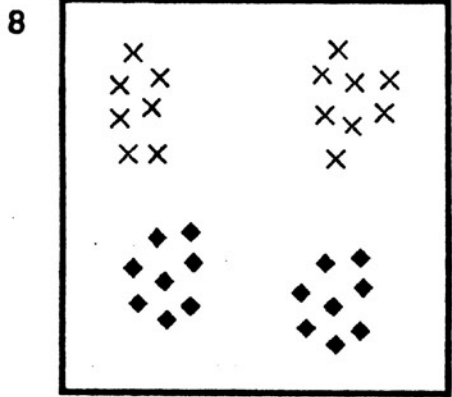
CHECK THE BEST PICTURE DESCRIPTION

PERSON A

PERSON B

PERSON C

PERSON D

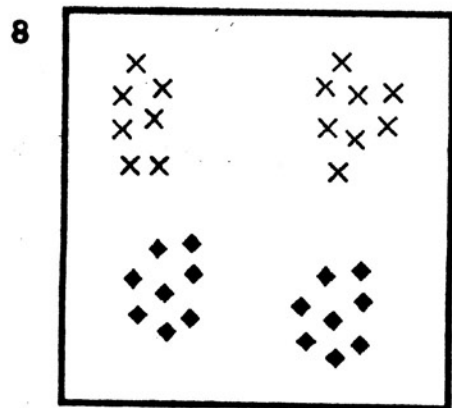


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Marks
<i>inventive</i>

CHECK THE BEST PICTURE DESCRIPTION

4 Groups
<i>negligent</i>

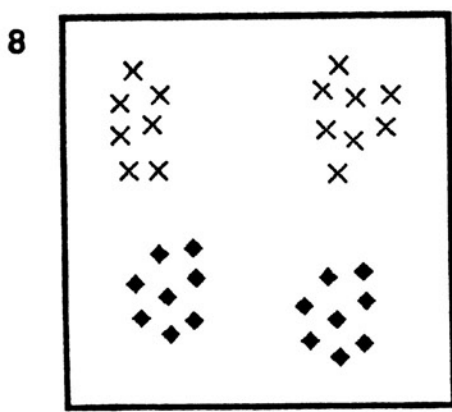


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Marks
<i>unpredictable</i>

CHECK THE BEST PICTURE DESCRIPTION

4 Groups
<i>imaginative</i>



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Marks
<i>intuitive</i>

CHECK THE BEST PICTURE DESCRIPTION

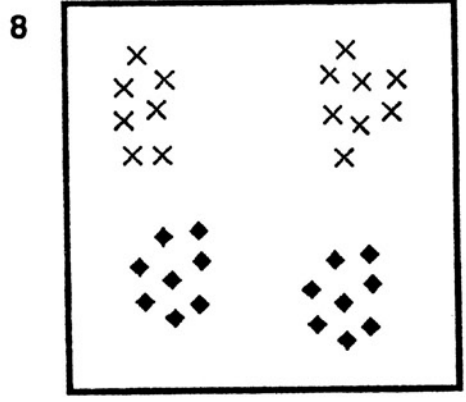
4 Groups
<i>passive</i>

PERSON A

PERSON B

PERSON C

PERSON D

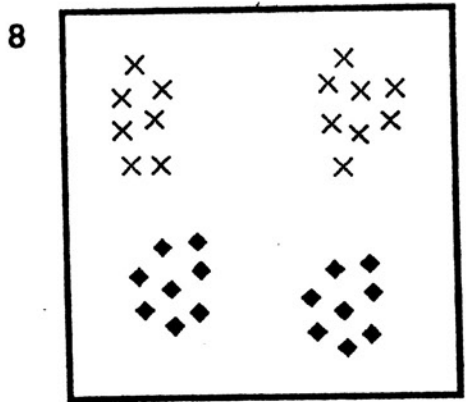
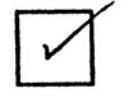


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Marks
passive

4 Groups
in future

CHECK THE BEST PICTURE DESCRIPTION

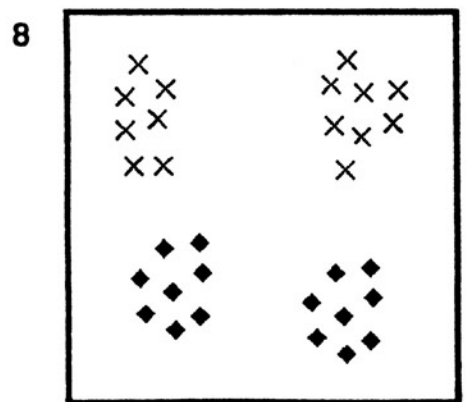
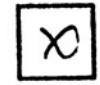
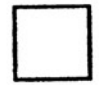


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Marks
unimaginative

4 Groups
unpredictable

CHECK THE BEST PICTURE DESCRIPTION

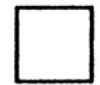


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Marks
negligent

4 Groups
inventive

CHECK THE BEST PICTURE DESCRIPTION



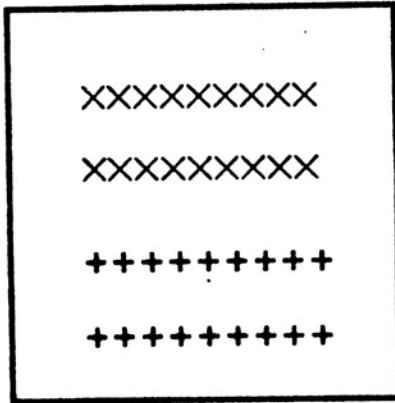
PERSON A

PERSON B

PERSON C

PERSON D

9

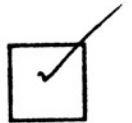


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

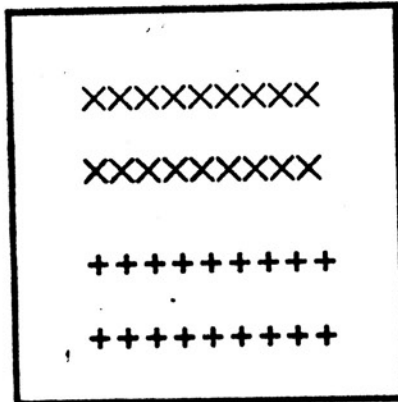
2 Pairs of Rows
dependent

6 Columns
ingenious

CHECK THE BEST PICTURE DESCRIPTION



9



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

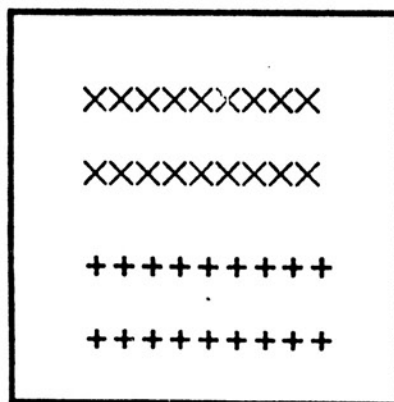
2 Pairs of Rows
extravagant

6 Columns
quickness

CHECK THE BEST PICTURE DESCRIPTION



9



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows
troubled

6 Columns
emotional

CHECK THE BEST PICTURE DESCRIPTION

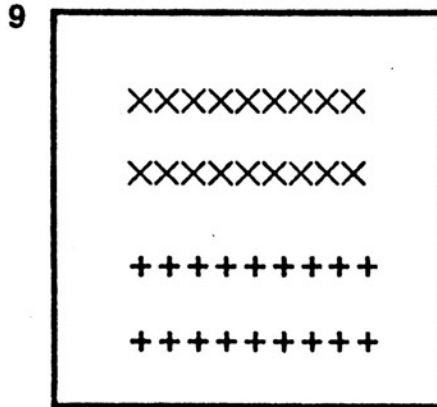


PERSON A

PERSON B

PERSON C

PERSON D

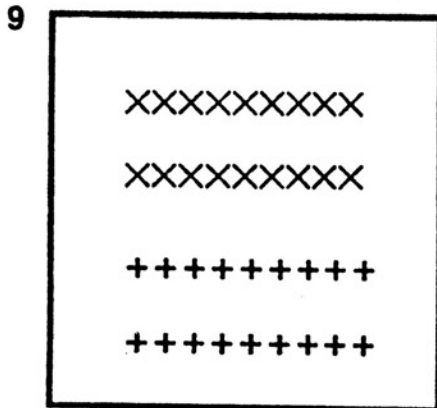


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows
ingenious

6 Columns
dependent

CHECK THE BEST PICTURE DESCRIPTION

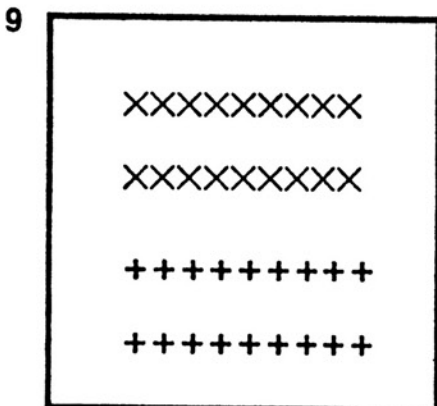


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows
quick-witted

6 Columns
extravagant

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows
emotional

6 Columns
troubled

CHECK THE BEST PICTURE DESCRIPTION

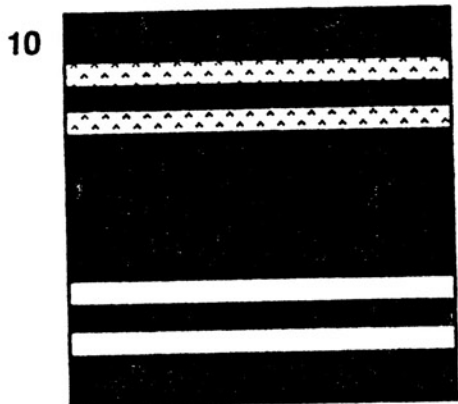


PERSON A

PERSON B

PERSON C

PERSON D

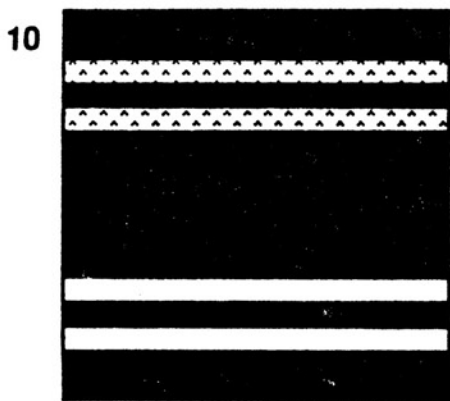


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

12 Stripes
<i>abstract</i>

2 Pairs of Stripes
<i>courageous</i>

CHECK THE BEST PICTURE DESCRIPTION

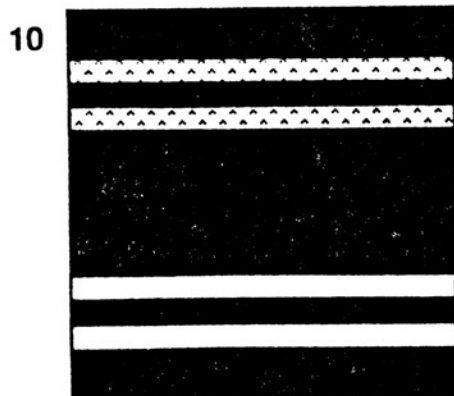


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

12 Stripes
<i>popular</i>

2 Pairs of Stripes
<i>sympathetic</i>

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

12 Stripes
<i>crafty</i>

2 Pairs of Stripes
<i>respectable</i>

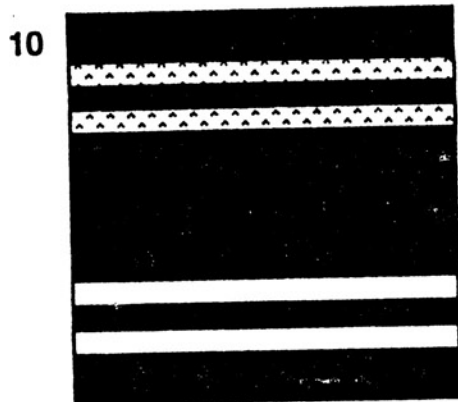
CHECK THE BEST PICTURE DESCRIPTION

PERSON A

PERSON B

PERSON C

PERSON D

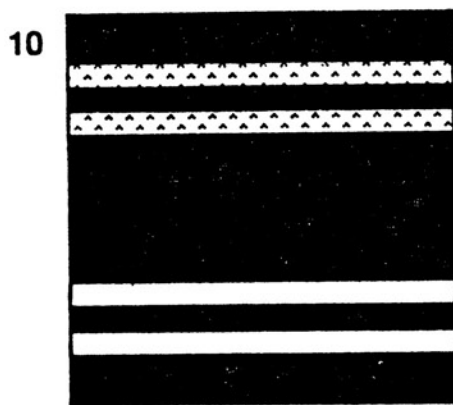


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

12 Stripes
<i>courageous</i>

2 Pairs of Stripes
<i>abstract</i>

CHECK THE BEST PICTURE DESCRIPTION

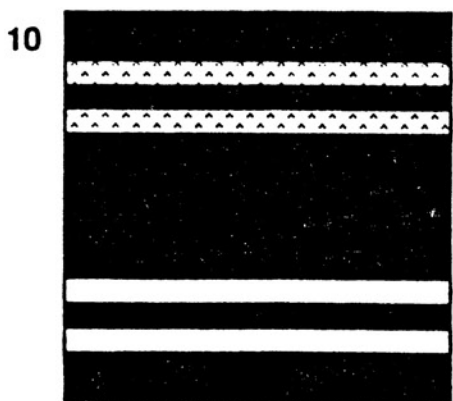


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

12 Stripes
<i>sympathetic</i>

2 Pairs of Stripes
<i>popular</i>

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

12 Stripes
<i>respectable</i>

2 Pairs of Stripes
<i>crafty</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON A

PERSON B

PERSON C

PERSON D

11

WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>cultured</i>

2 Marks
<i>temperamental</i>

CHECK THE BEST PICTURE DESCRIPTION

11

WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>clear-headed</i>

2 Marks
<i>tidy</i>

CHECK THE BEST PICTURE DESCRIPTION

11

WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>versatile</i>

2 Marks
<i>fense</i>

CHECK THE BEST PICTURE DESCRIPTION

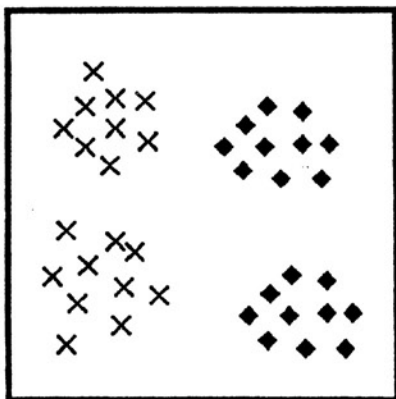
PERSON A

PERSON B

PERSON C

PERSON D

11



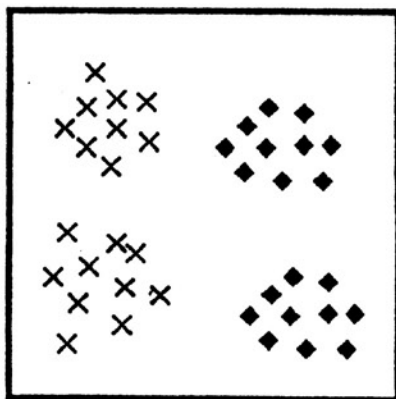
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>temperamental</i>

2 Marks
<i>cultured</i>

CHECK THE BEST PICTURE DESCRIPTION

11



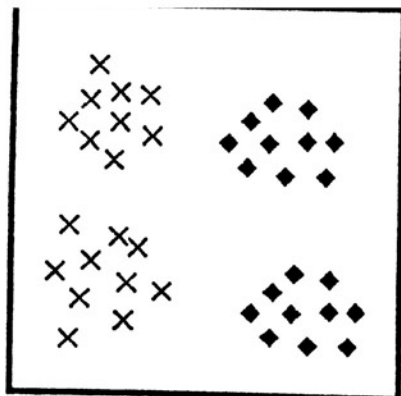
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>tidy</i>

2 Marks
<i>clear-headed</i>

CHECK THE BEST PICTURE DESCRIPTION

11



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>fense</i>

2 Marks
<i>sensative</i>

CHECK THE BEST PICTURE DESCRIPTION

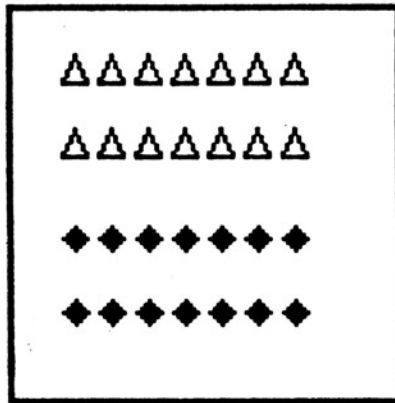
PERSON A

PERSON B

PERSON C

PERSON D

12



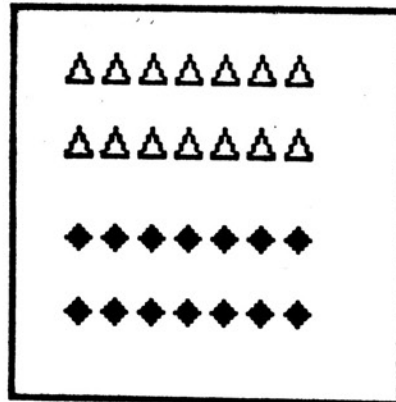
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Columns
<i>self-conscious</i>

2 Pairs of Rows
<i>high spirited</i>

CHECK THE BEST PICTURE DESCRIPTION

12



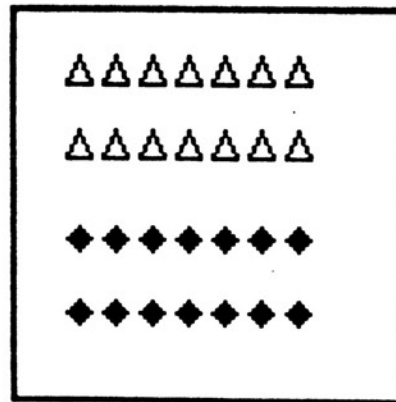
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Columns
<i>clever</i>

2 Pairs of Rows
<i>cold</i>

CHECK THE BEST PICTURE DESCRIPTION

12



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Columns
<i>logical</i>

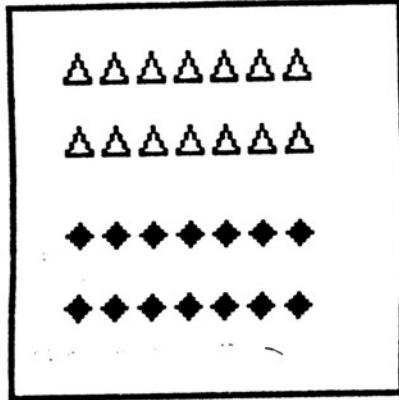
2 Pairs of Rows
<i>incompetent</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON A

PERSON B

12



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

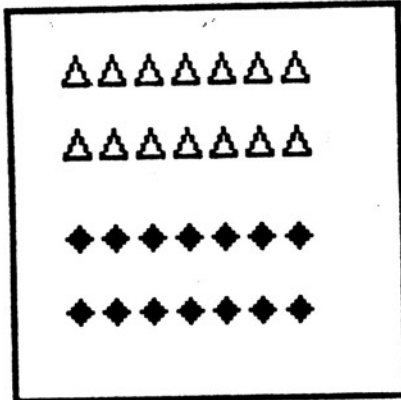
10 Columns
<i>high-spirited</i>

2 Pairs of Rows
<i>self-conscious</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON C

12



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

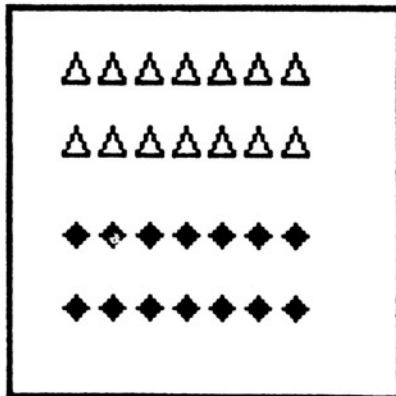
10 Columns
<i>incompetent</i>

2 Pairs of Rows
<i>logical</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON D

12



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Columns
<i>cold</i>

2 Pairs of Rows
<i>clever</i>

CHECK THE BEST PICTURE DESCRIPTION

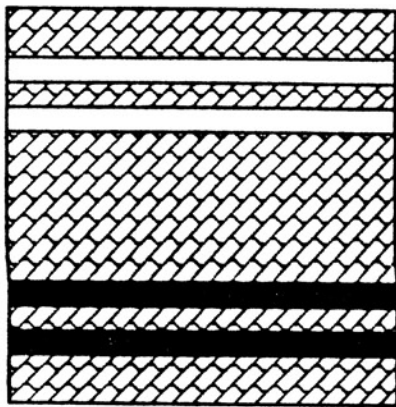
PERSON A

PERSON B

PERSON C

PERSON D

13



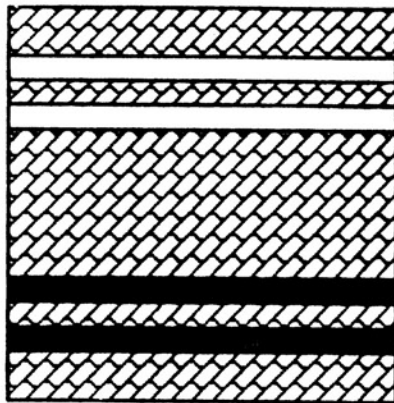
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>foolish</i>

14 Stripes
<i>spirited</i>

CHECK THE BEST PICTURE DESCRIPTION

13



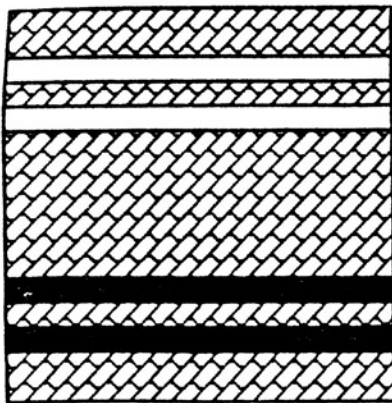
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>ungrateful</i>

14 Stripes
<i>informal</i>

CHECK THE BEST PICTURE DESCRIPTION

13



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>immature</i>

14 Stripes
<i>verbal</i>

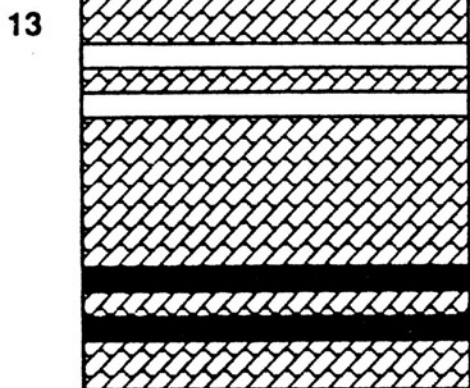
CHECK THE BEST PICTURE DESCRIPTION

PERSON A

PERSON B

PERSON C

PERSON D

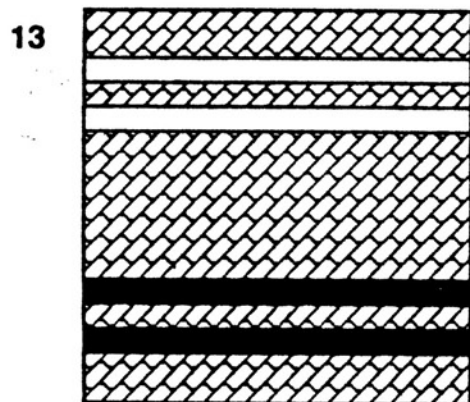


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>spirited</i>

14 Stripes
<i>foolish</i>

CHECK THE BEST PICTURE DESCRIPTION

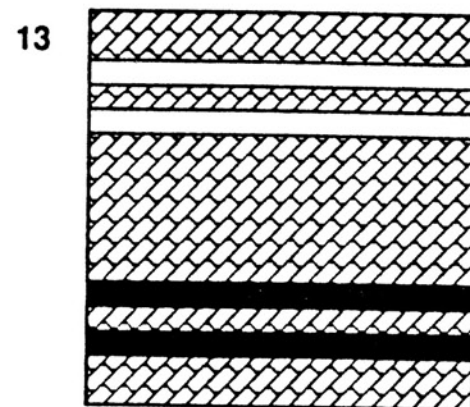


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>informal</i>

14 Stripes
<i>ungrateful</i>

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>verbal.</i>

14 Stripes
<i>immature</i>

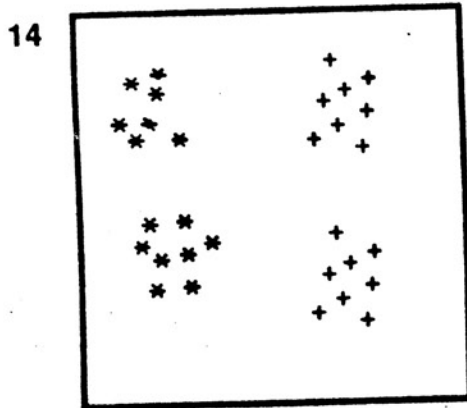
CHECK THE BEST PICTURE DESCRIPTION

PERSON A

PERSON B

PERSON C

PERSON D

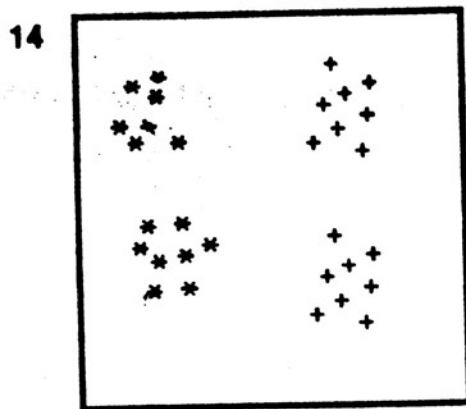


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stars
<i>steady</i>

4 Groups
<i>rational</i>

CHECK THE BEST PICTURE DESCRIPTION

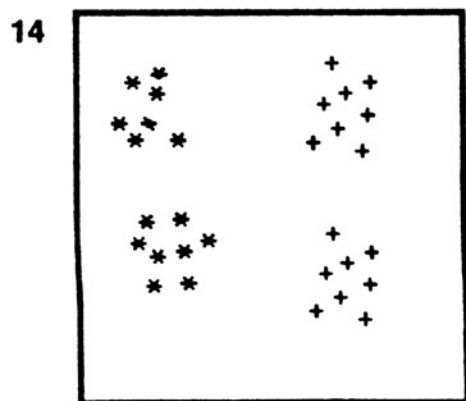


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stars
<i>casual</i>

4 Groups
<i>inexperienced</i>

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stars
<i>low key</i>

4 Groups
<i>scientific</i>

CHECK THE BEST PICTURE DESCRIPTION

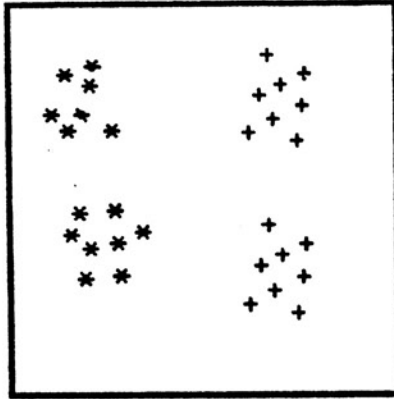
PERSON A

PERSON B

PERSON C

PERSON D

14



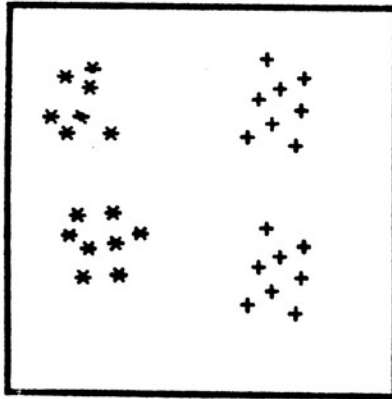
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stars
<i>irrational</i>

4 Groups
<i>steady</i>

CHECK THE BEST PICTURE DESCRIPTION

14



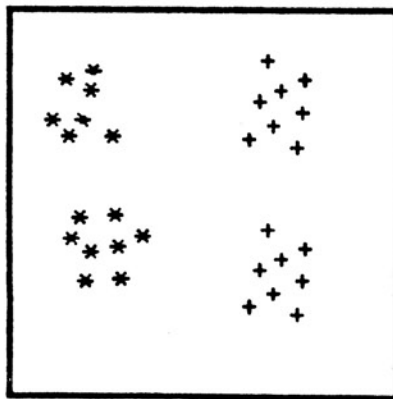
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stars
<i>inexperienced</i>

4 Groups
<i>casual</i>

CHECK THE BEST PICTURE DESCRIPTION

14



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stars
<i>scientific</i>

4 Groups
<i>low-key</i>

CHECK THE BEST PICTURE DESCRIPTION

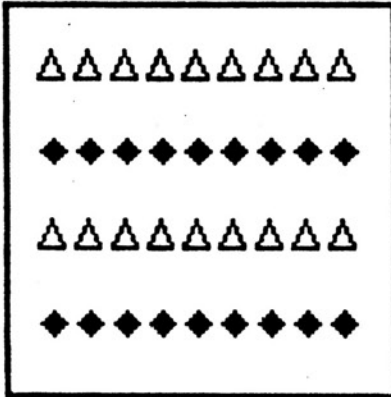
PERSON A

PERSON B

PERSON C

PERSON D

15



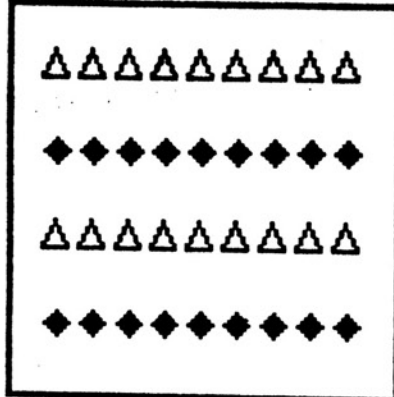
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Rows
<i>trusty</i>

9 Columns
<i>superstition</i>

CHECK THE BEST PICTURE DESCRIPTION

15



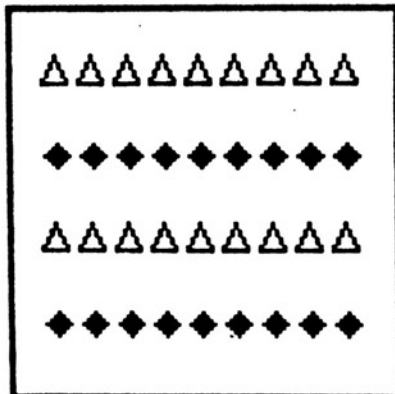
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Rows
<i>cheerful</i>

9 Columns
<i>inaccurate</i>

CHECK THE BEST PICTURE DESCRIPTION

15



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Rows
<i>reasonable</i>

9 Columns
<i>sociable</i>

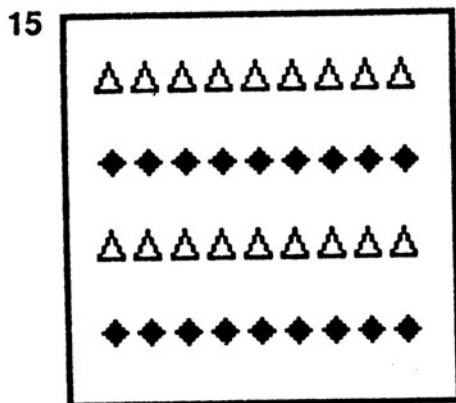
CHECK THE BEST PICTURE DESCRIPTION

PERSON A

PERSON B

PERSON C

PERSON D



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

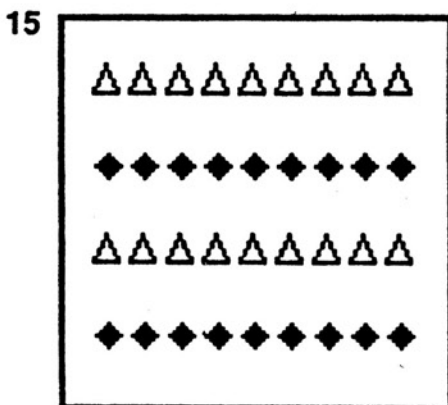
2 Pairs of 2 Rows

superstitious

9 Columns

frustrated

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

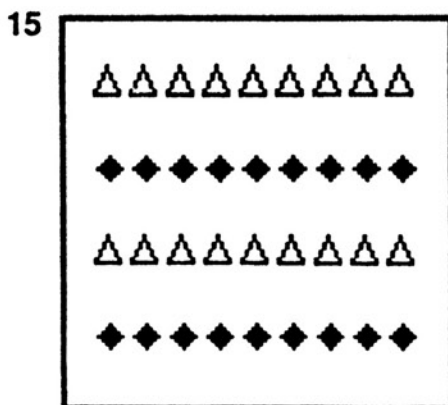
2 Pairs of 2 Rows

inaccurate

9 Columns

cheerful

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Rows

sociable

9 Columns

reasonable

CHECK THE BEST PICTURE DESCRIPTION

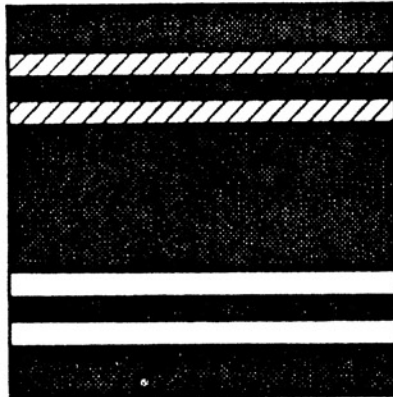
PERSON A

PERSON B

PERSON C

PERSON D

16



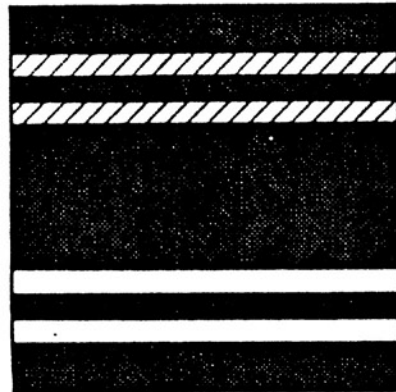
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

5 Stripes
<i>reserved</i>

2 Pairs of Stripes
<i>eccentric</i>

CHECK THE BEST PICTURE DESCRIPTION

16



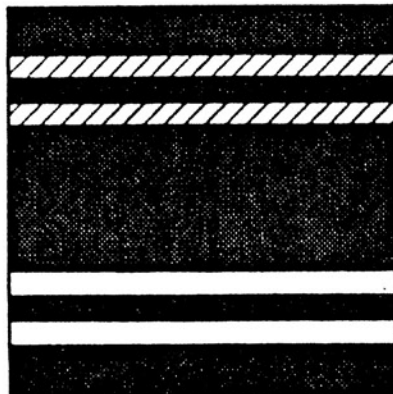
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

5 Stripes
<i>deliberate</i>

2 Pairs of Stripes
<i>wordy</i>

CHECK THE BEST PICTURE DESCRIPTION

16



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

5 Stripes
<i>sensitive</i>

2 Pairs of Stripes
<i>shallow</i>

CHECK THE BEST PICTURE DESCRIPTION

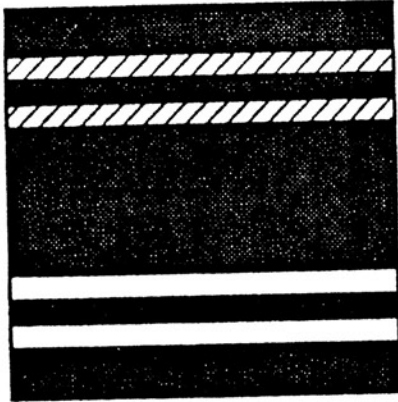
PERSON A

PERSON B

PERSON C

PERSON D

16



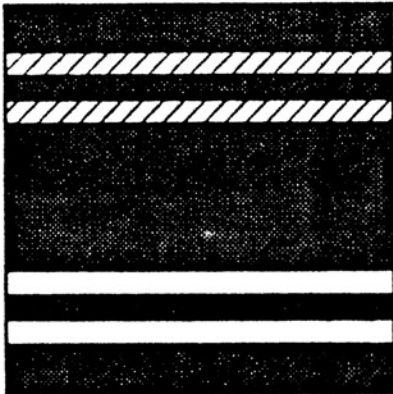
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

5 Stripes
<i>eccentric</i>

2 Pairs of Stripes
<i>reserved</i>

CHECK THE BEST PICTURE DESCRIPTION

16



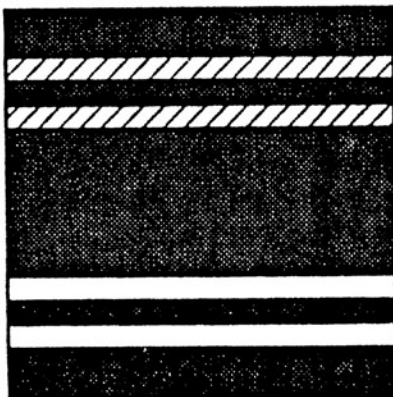
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

5 Stripes
<i>worried</i>

2 Pairs of Stripes
<i>deliberate</i>

CHECK THE BEST PICTURE DESCRIPTION

16



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

5 Stripes
<i>shallow</i>

2 Pairs of Stripes
<i>sensitive</i>

CHECK THE BEST PICTURE DESCRIPTION

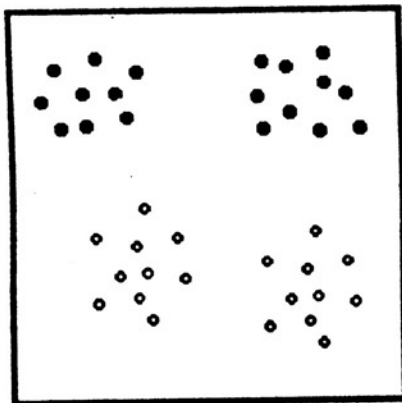
PERSON A

PERSON B

PERSON C

PERSON D

17



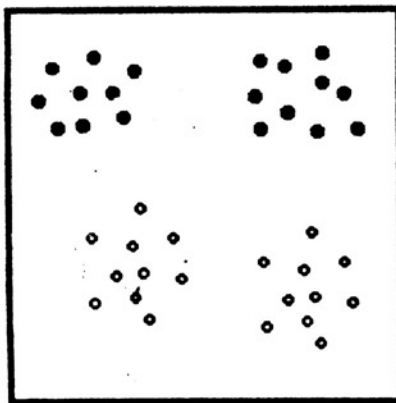
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>materialistic</i>

10 Dots
<i>studious</i>

CHECK THE BEST PICTURE DESCRIPTION

17



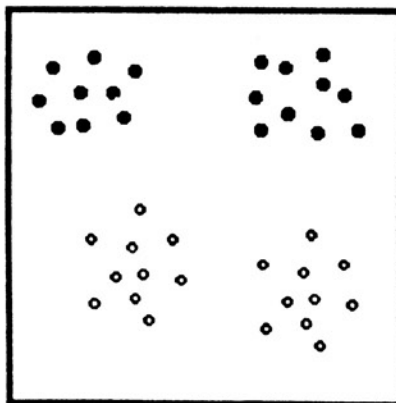
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>perfectionistic</i>

10 Dots
<i>inexperienced</i>

CHECK THE BEST PICTURE DESCRIPTION

17



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>sad</i>

10 Dots
<i>methodical</i>

CHECK THE BEST PICTURE DESCRIPTION

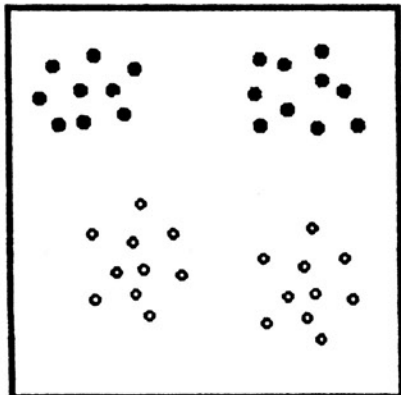
PERSON A

PERSON B

PERSON C

PERSON D

17



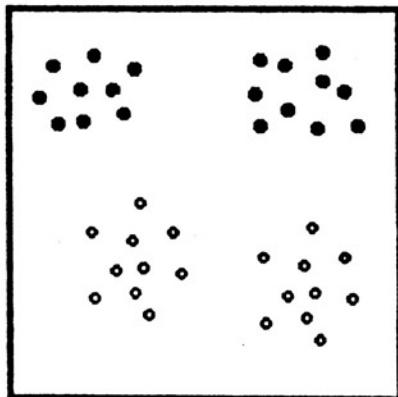
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>studious</i>

10 Dots
<i>materialistic</i>

CHECK THE BEST PICTURE DESCRIPTION

17



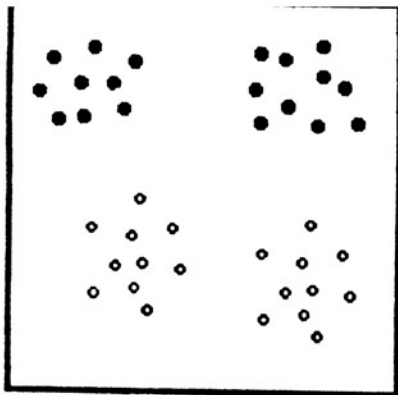
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>inexperienced</i>

10 Dots
<i>perfectionistic</i>

CHECK THE BEST PICTURE DESCRIPTION

17



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

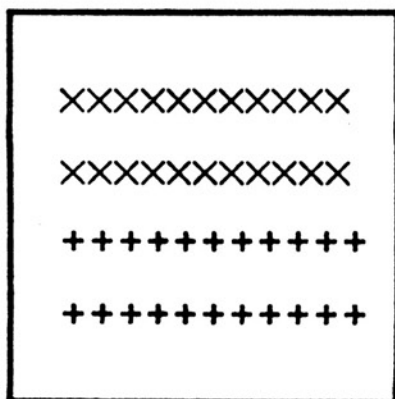
4 Groups
<i>methodical</i>

10 Dots
<i>sad</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON A

18



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

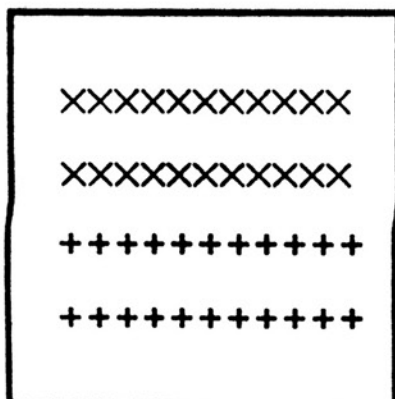
7 Columns
<i>meditative</i>

2 Pairs of Rows
<i>disorderly</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON B

18



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

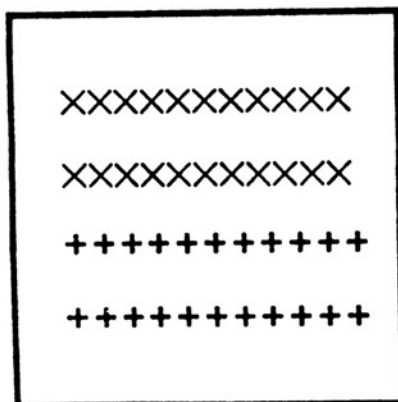
7 Columns
<i>meticulous</i>

2 Pairs of Rows
<i>careless</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON C

18



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

7 Columns
<i>subtle</i>

2 Pairs of Rows
<i>forgetful</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON D

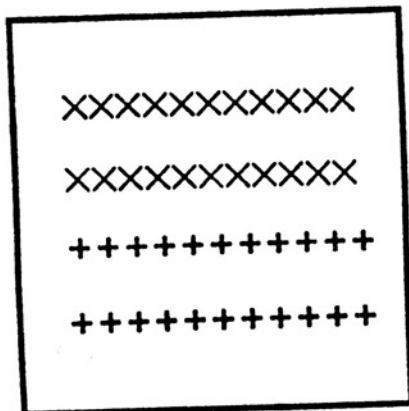
PERSON A

PERSON B

PERSON C

PERSON D

18



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

7 Columns

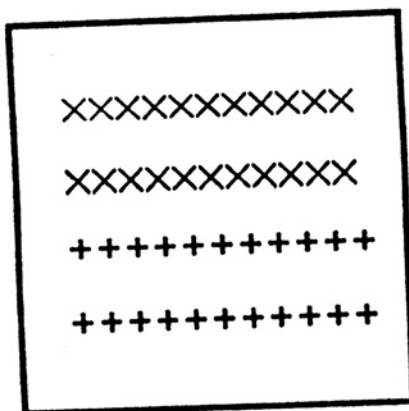
disorderly

2 Pairs of Rows

meditative

CHECK THE BEST PICTURE DESCRIPTION

18



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

7 Columns

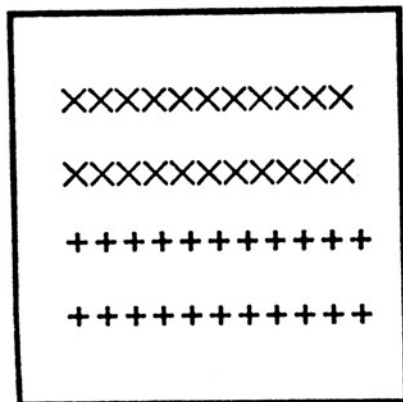
careless

2 Pairs of Rows

meticulous

CHECK THE BEST PICTURE DESCRIPTION

18



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

7 Columns

forgetful

2 Pairs of Rows

subtle

CHECK THE BEST PICTURE DESCRIPTION

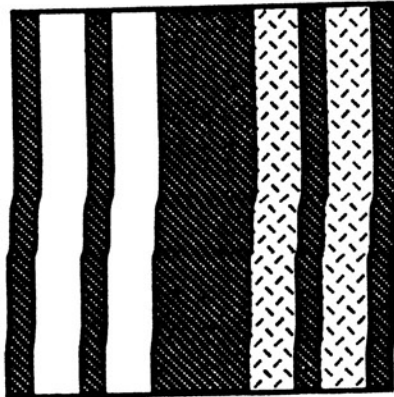
PERSON A

PERSON B

PERSON C

PERSON D

1



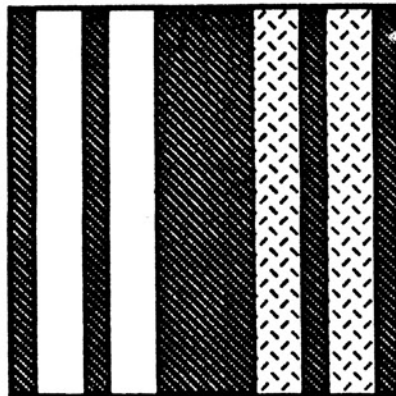
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Stripes
<i>tactful</i>

12 Stripes
<i>entertaining</i>

CHECK THE BEST PICTURE DESCRIPTION

1



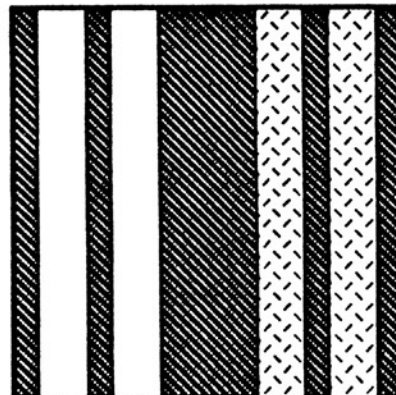
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Stripes
<i>optimistic</i>

12 Stripes
<i>adventurous</i>

CHECK THE BEST PICTURE DESCRIPTION

1



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

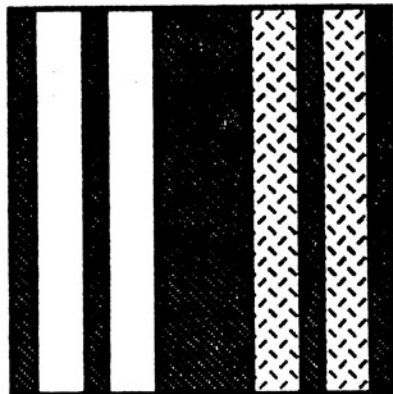
2 Pairs of 2 Stripes
<i>able</i>

12 Stripes
<i>vivacious</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON A

1



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

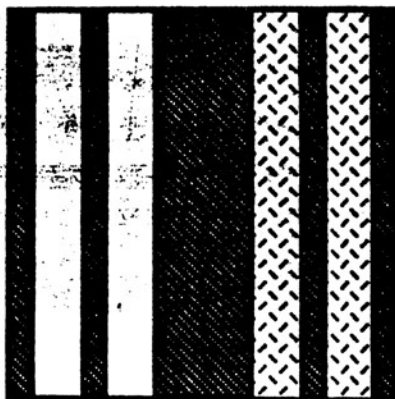
2 Pairs of 2 Stripes
<i>entertaining</i>

12 Stripes
<i>tactful</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON B

1



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

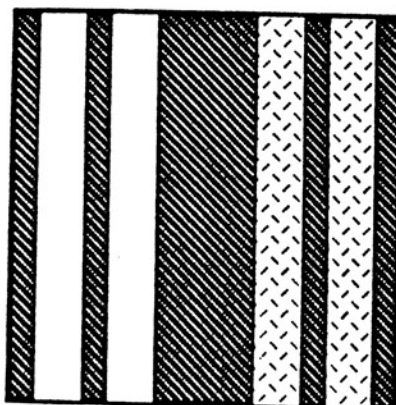
2 Pairs of 2 Stripes
<i>adventurous</i>

12 Stripes
<i>optimistic</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON C

1



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Stripes
<i>swacions</i>

12 Stripes
<i>able</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON D

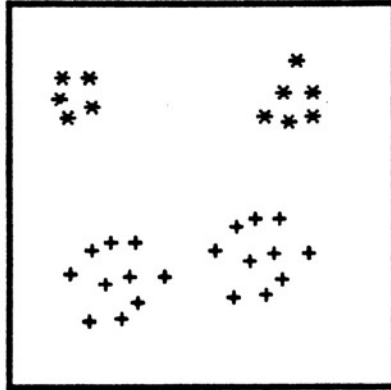
PERSON A

PERSON B

PERSON C

PERSON D

2



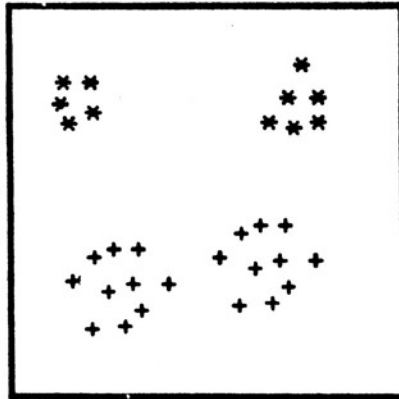
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Stars
<i>literary</i>

4 Groups
<i>congenial</i>

CHECK THE BEST PICTURE DESCRIPTION

2



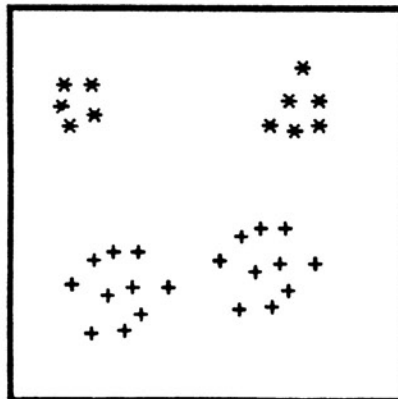
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Stars
<i>charming</i>

4 Groups
<i>cool-headed</i>

CHECK THE BEST PICTURE DESCRIPTION

2



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Stars
<i>enterprising</i>

4 Groups
<i>skilled</i>

CHECK THE BEST PICTURE DESCRIPTION

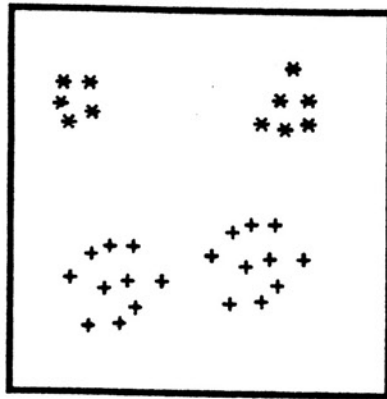
PERSON A

PERSON B

PERSON C

PERSON D

2



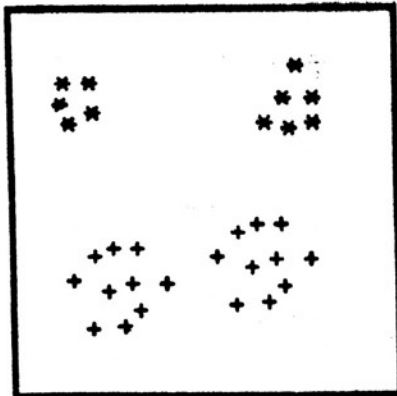
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Stars
<i>skilled</i>

4 Groups
<i>enterprising</i>

CHECK THE BEST PICTURE DESCRIPTION

2



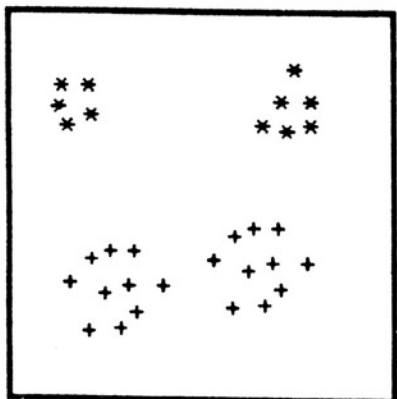
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Stars
<i>cool-headed</i>

4 Groups
<i>charming</i>

CHECK THE BEST PICTURE DESCRIPTION

2



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Stars
<i>congenial</i>

4 Groups
<i>literary</i>

CHECK THE BEST PICTURE DESCRIPTION

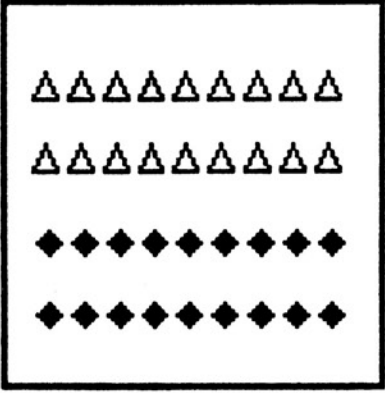
PERSON A

PERSON B

PERSON C

PERSON D

3



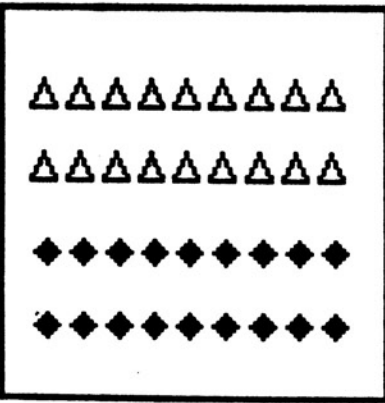
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows
middle-class

3 Columns
meditative

CHECK THE BEST PICTURE DESCRIPTION

3



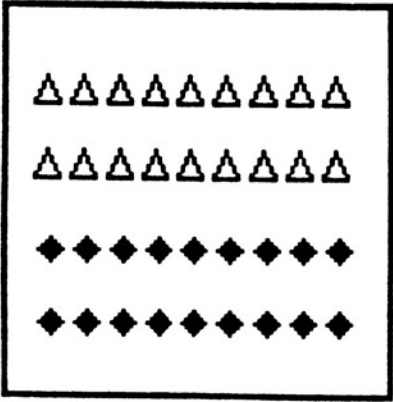
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows
creative

3 Columns
good-humored

CHECK THE BEST PICTURE DESCRIPTION

3



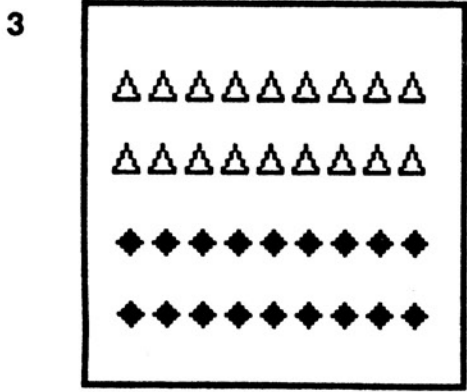
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows
discreet

3 Columns
interesting

CHECK THE BEST PICTURE DESCRIPTION

PERSON A



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

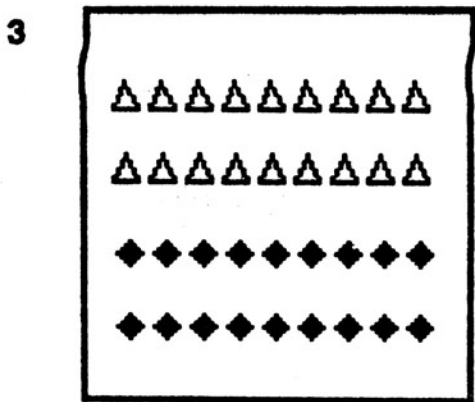
2 Pairs of Rows
meditative

3 Columns
middle class

CHECK THE BEST PICTURE DESCRIPTION



PERSON B



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

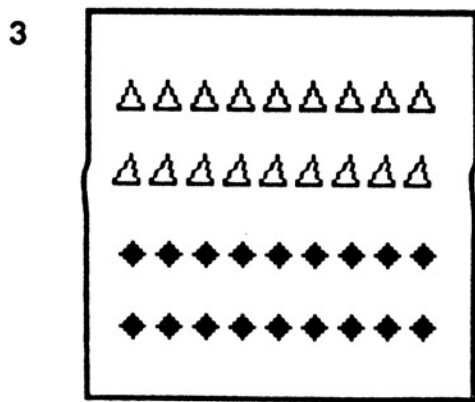
2 Pairs of Rows
good-humored

3 Columns
creative

CHECK THE BEST PICTURE DESCRIPTION



PERSON C



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows
interesting

3 Columns
discreet

CHECK THE BEST PICTURE DESCRIPTION



PERSON D

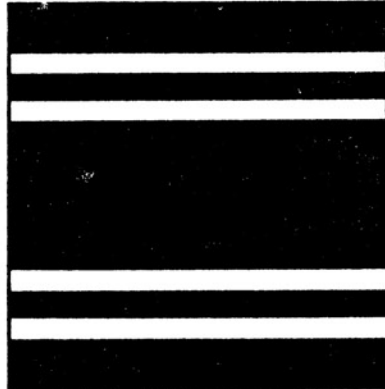
PERSON A

PERSON B

PERSON C

PERSON D

4



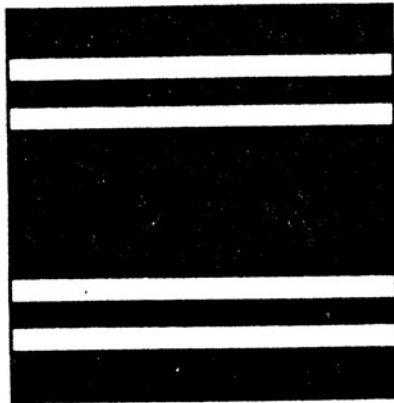
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stripes
<i>witty</i>

2 Pairs of Stripes
<i>futuristic</i>

CHECK THE BEST PICTURE DESCRIPTION

4



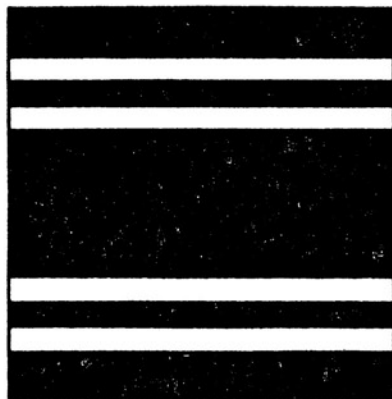
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stripes
<i>unmethodical</i>

2 Pairs of Stripes
<i>foreign</i>

CHECK THE BEST PICTURE DESCRIPTION

4



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stripes
<i>perceptive</i>

2 Pairs of Stripes
<i>persistent</i>

CHECK THE BEST PICTURE DESCRIPTION

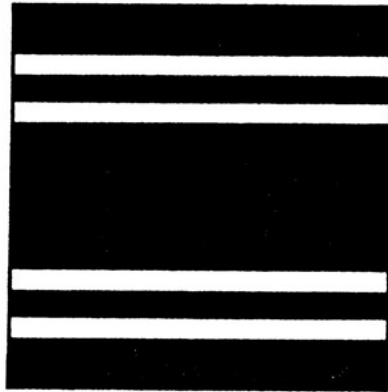
PERSON A

PERSON B

PERSON C

PERSON D

4



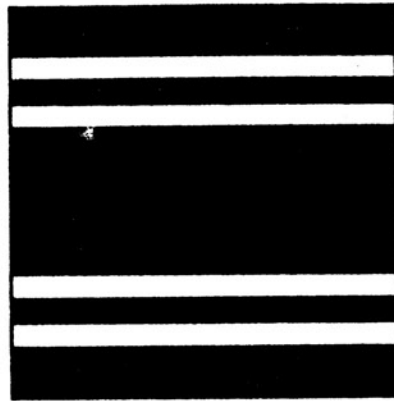
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stripes
<i>persistent</i>

2 Pairs of Stripes
<i>perceptive</i>

CHECK THE BEST PICTURE DESCRIPTION

4



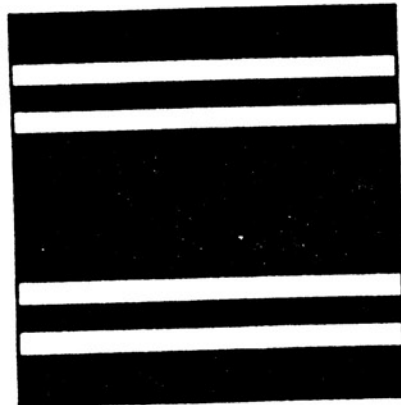
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stripes
<i>foreign</i>

2 Pairs of Stripes
<i>unmethodical</i>

CHECK THE BEST PICTURE DESCRIPTION

4



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stripes
<i>futuristic</i>

2 Pairs of Stripes
<i>witty</i>

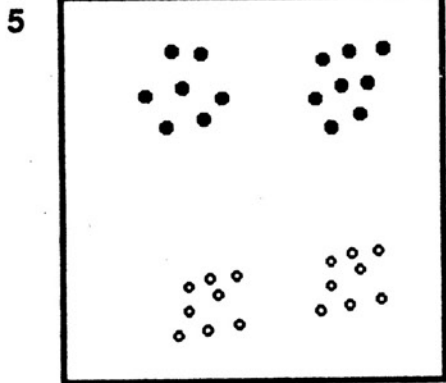
CHECK THE BEST PICTURE DESCRIPTION

PERSON A

PERSON B

PERSON C

PERSON D

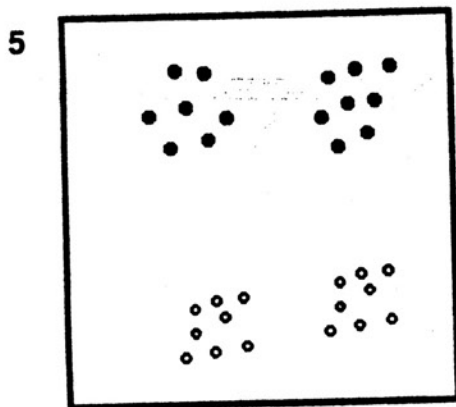


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>mild</i>

20 Dots
<i>thorough</i>

CHECK THE BEST PICTURE DESCRIPTION

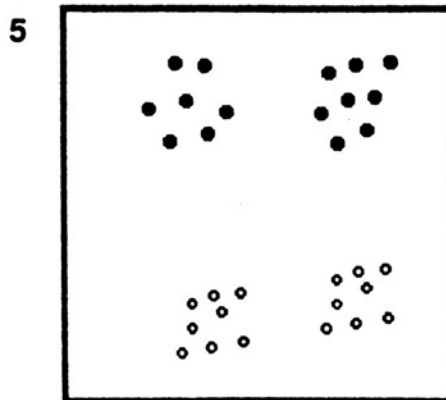


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>formal</i>

20 Dots
<i>curious</i>

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>flexible</i>

20 Dots
<i>fastidious</i>

CHECK THE BEST PICTURE DESCRIPTION

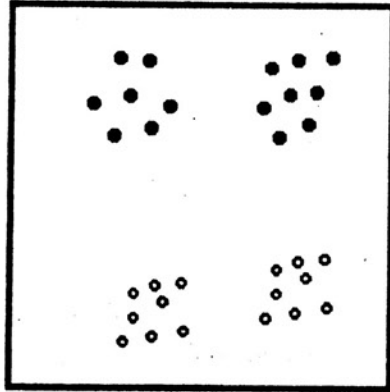
PERSON A

PERSON B

PERSON C

PERSON D

5



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>thorough</i>

20 Dots
<i>wield</i>

CHECK THE BEST PICTURE DESCRIPTION

5



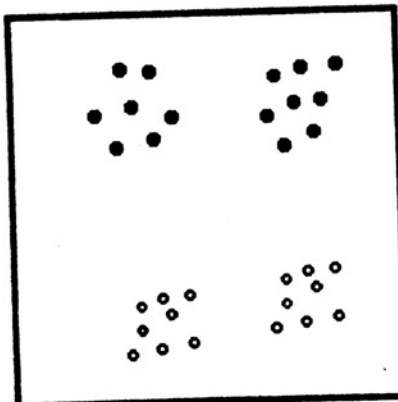
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>curious</i>

20 Dots
<i>formal</i>

CHECK THE BEST PICTURE DESCRIPTION

5



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

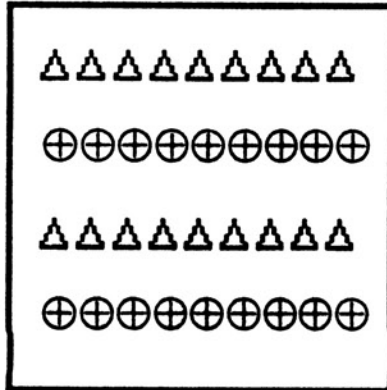
4 Groups
<i>fastidious</i>

20 Dots
<i>flexible</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON A

6



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

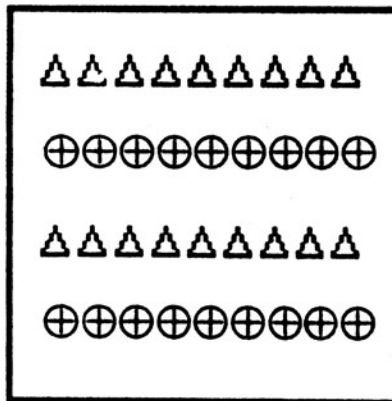
4 Rows
slave

2 Pairs of 2 Rows
cooperative

CHECK THE BEST PICTURE DESCRIPTION

PERSON B

6



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

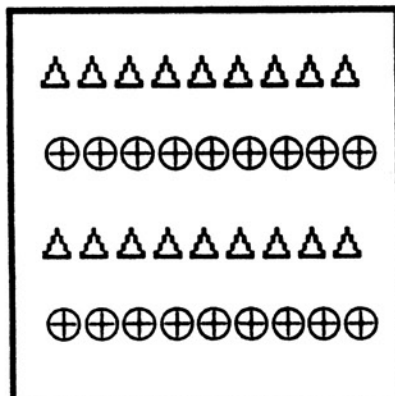
4 Rows
sentimental

2 Pairs of 2 Rows
well-mannered

CHECK THE BEST PICTURE DESCRIPTION

PERSON C

6



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Rows
fashionable

2 Pairs of 2 Rows
observant

CHECK THE BEST PICTURE DESCRIPTION

PERSON D

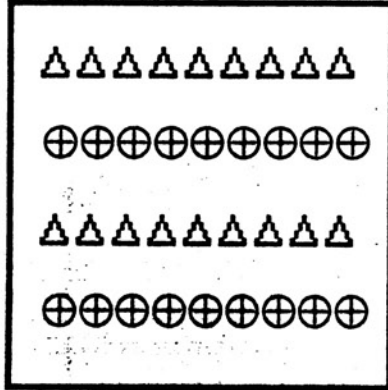
PERSON A

PERSON B

PERSON C

PERSON D

6



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

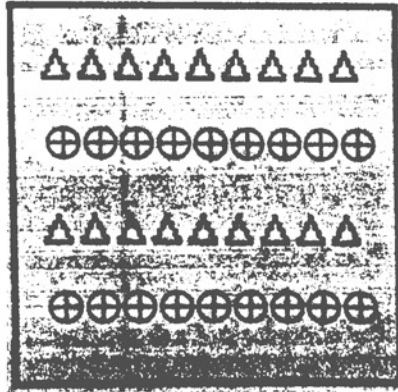
4 Rows
observant

2 Pairs of 2 Rows
fashionable

CHECK THE BEST PICTURE DESCRIPTION



6



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

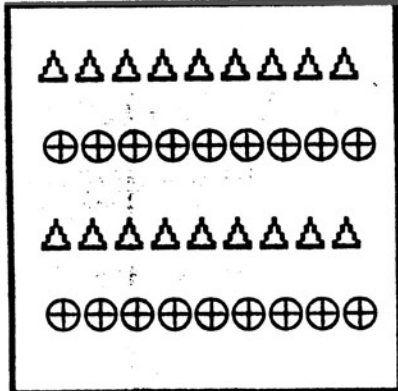
4 Rows
well-mannered

2 Pairs of 2 Rows
sentimental

CHECK THE BEST PICTURE DESCRIPTION



6



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Rows
cooperative

2 Pairs of 2 Rows
shave

CHECK THE BEST PICTURE DESCRIPTION



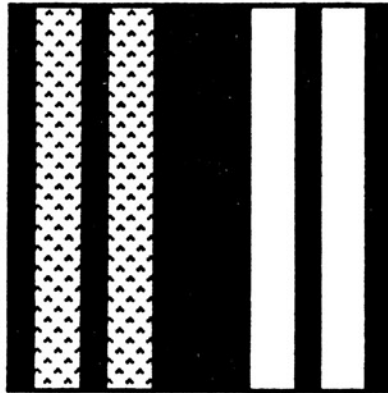
PERSON A

PERSON B

PERSON C

PERSON D

7



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes

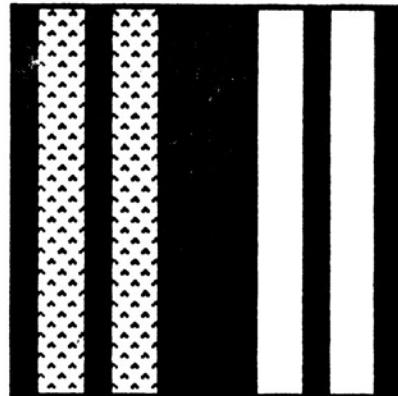
gracious

15 Stripes

methodical

CHECK THE BEST PICTURE DESCRIPTION

7



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes

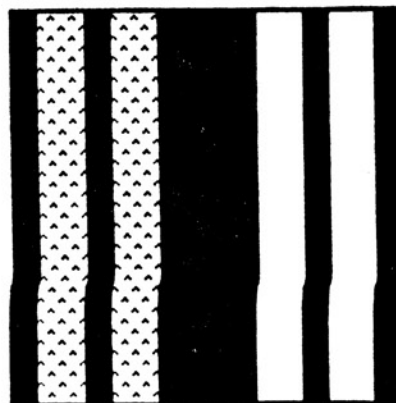
undecided

15 Stripes

direct

CHECK THE BEST PICTURE DESCRIPTION

7



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes

strange

15 Stripes

precise

CHECK THE BEST PICTURE DESCRIPTION

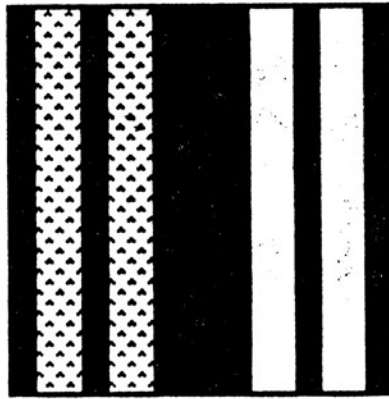
PERSON A

PERSON B

PERSON C

PERSON D

7



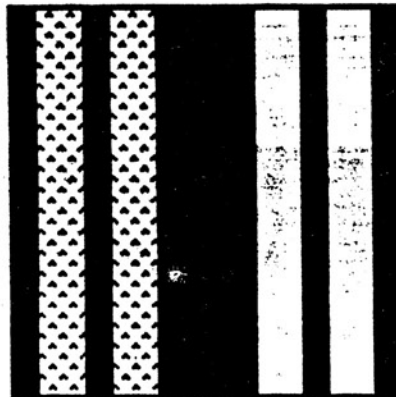
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>methodical</i>

15 Stripes
<i>glibious</i>

CHECK THE BEST PICTURE DESCRIPTION

7



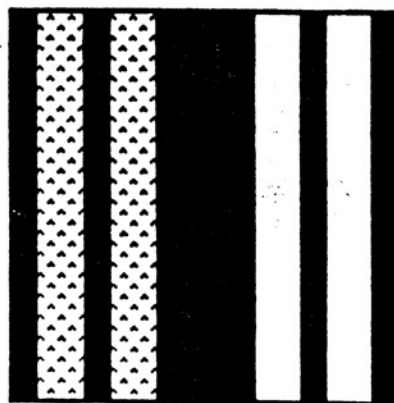
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>direct</i>

15 Stripes
<i>undecided</i>

CHECK THE BEST PICTURE DESCRIPTION

7



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>precise</i>

15 Stripes
<i>strange</i>

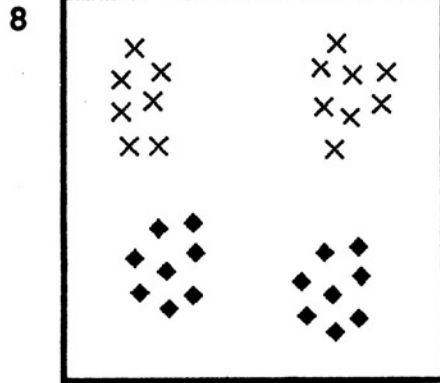
CHECK THE BEST PICTURE DESCRIPTION

PERSON A

PERSON B

PERSON C

PERSON D

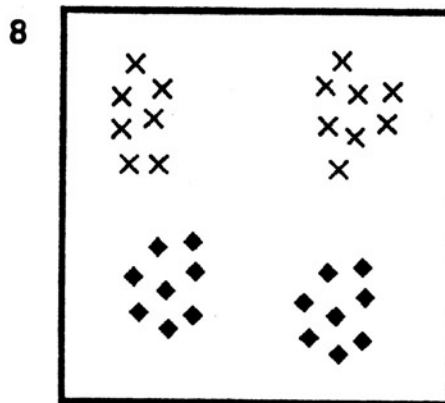


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Marks
<i>inventive</i>

CHECK THE BEST PICTURE DESCRIPTION

4 Groups
<i>mathematical</i>

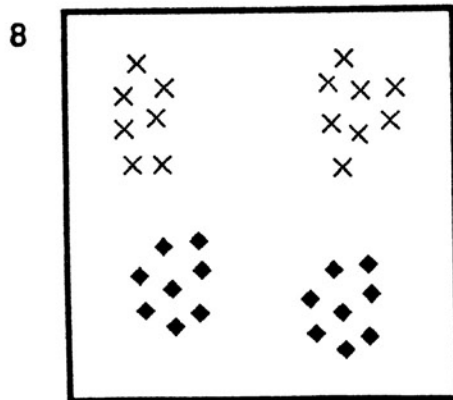


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Marks
<i>unpredictable</i>

CHECK THE BEST PICTURE DESCRIPTION

4 Groups
<i>imaginative</i>



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Marks
<i>intuitive</i>

CHECK THE BEST PICTURE DESCRIPTION

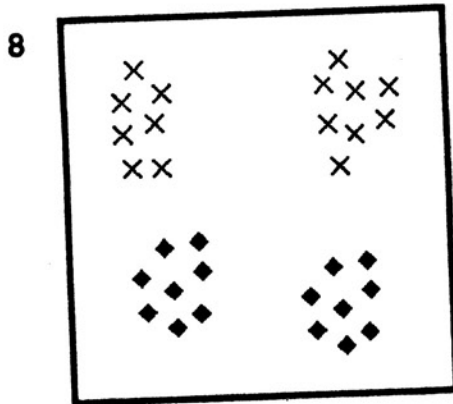
4 Groups
<i>bashful</i>

PERSON A

PERSON B

PERSON C

PERSON D



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

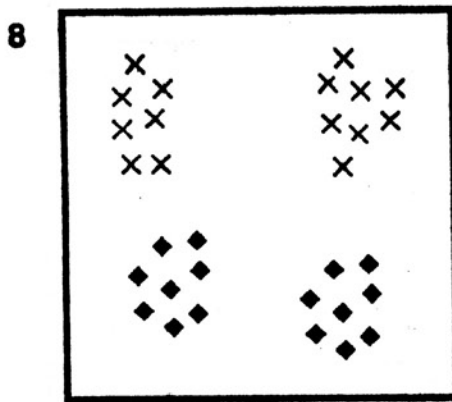
10 Marks

useful

4 Groups

inventive

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

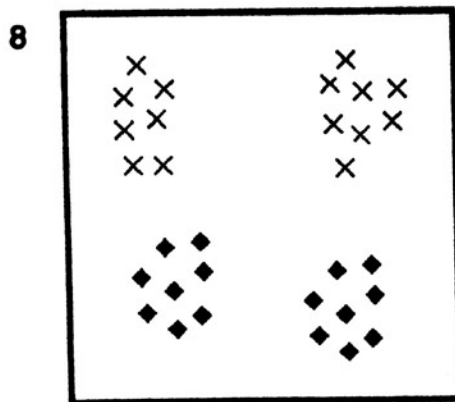
10 Marks

imaginative

4 Groups

unpredictable

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Marks

mathematical

4 Groups

inventive

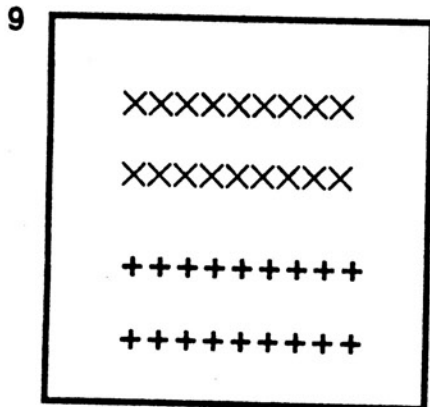
CHECK THE BEST PICTURE DESCRIPTION

PERSON A

PERSON B

PERSON C

PERSON D



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

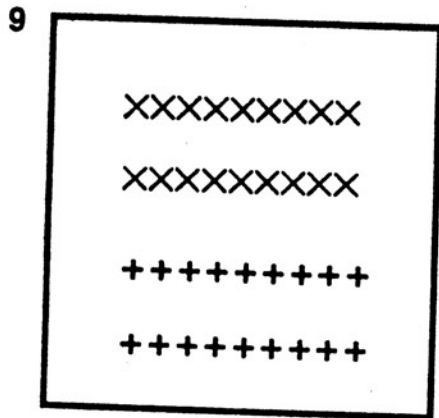
2 Pairs of Rows

changeable

6 Columns

vigorous

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

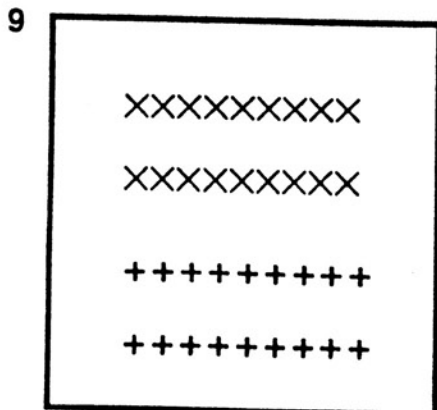
2 Pairs of Rows

extravagant

6 Columns

quick-witted

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows

nice

6 Columns

emotional

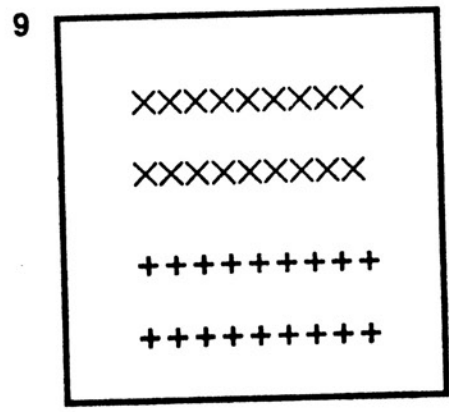
CHECK THE BEST PICTURE DESCRIPTION

PERSON A

PERSON B

PERSON C

PERSON D

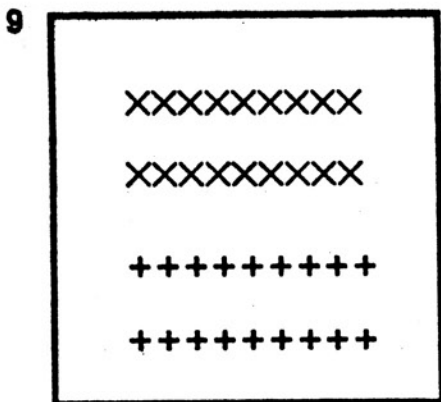


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows
ingenious

6 Columns
changeable

CHECK THE BEST PICTURE DESCRIPTION

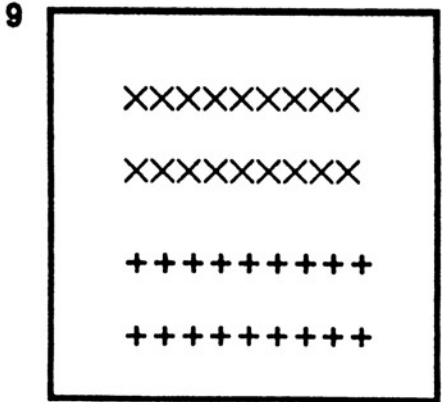


WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows
quick-witted

6 Columns
extravagant

CHECK THE BEST PICTURE DESCRIPTION



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Rows
emotional

6 Columns
nice

CHECK THE BEST PICTURE DESCRIPTION



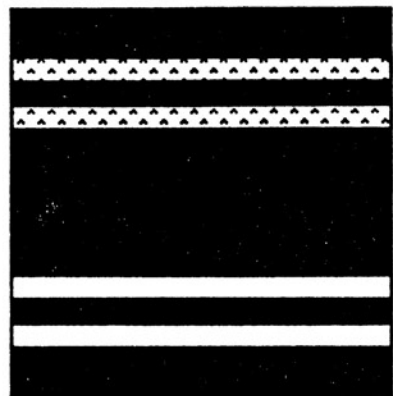
PERSON A

PERSON B

PERSON C

PERSON D

10



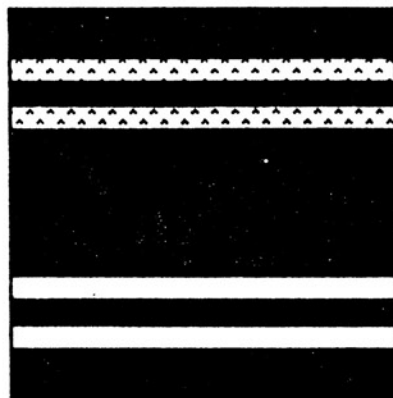
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

12 Stripes
<i>easy-going</i>
2 Pairs of Stripes
<i>courageous</i>

CHECK THE BEST PICTURE DESCRIPTION

<input type="checkbox"/>
<input checked="" type="checkbox"/>

10



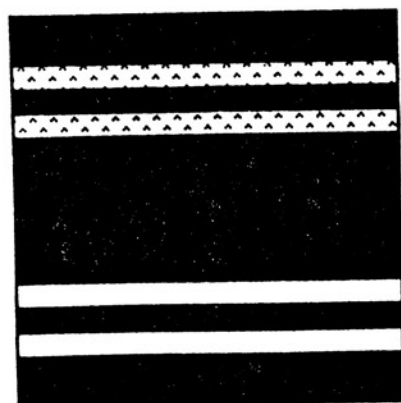
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

12 Stripes
<i>energetic</i>
2 Pairs of Stripes
<i>sympathetic</i>

CHECK THE BEST PICTURE DESCRIPTION

<input type="checkbox"/>
<input checked="" type="checkbox"/>

10



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

12 Stripes
<i>active</i>
2 Pairs of Stripes
<i>respectable</i>

CHECK THE BEST PICTURE DESCRIPTION

<input type="checkbox"/>
<input checked="" type="checkbox"/>

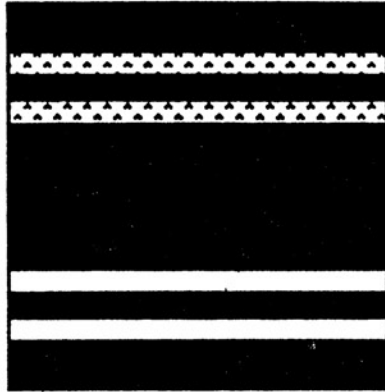
PERSON A

PERSON B

PERSON C

PERSON D

10



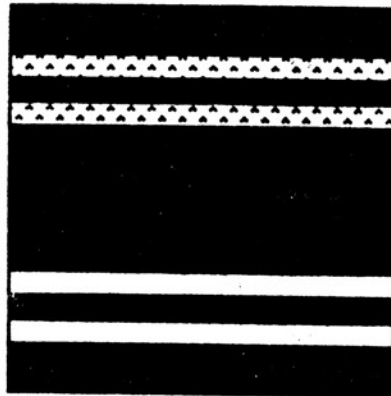
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

12 Stripes
<i>courageous</i>

2 Pairs of Stripes
<i>easy-going</i>

CHECK THE BEST PICTURE DESCRIPTION

10



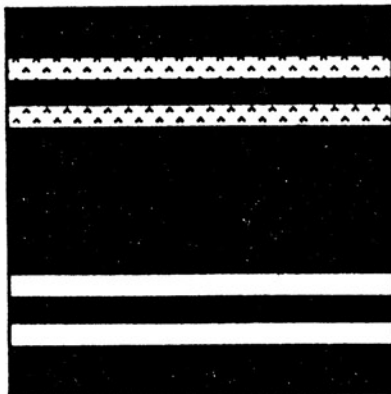
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

12 Stripes
<i>sympathetic</i>

2 Pairs of Stripes
<i>energetic</i>

CHECK THE BEST PICTURE DESCRIPTION

10



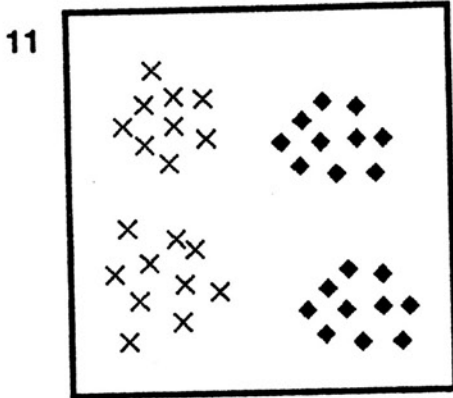
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

12 Stripes
<i>respectable</i>

2 Pairs of Stripes
<i>active</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON A



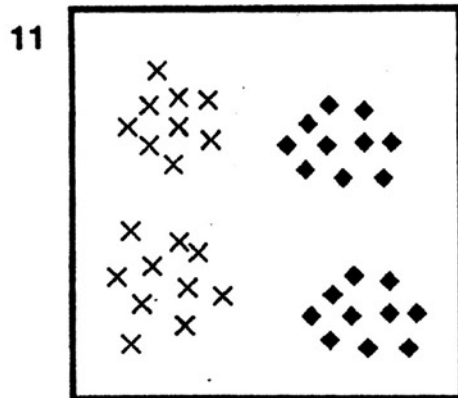
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>cultured</i>

CHECK THE BEST PICTURE DESCRIPTION

2 Marks
<i>realistic</i>

PERSON B



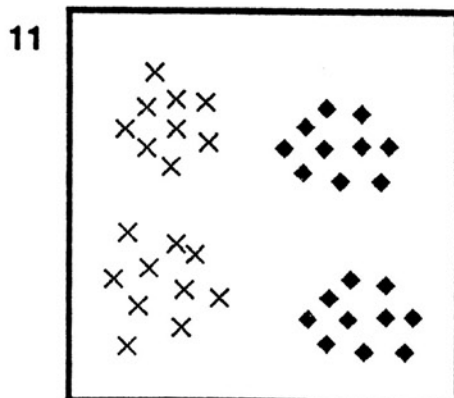
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>clear-headed</i>

CHECK THE BEST PICTURE DESCRIPTION

2 Marks
<i>amiable</i>

PERSON C



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>Versatile</i>

CHECK THE BEST PICTURE DESCRIPTION

2 Marks
<i>decent</i>

PERSON D

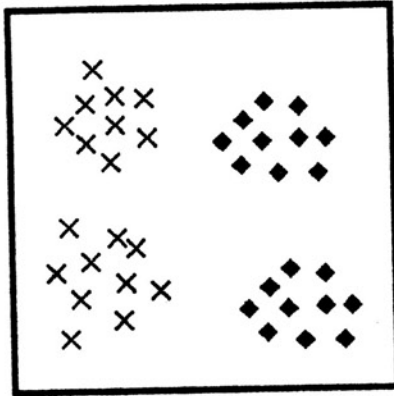
PERSON A

PERSON B

PERSON C

PERSON D

11



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

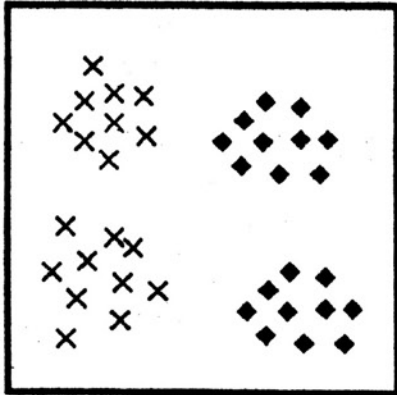
4 Groups
realistic

2 Marks
cultured

CHECK THE BEST PICTURE DESCRIPTION



11



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

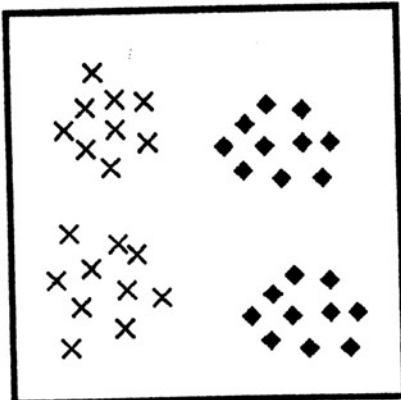
4 Groups
amiable

2 Marks
clear-headed

CHECK THE BEST PICTURE DESCRIPTION



11



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
decent

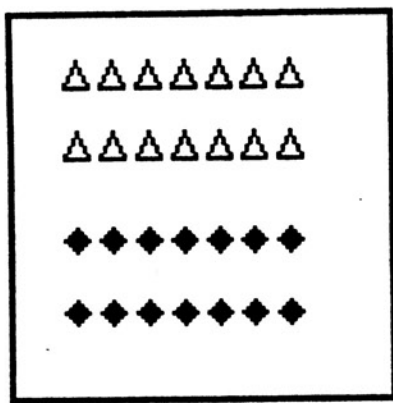
2 Marks
versatile

CHECK THE BEST PICTURE DESCRIPTION



PERSON A

12



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Columns
<i>self-conscious</i>

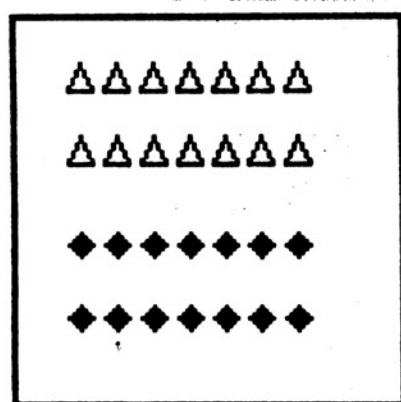
2 Pairs of Rows
<i>high-spirited</i>

CHECK THE BEST PICTURE DESCRIPTION



PERSON B

12



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Columns
<i>clever</i>

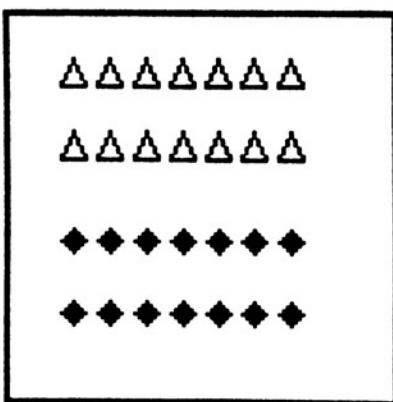
2 Pairs of Rows
<i>moderate</i>

CHECK THE BEST PICTURE DESCRIPTION



PERSON C

12



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Columns
<i>logical</i>

2 Pairs of Rows
<i>inoffensive</i>

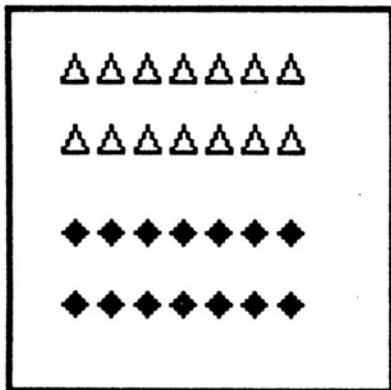
CHECK THE BEST PICTURE DESCRIPTION



PERSON D

PERSON A

12



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

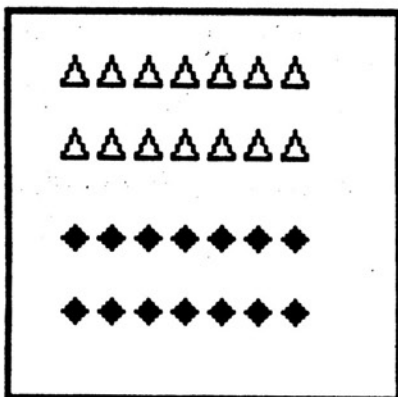
10 Columns
<i>high-spirited</i>

2 Pairs of Rows
<i>self-conscious</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON B

12



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

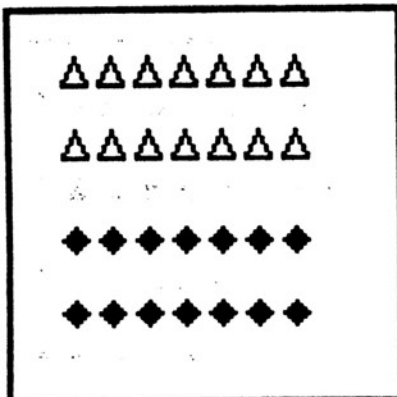
10 Columns
<i>inoffensive</i>

2 Pairs of Rows
<i>logical</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON C

12



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

10 Columns
<i>moderate</i>

2 Pairs of Rows
<i>clever</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON D

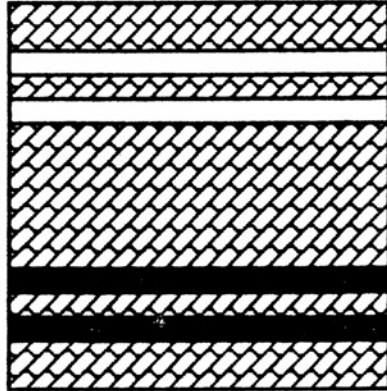
PERSON A

PERSON B

PERSON C

PERSON D

13



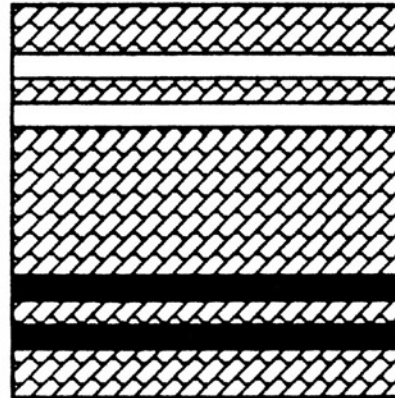
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>hesitant</i>

14 Stripes
<i>spirited</i>

CHECK THE BEST PICTURE DESCRIPTION

13



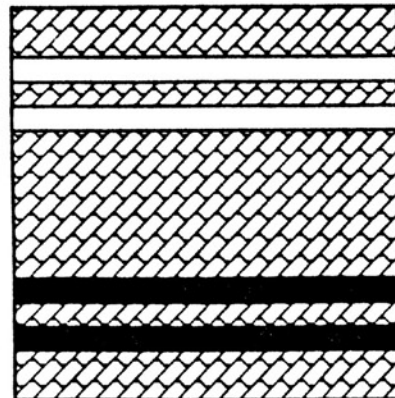
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>calm</i>

14 Stripes
<i>informal</i>

CHECK THE BEST PICTURE DESCRIPTION

13



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes
<i>shy</i>

14 Stripes
<i>verbal</i>

CHECK THE BEST PICTURE DESCRIPTION

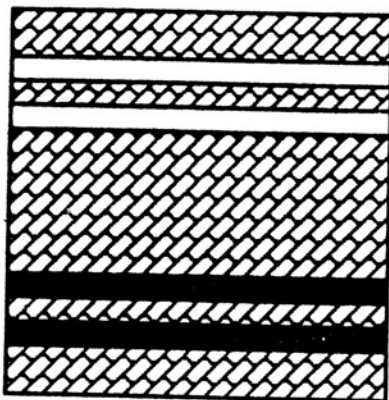
PERSON

PERSON B

PERSON C

PERSON D

13



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes

spirited

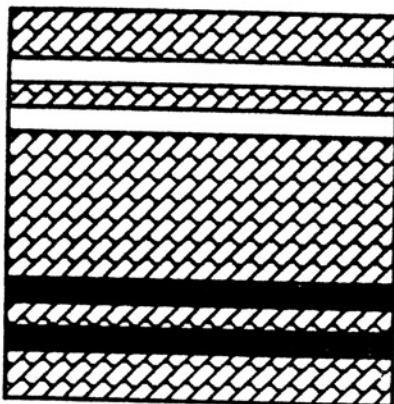
14 Stripes

hesitant

CHECK THE BEST PICTURE DESCRIPTION



13



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes

informal

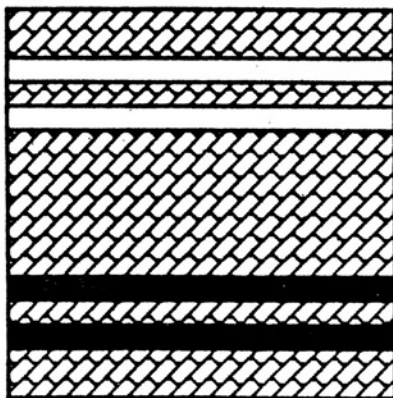
14 Stripes

calm

CHECK THE BEST PICTURE DESCRIPTION



13



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of Stripes

verbal

14 Stripes

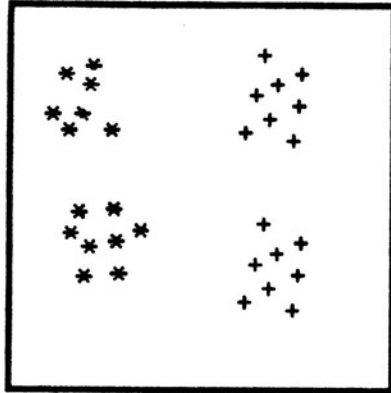
shy

CHECK THE BEST PICTURE DESCRIPTION



PERSON A

14



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

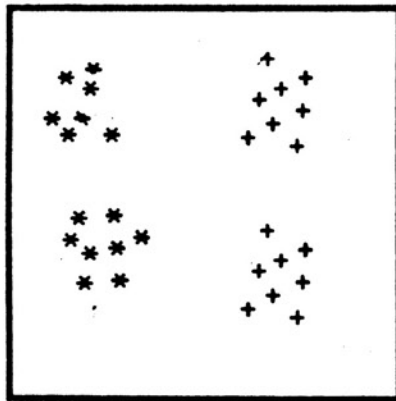
15 Stars
<i>steady</i>

4 Groups
<i>alternative</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON B

14



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

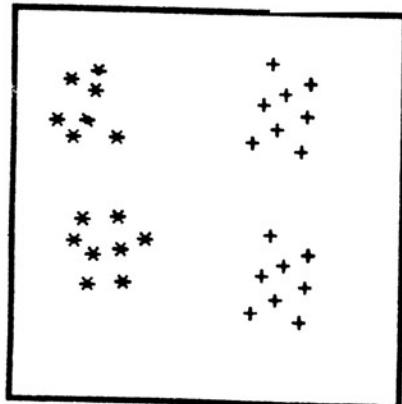
15 Stars
<i>casual</i>

4 Groups
<i>inexperienced</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON C

14



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stars
<i>low-key</i>

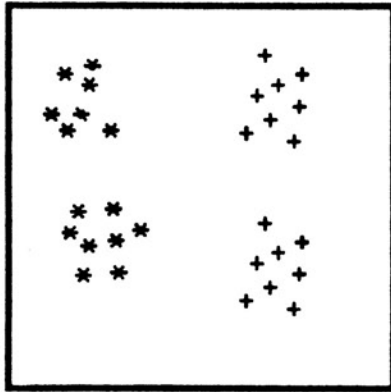
4 Groups
<i>scientific</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON D

PERSON A

14



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

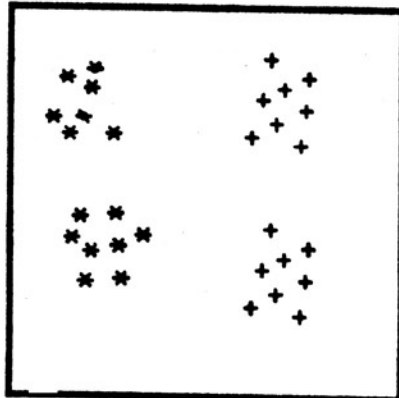
15 Stars
talentive

4 Groups
steady

CHECK THE BEST PICTURE DESCRIPTION

PERSON B

14



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

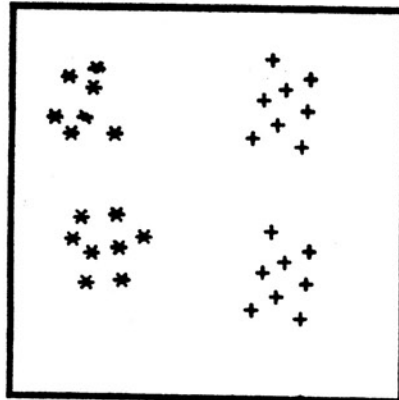
15 Stars
inexperienced

4 Groups
casual

CHECK THE BEST PICTURE DESCRIPTION

PERSON C

14



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

15 Stars
scientific

4 Groups
low-key

CHECK THE BEST PICTURE DESCRIPTION

PERSON D

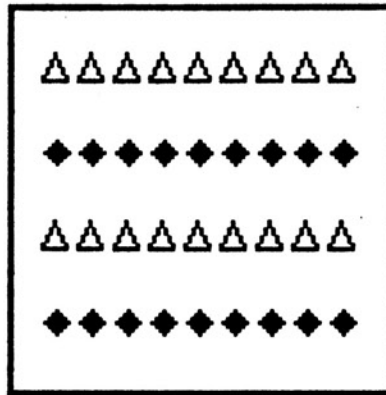
PERSON A

PERSON B

PERSON C

PERSON D

15



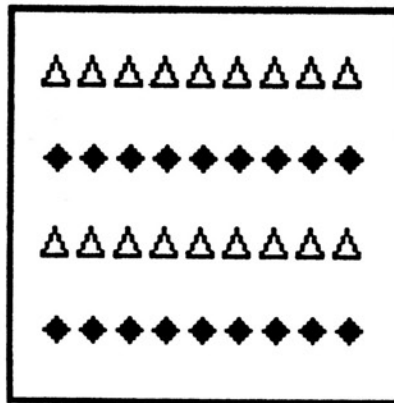
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Rows
<i>frustrated</i>

9 Columns
<i>neat</i>

CHECK THE BEST PICTURE DESCRIPTION

15



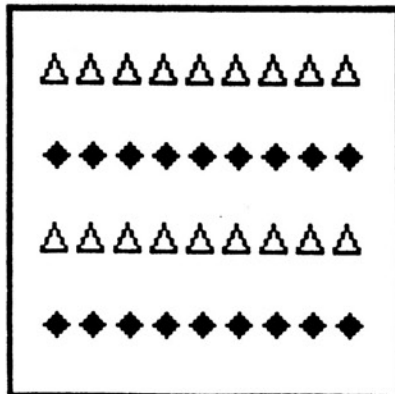
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Rows
<i>cheerful</i>

9 Columns
<i>amusing</i>

CHECK THE BEST PICTURE DESCRIPTION

15



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Rows
<i>reasonable</i>

9 Columns
<i>helpful</i>

CHECK THE BEST PICTURE DESCRIPTION

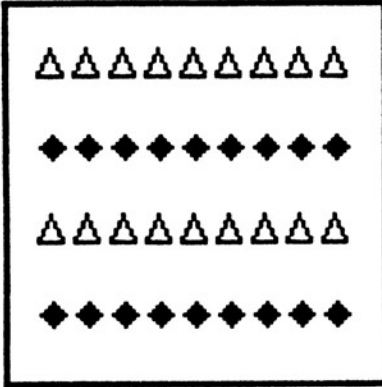
PERSON A

PERSON B

PERSON C

PERSON D

15



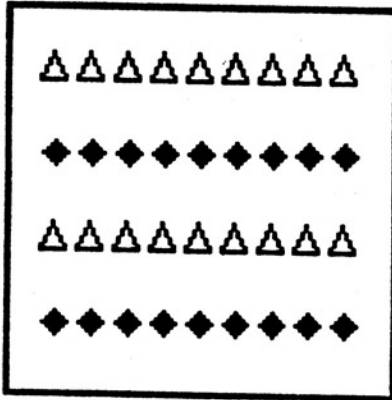
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Rows
<i>neat</i>

9 Columns
<i>fruity</i>

CHECK THE BEST PICTURE DESCRIPTION

15



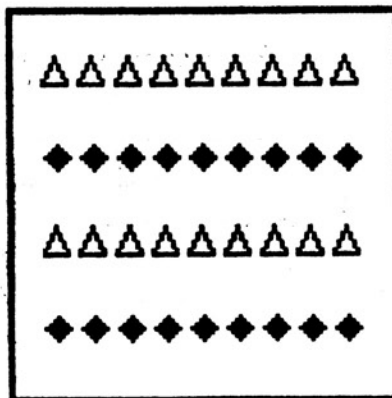
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Rows
<i>amusing</i>

9 Columns
<i>cheerful</i>

CHECK THE BEST PICTURE DESCRIPTION

15



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

2 Pairs of 2 Rows
<i>helpful</i>

9 Columns
<i>reasonable</i>

CHECK THE BEST PICTURE DESCRIPTION

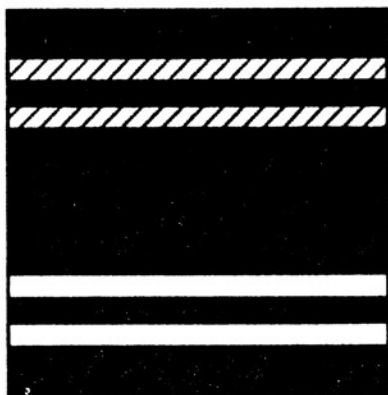
PERSON A

PERSON B

PERSON C

PERSON D

16



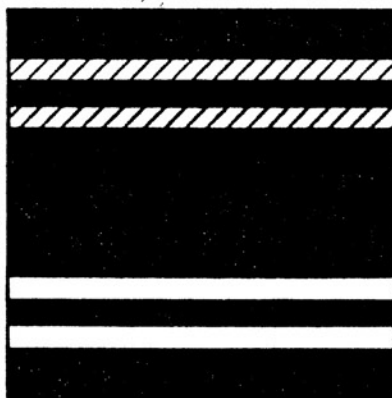
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

5 Stripes
<i>reserved</i>

2 Pairs of Stripes
<i>eccentric</i>

CHECK THE BEST PICTURE DESCRIPTION

16



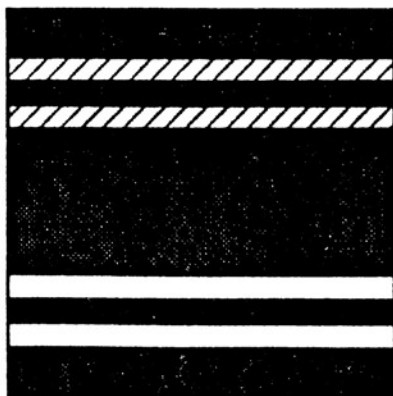
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

5 Stripes
<i>deliberate</i>

2 Pairs of Stripes
<i>theatrical</i>

CHECK THE BEST PICTURE DESCRIPTION

16



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

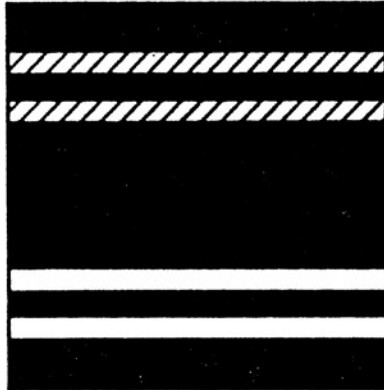
5 Stripes
<i>sensitive</i>

2 Pairs of Stripes
<i>modern</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON A

16



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

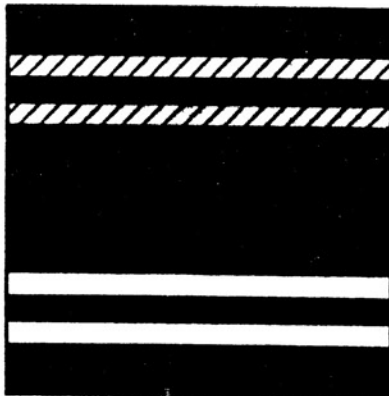
5 Stripes
<i>eccentric</i>

2 Pairs of Stripes
<i>reserved</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON B

16



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

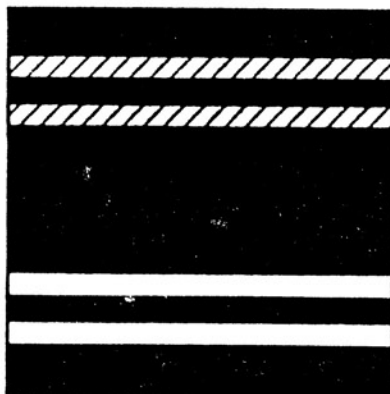
5 Stripes
<i>theatrical</i>

2 Pairs of Stripes
<i>deliberate</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON C

16



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

5 Stripes
<i>modern</i>

2 Pairs of Stripes
<i>sensitive</i>

CHECK THE BEST PICTURE DESCRIPTION

PERSON D

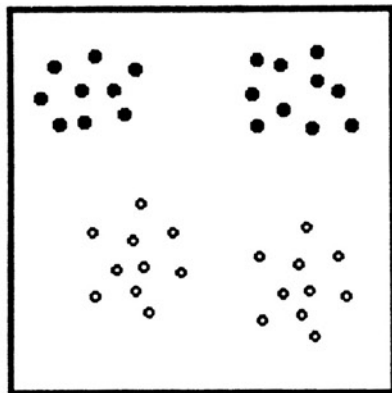
PERSON A

PERSON B

PERSON C

PERSON D

17



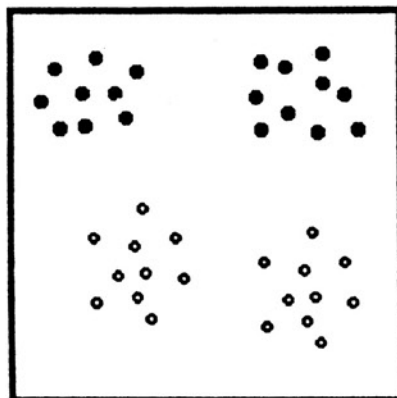
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>self-assured</i>

10 Dots
<i>studious</i>

CHECK THE BEST PICTURE DESCRIPTION

17



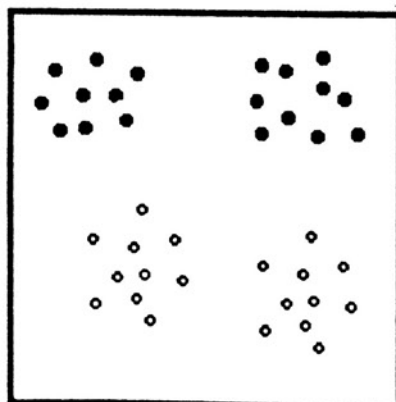
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>quiet</i>

10 Dots
<i>inexperienced</i>

CHECK THE BEST PICTURE DESCRIPTION

17



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>excitable</i>

10 Dots
<i>methodical</i>

CHECK THE BEST PICTURE DESCRIPTION

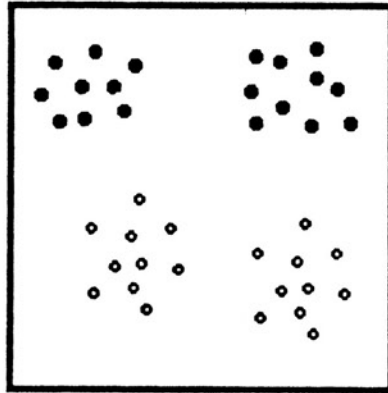
PERSON A

PERSON B

PERSON C

PERSON D

17



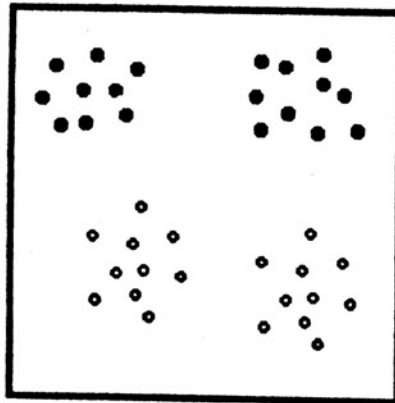
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>studious</i>

10 Dots
<i>self-assured</i>

CHECK THE BEST PICTURE DESCRIPTION

17



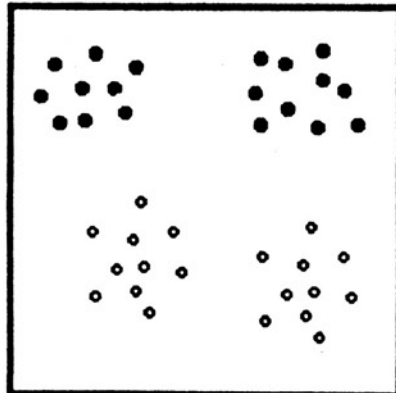
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>inexperienced</i>

10 Dots
<i>quiet</i>

CHECK THE BEST PICTURE DESCRIPTION

17



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

4 Groups
<i>methodical</i>

10 Dots
<i>excitable</i>

CHECK THE BEST PICTURE DESCRIPTION

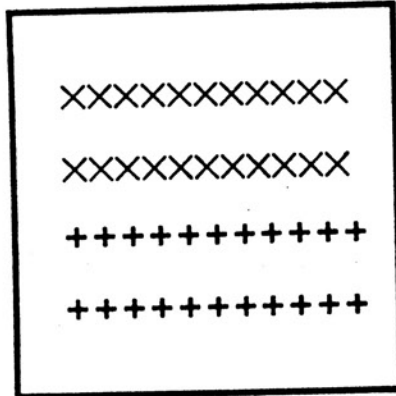
PERSON A

PERSON B

PERSON C

PERSON D

18



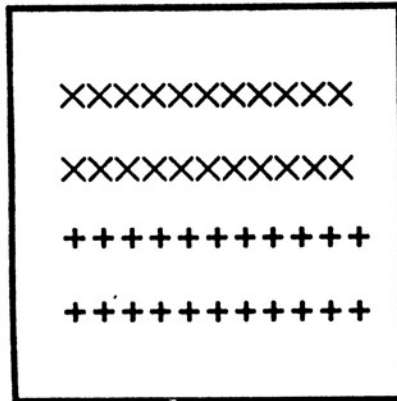
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

7 Columns
<i>meditative</i>

2 Pairs of Rows
<i>non-chalant</i>

CHECK THE BEST PICTURE DESCRIPTION

18



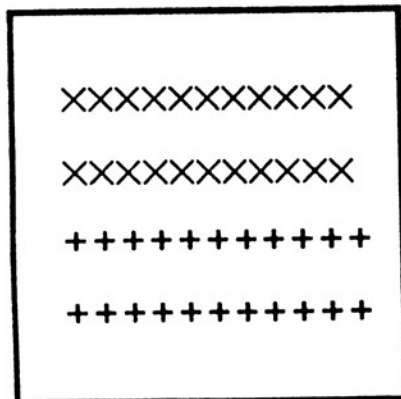
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

7 Columns
<i>meticulous</i>

2 Pairs of Rows
<i>moral</i>

CHECK THE BEST PICTURE DESCRIPTION

18



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

7 Columns
<i>subtle</i>

2 Pairs of Rows
<i>prudent</i>

CHECK THE BEST PICTURE DESCRIPTION

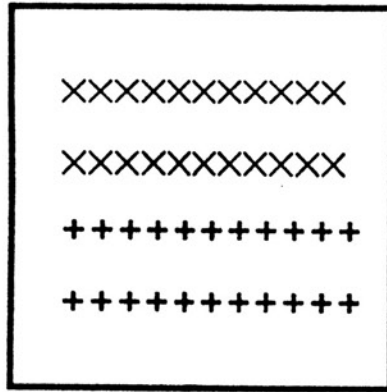
PERSON A

PERSON B

PERSON C

PERSON D

18



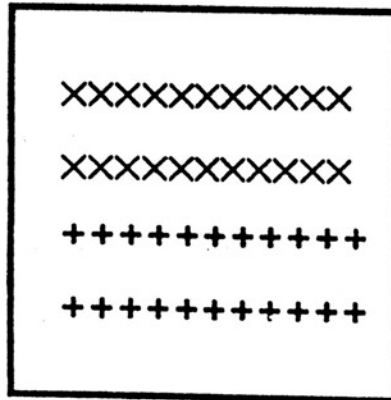
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

7 Columns
<i>non -chalant</i>

2 Pairs of Rows
<i>meditative</i>

CHECK THE BEST PICTURE DESCRIPTION

18



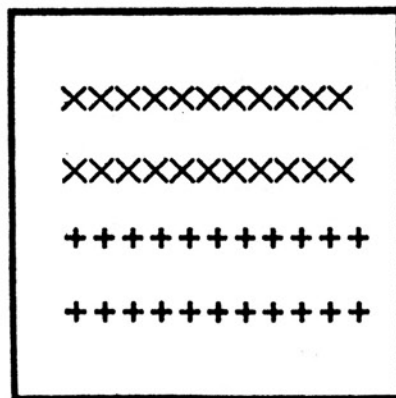
WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

7 Columns
<i>moral</i>

2 Pairs of Rows
<i>meticulous</i>

CHECK THE BEST PICTURE DESCRIPTION

18



WRITE BELOW EACH DESCRIPTION AN ASSOCIATED CHARACTERISTIC

7 Columns
<i>prudent</i>

2 Pairs of Rows
<i>subtle</i>

CHECK THE BEST PICTURE DESCRIPTION

APPENDIX VI: CONSENT FORM

CONSENT FOR PARTICIPATION IN AN INVESTIGATION
UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES

COGNITIVE STYLE AND PERSONALITY STUDY

PLEASE READ CAREFULLY

You are invited to participate in a research study of how the way people think interacts with personality factors. We are investigating how people's thought processes are linked with their personality, and how others perceive them as a person.

If you decide to participate, you will be presented with different pictures and asked to respond to questions about them. We will ask you for a urine sample in the beginning and at the end of the experiment. During the experiment you will be fitted with a blood pressure cuff which will be worn throughout the session. In addition, you will be asked to fill out questionnaires concerning your reaction to the experiment. This individual session study will last roughly an hour and a half to two hours. A complete explanation of the measurements made in the experiment will be given at the end of the session.

You will receive up to \$45.00 for your participation in the study. Other than the financial compensation, you will not receive any benefits from this study although your participation will contribute to our research.

You will be given a subject number, which will appear on all your questionnaires and results of your picture exercise. The consent form will have both your name and the subject number on it and will be kept in a locked filing cabinet and stored in the Department of Medical Psychology. Any information from this study will be disclosed in publication in a manner that does not reveal your identity. Confidentiality is protected to the best extent provided under law.

Possible inconvenience or discomfort from this study involves possible frustration on the picture matching task. You may experience some discomfort from the blood pressure cuff while your blood pressure is being measured. If, in the judgement of the experimenter, you are experiencing an undue amount of discomfort or frustration, the experiment will be discontinued. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. Your decision whether or not to participate will not prejudice your future contacts with the Uniformed Services University of the Health Sciences or its affiliates.

This study does not entail any foreseeable physical or mental risk beyond those described above. If, however, you become uncomfortable during the study, tell us. We do not expect this to occur, but if, for any reason, you feel that continuing would constitute a hardship for you, please tell us and we will end the session.

The particular experimental procedure may involve risks to you (or your embryo or fetus, should you be or become pregnant) which are currently unforeseeable.

If you believe that you have suffered any injury or illness as the result of participating in this research, please contact Research Administration, 295-3303, at the University. This office can review the matter with you and may be able to identify resources available to you.

Feel free to ask any questions you have about the study, and we will be happy to answer them. If you have any questions later don't hesitate to contact us. Please call Lisa Mezzacappa at 295-3522 with any additional questions.

You are making a decision whether or not to participate. Your signature indicates that having read the above information, you have decided to participate.

COGNITIVE STYLE AND PERSONALITY STUDY

I certify that I have received a copy of this form. _____ (please initial)

Date/Time _____

Signature _____

Printed Name/Status _____

Witness Signature

Investigator or Designee Signature

Printed Name/Rank

Printed Name Rank

APPENDIX VII: DATA SHEET

Date/ Time _____
 Subject Number _____
 Coh: H L
 TPN: H L

COGNITIVE STYLE AND PERSONALITY STUDY

MORNING VOID TOTAL VOLUME _____ ml.

FIRST VOID TOTAL VOLUME _____ ml.

SECOND VOID TOTAL VOLUME _____ ml.

BASELINE

16 min

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

18 min

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

20 min

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

PRE-QUESTIONNAIRES

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

**PRE
#1**

SYS	MAP
DIA	HR

**#2 40 sec
#3 1:20
#4 2:00**

SYS	MAP
DIA	HR

**#5 2:40
#6 3:20
#7 4:00**

SYS	MAP
DIA	HR

**#8 4:40
#9 5:20
#10 6:00**

SYS	MAP
DIA	HR

**#11 6:40
#12 7:20
#13 8:00**

SYS	MAP
DIA	HR

**#14 8:40
#15 9:20
#16 10:00**

SYS	MAP
DIA	HR

**#17 10:40
#18 11:20
END 12:00**

SYS	MAP
DIA	HR

CSPQ-B

PRE

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

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SYS	MAP
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SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

SYS	MAP
DIA	HR

POST QUESTIONNAIRES

COMMENTS

SYS	MAP
DIA	HR

1 Most Enjoyable aspect

SYS	MAP
DIA	HR

2 Most Difficult aspect.

SYS	MAP
DIA	HR

3. Δ in feelings, cognitions,

4 Purpose?

5. Did you think others' answers were supposed to affect your answers?

1st thought of it?

POST DEBRIEF

SYS	MAP
DIA	HR

did persist?

APPENDIX VIII: EXPERIMENTER-DERIVED QUESTIONNAIRES

1. Cohesiveness Questionnaire

2. Final Questionnaire

For future studies we hope to use volunteer groups again. To help us again with our recruiting efforts please answer all the following questions according to how much you disagree or agree with the statement:

1. I like the members of my group

Disagree 1 2 3 4 5 6 7 Agree

2. I would be willing to work with them again

Disagree 1 2 3 4 5 6 7 Agree

3. I would be willing to volunteer without them

Disagree 1 2 3 4 5 6 7 Agree

The following questions ask about how you felt while you were reading the answers of you fellow group members on the Cognitive Style and Personality Questionnaire. Please circle the number according to how much you disagree or agree with the statement.

1. I felt that the majority of the time, that the others chose good answers

Disagree 1 2 3 4 5 6 7 Agree

2. The others in the group seemed to be incompetent

Disagree 1 2 3 4 5 6 7 Agree

3. The others in the group did not seem to understand the directions

Disagree 1 2 3 4 5 6 7 Agree

4. I wanted to feel like I was part of the group

Disagree 1 2 3 4 5 6 7 Agree

5. I did not want to isolate myself from the others

Disagree 1 2 3 4 5 6 7 Agree

6. I felt accepted by the others

Disagree 1 2 3 4 5 6 7 Agree

7. In general, the other group members had similar picture descriptions

Disagree 1 2 3 4 5 6 7 Agree

8. Understanding the other people's picture descriptions influenced my answers/my own

Disagree 1 2 3 4 5 6 7 Agree

9. We disagreed most of the time on what was the best description for pictures

Disagree 1 2 3 4 5 6 7 Agree

10. We agreed most of the time on what was the best description for pictures

Disagree 1 2 3 4 5 6 7 Agree

11. I came to adopt the picture descriptions of the group

Disagree 1 2 3 4 5 6 7 Agree

12. I felt confused when I saw the other peoples answers

Disagree 1 2 3 4 5 6 7 Agree

13. The others had normal methods of describing pictures

Disagree 1 2 3 4 5 6 7 Agree

14. The others see things differently than I do

Disagree 1 2 3 4 5 6 7 Agree

15. The Cognitive Style and Personality Questionnaire was too difficult

Disagree 1 2 3 4 5 6 7 Agree

16. The directions were clear

Disagree 1 2 3 4 5 6 7 Agree

17. I felt something was wrong during the experiment

Disagree 1 2 3 4 5 6 7 Agree

18. At times, I wondered what was wrong with me

Disagree 1 2 3 4 5 6 7 Agree

19. At times, I wondered what was wrong with the rest of the group

Disagree 1 2 3 4 5 6 7 Agree

20. The others' answers made me look at my own answers more closely

Disagree 1 2 3 4 5 6 7 Agree

21. I believe that there were good reasons for the difference in answers in
the group

Disagree 1 2 3 4 5 6 7 Agree

22. I enjoyed seeing the different picture descriptions

Disagree 1 2 3 4 5 6 7 Agree

23. The personality characteristics that others associated with my answers
were mostly positive

Disagree 1 2 3 4 5 6 7 Agree

25. The personality characteristics that others associated with my answers were mostly negative

Disagree 1 2 3 4 5 6 7 Agree

26. I think that the others' methods of picture descriptions are inappropriate for this experiment

Disagree 1 2 3 4 5 6 7 Agree

27. I felt like I was a liability to the group

Disagree 1 2 3 4 5 6 7 Agree

28. Knowing the answers to these questions helps to understand each others' perspective

Disagree 1 2 3 4 5 6 7 Agree

29. Knowing the answers to these questions helps to know each others' personality

Disagree 1 2 3 4 5 6 7 Agree

30. I began to think as the others did, their way made more sense

Disagree 1 2 3 4 5 6 7 Agree

31. As the experiment progressed my way of looking at the pictures changed

Disagree 1 2 3 4 5 6 7 Agree

32. During the experiment, I felt proud

Disagree 1 2 3 4 5 6 7 Agree

33. During the experiment, I felt anxious

Disagree 1 2 3 4 5 6 7 Agree

34. During the experiment, I felt happy

Disagree 1 2 3 4 5 6 7 Agree

35. During the experiment, I felt angry

Disagree 1 2 3 4 5 6 7 Agree

36. During the experiment, I felt confused

Disagree 1 2 3 4 5 6 7 Agree

37. During the experiment, I felt confident
Disagree 1 2 3 4 5 6 7 Agree
38. During the experiment, I felt superior
Disagree 1 2 3 4 5 6 7 Agree
39. During the experiment, I felt irritated
Disagree 1 2 3 4 5 6 7 Agree
40. During the experiment, I felt uncomfortable
Disagree 1 2 3 4 5 6 7 Agree
41. During the experiment, I felt calm
Disagree 1 2 3 4 5 6 7 Agree
42. In general I feel very similar to the others
Disagree 1 2 3 4 5 6 7 Agree
43. In general I feel very dissimilar to the others
Disagree 1 2 3 4 5 6 7 Agree

The following questions are about how you felt when you filled out the Cognitive Style and Personality Questionnaire here in the laboratory. Please circle the number that indicates how much you disagree or agree with the statement.

1. The others influenced my answers

Disagree 1 2 3 4 5 6 7 Agree

2. I answered competently

Disagree 1 2 3 4 5 6 7 Agree

3. I answered to the best of my ability

Disagree 1 2 3 4 5 6 7 Agree

4. I believed that there was no such thing as a better or worse answer

Disagree 1 2 3 4 5 6 7 Agree

5. I think most people in this situation would answer the questions as I did

Disagree 1 2 3 4 5 6 7 Agree

6. I think most people in this situation would answer the questions as some of the others did

Disagree 1 2 3 4 5 6 7 Agree

7. I felt a strong desire to give my own answers, regardless of what the others did

Disagree 1 2 3 4 5 6 7 Agree

8. I felt anxious about disagreeing

Disagree 1 2 3 4 5 6 7 Agree

9. I felt like I was messing up the results for this group

Disagree 1 2 3 4 5 6 7 Agree

10. I wanted to give unique answers

Disagree 1 2 3 4 5 6 7 Agree

11. I answered in a way that I could appear competent

Disagree 1 2 3 4 5 6 7 Agree

12. I followed the experimenters directions to the best of my ability
Disagree 1 2 3 4 5 6 7 Agree
13. I didn't want to be dishonest to the experimenter
Disagree 1 2 3 4 5 6 7 Agree
14. I couldn't be completely honest in my answers
Disagree 1 2 3 4 5 6 7 Agree
15. I was self-conscious about my answers
Disagree 1 2 3 4 5 6 7 Agree
16. If I thought some of my previous answers I gave were bad ones, I chose another alternative
Disagree 1 2 3 4 5 6 7 Agree
17. I answered in my usual way
Disagree 1 2 3 4 5 6 7 Agree
18. The best answers were easy to figure out
Disagree 1 2 3 4 5 6 7 Agree
19. I tried to see as the others did
Disagree 1 2 3 4 5 6 7 Agree
20. Reading the others' answers made me think about my own answers more closely
Disagree 1 2 3 4 5 6 7 Agree
21. At times I had trouble choosing my answer
Disagree 1 2 3 4 5 6 7 Agree
22. It took a lot of effort for me to write down answers that were different than what the other group members wrote down
Disagree 1 2 3 4 5 6 7 Agree
23. I didn't know whether or not to give my own answer
Disagree 1 2 3 4 5 6 7 Agree

24. I didn't know whether to answer according to the others' answers or not
Disagree 1 2 3 4 5 6 7 Agree
25. Sometimes I gave one answer and not the other so I wouldn't be laughed at
Disagree 1 2 3 4 5 6 7 Agree
26. Sometimes I gave one answer and not the other so I would be more liked
Disagree 1 2 3 4 5 6 7 Agree
27. Sometimes I gave one answer and not the other because it would be better
for the group
Disagree 1 2 3 4 5 6 7 Agree
28. I did not care what other people would think of my answers
Disagree 1 2 3 4 5 6 7 Agree
29. Differing answers would hurt the group, show less unity and compatibility
Disagree 1 2 3 4 5 6 7 Agree
30. Similar answers would show the group as unified, more compatible
Disagree 1 2 3 4 5 6 7 Agree
31. Differing answers would help the group by having more diverse thinking,
and showing more creativity as the group
Disagree 1 2 3 4 5 6 7 Agree
32. Similar answers would hurt the group, show more narrow thinking and less
creativity
Disagree 1 2 3 4 5 6 7 Agree
33. Because of my answers the group will probably think I am abnormal
Disagree 1 2 3 4 5 6 7 Agree
34. Because of my answers the group will probably think I am creative
Disagree 1 2 3 4 5 6 7 Agree
35. People who think like me would be well accepted in this group
Disagree 1 2 3 4 5 6 7 Agree

36. There were times that I gave was not really what I thought was the best answer

Disagree 1 2 3 4 5 6 7 Agree

37. When I did the picture descriptions at home, my judgement of the pictures was incorrect

Disagree 1 2 3 4 5 6 7 Agree

38. I tried my best even if my way of thinking was different than the others'

Disagree 1 2 3 4 5 6 7 Agree

39. I answered all of the questions differently that what the others did

Disagree 1 2 3 4 5 6 7 Agree

40. I mostly answered according to my own way of thinking, even if it meant being different

Disagree 1 2 3 4 5 6 7 Agree

41. I mostly answered as the group did, even if it meant ignoring my own perspective

Disagree 1 2 3 4 5 6 7 Agree

42. I was too tense to do a good job

Disagree 1 2 3 4 5 6 7 Agree

43. I was too tired to do a good job

Disagree 1 2 3 4 5 6 7 Agree

To help us plan for the group session part of the experiment please answer all the following questions according to how much you disagree or agree with the statement:

1. I like the members of my group

Disagree 1 2 3 4 5 6 7 Agree

2. I would be willing to work with them again

Disagree 1 2 3 4 5 6 7 Agree

3. I would be willing to volunteer without them

Disagree 1 2 3 4 5 6 7 Agree

Open Ended Questions

1. What was most enjoyable aspect of this experiment?
2. What was the most difficult aspect of this experiment?
3. Please explain any change of feelings, attitudes or cognitions during the experiment.
4. What did you think our purpose was?
5. Did you suspect that the group answers were intended to affect your own?
6. When did you first feel this suspicion?
7. Did you retain this suspicion throughout the rest of the experiment?

APPENDIX IX: INDIVIDUAL DIFFERENCES QUESTIONNAIRES

1. California Psychological Inventory
2. Individuation Scale
3. Social Network Index
4. Work and Family Orientation Questionnaire
5. Pennebaker Index of Limbic Languidness

Questionnaire

For the following items, please indicate your degree of willingness to engage in each of the behaviors. Fill in the blank next to each item by choosing the appropriate number on the scale: (1) Not at all willing to do this; (2) Not very willing; (3) Slightly willing; (4) Fairly willing; (5) Very much willing to do this. While many of these behaviors might depend on the specifics of the situation, please try to indicate what your typical response would be. Be sure to answer each item.

- | 1 | 2 | 3 | 4 | 5 |
|-------------------------------|----------|----------|--------|------------------------------|
| Not at all willing to do this | Not very | Slightly | Fairly | Very much willing to do this |
- ___1. Give a lecture to a large audience.
 - ___2. Raise your hand to ask a question in a meeting or lecture.
 - ___3. Volunteer to head a committee for a group of people you do not know very well.
 - ___4. Tell a person that you like him/her.
 - ___5. Publicly challenge a speaker whose position clashes with your own.
 - ___6. Accept a nomination to be a leader of a group.
 - ___7. Present a personal opinion, on a controversial issue, to a group of strangers.
 - ___8. When asked to introduce yourself, say something more personal about yourself than just your name and occupation.
 - ___9. Give an informal talk in front of a small group of classmates or colleagues.
 - ___10. Speak up about your ideas even though you are uncertain of whether you are correct.
 - ___11. Perform on a stage before a large audience.
 - ___12. Give your opinion on a controversial issue, even though no one has asked for it.

Social Network Index

Instructions: This questionnaire is concerned with how many people you see or talk to on a regular basis including family, friends, workmates, neighbors, etc. Please read each question carefully before answering. For each question, place a check next to the appropriate response.

1) Which of the following best describes your marital status?

- (1) never married and never lived with someone in a marital-like relationship
 (2) currently married and living together or living with someone in a marital-like relationship
 (3) separated
 (4) divorced or formerly lived with someone in a marital-like relationship
 (5) widowed

2) How many children do you have?

- none 1 2 3
 4 5 6 7 or more

(IF YOU HAVE CHILDREN, PLEASE CONTINUE WITH 2a. IF YOU DO NOT HAVE CHILDREN, GO ON TO QUESTION 3.)

a) How many of your children live with you

- none 1 2 3
 4 5 6 7 or more

b) How many of your children do you see or talk to on the phone at least once every two weeks?

- none 1 2 3
 4 5 6 7 or more

3) Are either of your parents living?

- neither mother only father only both parents

(IF YOU HAVE A PARENT WHO IS LIVING, PLEASE CONTINUE WITH 3a. IF NEITHER PARENT IS LIVING, GO ON TO QUESTION 4)

a) Do you see or talk on the telephone to either of your parents at least once every two weeks?

neither mother only father only both parents

4) If you are married or in a marital-type relationship, are either of your spouse's parents living?

neither mother only father only both parents
 not applicable (not married)

(IF YOU ARE MARRIED AND AT LEAST ONE OF YOUR SPOUSE'S PARENTS IS ALIVE, PLEASE GO ON TO QUESTION 4a. IF YOU ARE NOT MARRIED, OR NEITHER OF YOUR SPOUSE'S PARENTS ARE LIVING, PLEASE SKIP 4a AND GO ON TO QUESTION 5)

a) Do you see or talk on the telephone to either of your spouse's parents at least once every two weeks?

neither mother only father only both parents

5) How many other relatives (other than your spouse, parents, & children) do you feel close to?

none 1 2 3
 4 5 6 7 or more

a) How many of these relatives do you see or talk to on the telephone at least once every two weeks?

none 1 2 3
 4 5 6 7 or more

6) How many close friends do you have? (meaning people that you feel at ease with, can talk to about private matters, and can call on for help)

none 1 2 3
 4 5 6 7 or more

a) How many of these friends do you see or talk to at least once every two weeks?

none 1 2 3
 4 5 6 7 or more

7) Do you belong to a church, temple, or other religious group?

no yes

If yes:

a) During the last month, how many times have you attended religious services?

none 1 2 3
 4 5 6 7 or more

b) How many members of your church or religious group do you talk to at least once every two weeks? (this includes at group meetings)

none 1 2 3
 4 5 6 7 or more

8) Do you belong to any other kinds of groups? (for example, social or recreational group, trade union, commercial group, professional organization, a group concerned with children [PTA, Boy Scouts], a group concerned with community betterment, charity, or service)

no yes

If yes:

a) During the last month, how many times have you attended group functions or meetings?

none 1 2 3
 4 5 6 7 or more

b) How many members of the group (or groups) that you belong to do you see or talk to at least once every two weeks? (this includes at group meetings)

none 1 2 3
 4 5 6 7 or more

9) Are you currently employed (full or part-time)?

no yes, self-employed yes, employed by others

If yes:

a) If you supervise others, how many people do you manage?

none 1 2 3
 4 5 6 7 or more
 not applicable

b) How many people at work (other than those you supervise) do you talk to at least once a week?

none 1 2 3
 4 5 6 7 or more

10) Are you currently involved in regular voluntary work?

no yes

If yes:

a) How many people involved in this volunteer work do you talk to at least once a week?

none 1 2 3
 4 5 6 7 or more

11) Do you attend any classes (school, university, technical training, or adult education) on a regular basis?

no yes

If yes:

a) How many fellow students or teachers do you talk to at least once every two weeks? (this includes at class meetings)

none 1 2 3
 4 5 6 7 or more

12) How many of your neighbors do you visit or talk to at least once every two weeks?

___ none(or have no neighbors) ___ 1
___ 4 ___ 5 ___ 6 ___ 2 ___ 3
___ 7 or more

Work and Family Orientation Questionnaire

The following statements describe reactions to conditions of work and challenging situations. For each item, indicate how much you agree or disagree with the statements, as it refers to yourself, by choosing the appropriate letter on the scale, A, B, C, D, or E.

1. I would rather do something at which I feel confident and relaxed than something which is challenging and difficult.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

2. It is important for me to do my work as well as I can even if it isn't popular with my co-workers.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

3. I enjoy working in situations involving competition with others.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

4. When a group I belong to plans an activity, I would rather direct it myself than just help out and have someone else organize it.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

5. I feel that good relations with my fellow workers are more important than performance on a task.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

6. I would rather learn easy fun games than difficult thought games.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

7. It is important to me to perform better than others on a task.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

8. I worry because my success may cause others to dislike me.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

9. I find satisfaction in working as well as I can.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

10. If I am not good at something I would rather keep struggling to master it than move on to something I may be good at.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

11. I avoid discussing my accomplishments because other people might be jealous.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

12. Once I undertake a task, I persist.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

13. I prefer to work in situations that require a high level of skill.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

14. There is satisfaction in a job well done.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

15. I feel that winning is important in both work and games.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

16. I more often attempt tasks that I am not sure I can do than tasks that I believe I can do.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

17. I sometimes work at less than my best because I feel that others may resent me for performing well.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

18. I find satisfaction in exceeding my previous performance even if I don't outperform others.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

19. I like to work hard.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

20. Part of my enjoyment in doing things in improving my past performance.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

21. It annoys me when other people perform better than I do.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

22. I like to be busy all the time.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

23. I try harder when I'm in competition with other people.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

24. It is important for me to get a job in which there is opportunity for promotion and advancement.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

25. Assuming that I get (or am) married, I would like my husband or my wife to have a job or career that pays well.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

26. It is important to my future satisfaction in life to have a job or career that pays well.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

27. Assuming that I get (or am) married, I would like my husband or my wife to have a job or career that brings recognition and prestige from others.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

28. It is important to me to have a job or career that will bring me prestige and recognition from others.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

29. Assuming that I get (or am) married, it wouldn't bother me if my spouse had a better job than I do.

A	B	C	D	E
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

30. What is the least amount of education that will satisfy you?

- a. graduate from high school
- b. some special vocational training beyond high school (electronics, auto mechanics, nursing, secretarial school, etc.)
- c. some college
- d. graduate from college
- e. advanced professional degree (Ph.D., MD. law degree, etc.)

31. How important do you think marriage will be to your satisfaction in life, in comparison to a job?
- a. the most important thing; I will work primarily for financial reasons.
 - b. marriage relatively more important than my work.
 - c. marriage and my work equally important.
 - d. marriage relatively less important than my work.
 - e. marriage is unimportant; I would be reasonably content if I did not marry.
32. How many children would you ideally like to have?
- a. 0
 - b. 1
 - c. 2
 - d. 3
 - e. 4 or more

Inventory of Limbic Languidness

On the following pages several common symptoms of bodily sensations are listed. Most people have experienced most of them at one time or another. We are currently interested in finding out how prevalent each symptom is among people. All data will be confidential.

On the answer sheet, next to the number corresponding to the symptoms shown below, clearly write the letter which indicates how frequently you experience that symptom. For all items, use the following scale:

A	B	C	D	E
Have never or almost never experienced the symptom	Less than 3 or 4 times per year	Every month or so	Every week or so	More than once every week

For example, if your eyes water once every week or two, you would clearly write a D next to item #1 on your answer sheet.

-
- | | |
|--|-----------|
| 1. Eyes water | 1. _____ |
| 2. Itching or painful eyes | 2. _____ |
| 3. Ringing in ears | 3. _____ |
| 4. Temporary deafness or hard of hearing | 4. _____ |
| 5. Lump in throat | 5. _____ |
| 6. Choking sensations | 6. _____ |
| 7. Sneezing spells | 7. _____ |
| 8. Running nose | 8. _____ |
| 9. Congested nose | 9. _____ |
| 10. Bleeding nose | 10. _____ |
| 11. Asthma or wheezing | 11. _____ |
| 12. Coughing | 12. _____ |
| 13. Out of breath | 13. _____ |
| 14. Swollen ankles | 14. _____ |
| 15. Chest pains | 15. _____ |
| 16. Racing heart | 16. _____ |
| 17. Cold hands or feet even in hot weather | 17. _____ |
| 18. Leg cramps | 18. _____ |
| 19. Insomnia | 19. _____ |
| 20. Toothaches | 20. _____ |
| 21. Upset stomach | 21. _____ |
| 22. Indigestion | 22. _____ |
| 23. Heartburn | 23. _____ |

- | | |
|--|-----------|
| 24. Severe pains or cramps in stomach | 24. _____ |
| 25. Diarrhea | 25. _____ |
| 26. Constipation | 26. _____ |
| 27. Hemorrhoids | 27. _____ |
| 28. Swollen joints | 28. _____ |
| 29. Stiff muscles | 29. _____ |
| 30. Back pains | 30. _____ |
| 31. Sensitive or tender skin | 31. _____ |
| 32. Face flushes | 32. _____ |
| 33. Severe itching | 33. _____ |
| 34. Skin breaks out in rash | 34. _____ |
| 35. Acne or pimples on face | 35. _____ |
| 36. Acne or pimples other than face | 36. _____ |
| 37. Boils | 37. _____ |
| 38. Sweat even in cold weather | 38. _____ |
| 39. Strong reactions to insect bites | 39. _____ |
| 40. Headaches | 40. _____ |
| 41. Sensation of pressure in head | 41. _____ |
| 42. Hot flashes | 42. _____ |
| 43. Chills | 43. _____ |
| 44. Dizziness | 44. _____ |
| 45. Feel faint | 45. _____ |
| 46. Numbness or tingling in any part of body | 46. _____ |
| 47. Twitching of eyelid | 47. _____ |
| 48. Twitching other than eyelid | 48. _____ |
| 49. Hands tremble or shake | 49. _____ |
| 50. Stiff joints | 50. _____ |
| 51. Sore muscles | 51. _____ |
| 52. Sore throat | 52. _____ |
| 53. Sunburn | 53. _____ |
| 54. Nausea | 54. _____ |

APPENDIX X: SELF-REPORT INDICES OF STRESS RESPONSE

1. Profile of Mood States
2. Symptom-Emotion Checklist

Right now, at this moment, I am feeling:

Not happy _____ _____ _____ _____ _____ _____
happy

Not anxious _____ _____ _____ _____ _____ _____
anxious

Not angry _____ _____ _____ _____ _____ _____
angry

Not guilty _____ _____ _____ _____ _____ _____
guilty

Not sad _____ _____ _____ _____ _____ _____
sad

APPENDIX XI: MISCELLANEOUS INFORMATION SENT TO SUBJECTS

March , 1993

Dear

We appreciate your decision to participate in our study. Enclosed you will find the urine container and questionnaires that I told you about over the telephone. Following in this letter are instructions concerning the questionnaires you will fill out and return and the collection of the urine sample. Please call to let me know you have received this package and understand the following directions. My number is (301) 295-3522 or (301) 295-3270 at the Department of Medical Psychology (you may call collect if this is a toll call). I can also be reached via email on Bitnet at the address sibilboro@usuhs or on Internet at sibilboro@usuhs.ucc.usuhs.nmmc.navy.mil.

Instructions for the Questionnaires:

You should find 7 questionnaires entitled The California Psychological Inventory, The Social Network Index, The Inventory of Limbic Languidness, The Work and Family Orientation Scale, the Questionnaire, The Cognitive Style and Personality Questionnaire, and the Preferred Group Member Questionnaire. It is very important that you use a #2 pencil to fill out the bubbles on the California Psychological Inventory questionnaire, so please use the pencil provided. In addition, there is a calendar on which to mark the best days for you to come in for both the initial individual session (if the pre-arranged time has to be canceled) and the second group discussion session.

Please fill these out and send them back to us in the post-paid envelope before _____.

Be sure to read the directions on each questionnaire carefully before filling them out. Also there is a checklist for all the materials to be sent back to us, to make sure the package is complete. If you have any questions about the instructions please call me immediately.

Instructions for the morning urine sample:

The container contains a small amount of white powder which is a preservative. Please do not remove the preservative from the container, do not touch it and avoid getting it in your eyes. Keep it out of the reach of children.

Please collect all your urine from your first morning void in this container. The urine has to be kept cool for as much of the time as possible before you bring it to the experiment. You can keep the container in the refrigerator, in a pan of ice, or in a bag with ice packs. Also the container needs to be protected from sunlight. Keep it in a paper bag if necessary.

Also, you should fill out the Food Checklist by circling all the foods that you consumed the night before the time of the urine collection.

Summary:

Fill out the 7 questionnaires and calendar, send them back within a week.

On the day you are to come in for the first individual experimental session, collect all urine from your first morning void.

Fill out the Food Checklist.

Bring in your urine in the container provided and the completed Food Checklist to the experiment.

Again, if you have any questions, do not hesitate to call us.

We sincerely thank you for your help and cooperation and are looking forward to working with you and your group.

Sincerely,

Lisa Mezzacappa

DIRECTIONS TO: DEPARTMENT OF MEDICAL PSYCHOLOGY
UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES (USUHS)

We are located in Bethesda, across Rockville Pike from the National Institutes of Health.

FROM D.C.: Take Wisconsin Avenue (also called Rockville Pike and 355) north through Bethesda to the stoplight at Jones Bridge Road. Turn RIGHT onto Jones Bridge Road. You will come to a stoplight at an entrance to USUHS. DO NOT TURN HERE, rather take the next LEFT into USUHS. There is no stoplight or stop sign at this turn, but it is marked by a stone sign. Pass through one stop sign. Follow this road all the way into the underground parking garage. Follow the signs for parking. Once you have parked, find the entrance for BUILDING B. Inside the door you will find a security desk. Tell the security person you are here to see Lisa Mezzacappa (who is coordinating the study). The phone number is 295-3522 or 295-3270. Lisa or one of the other researchers will meet you there.

FROM 495/BELTWAY: Take 495 to the Rockville Pike/Wisconsin Avenue/355 exit. Exit SOUTH onto the Pike and go straight through four stoplights. At the fifth stoplight turn LEFT onto Jones Bridge Road. You will come to a stoplight at an entrance to USUHS. DO NOT TURN HERE, rather take the next LEFT into USUHS. There is no stoplight or stop sign at this turn, but it is marked by a stone sign. Pass through one stop sign. Follow this road all the way into the underground parking garage. Follow the signs for parking. Once you have parked, find the entrance for BUILDING B. Inside the door you will find a security desk. Tell the security person you are here to see Lisa Mezzacappa (who is coordinating the study). The phone number from the security desk is 5-3279 or 5-3522. Lisa or one of the other researchers will meet you there.

YOU ARE SCHEDULED TO PARTICIPATE IN OUR STUDY ON:

_____ , _____ - _____ - _____ at _____
day of the week month day year time

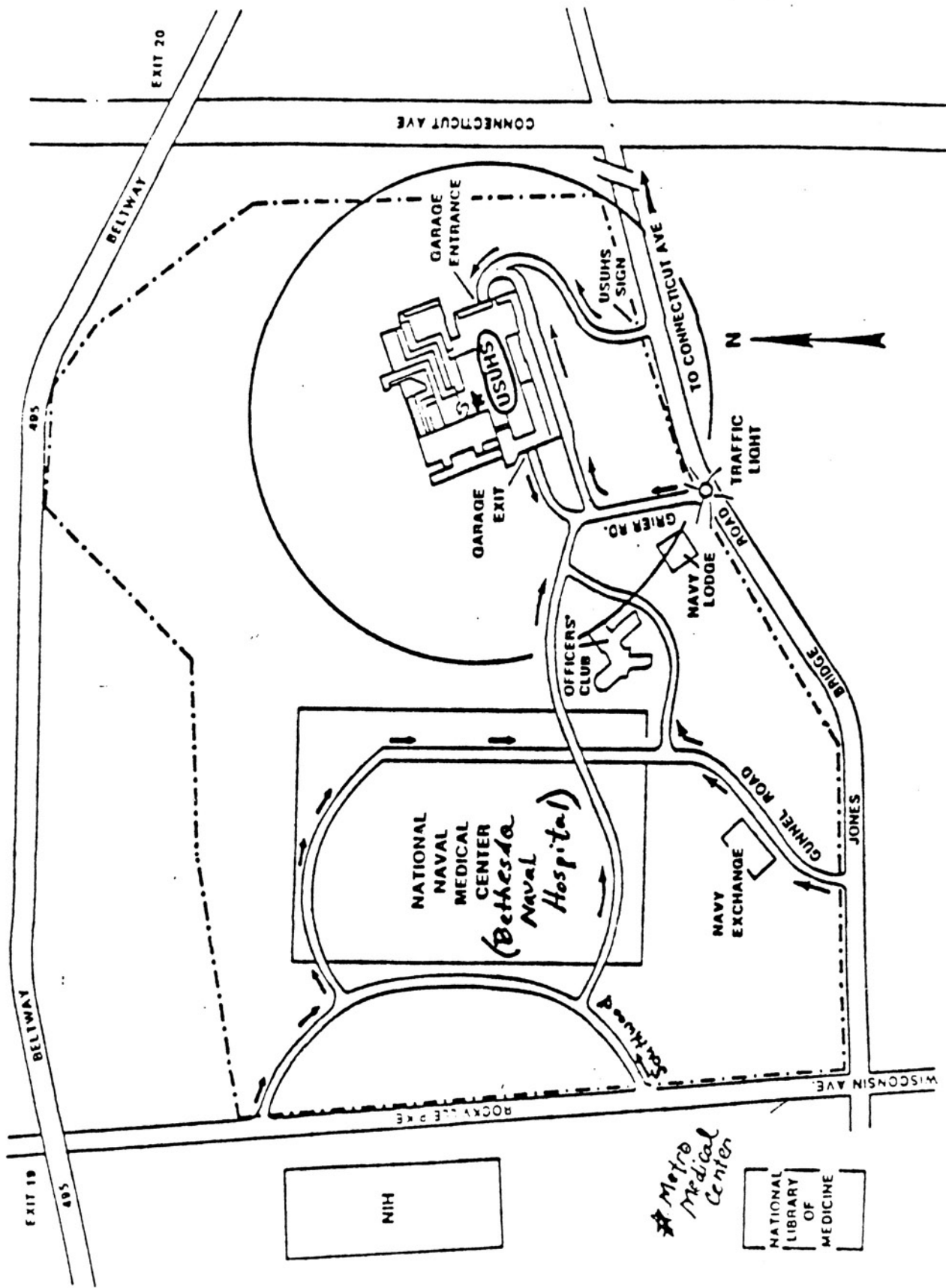
Remember to:

1. Bring your first morning void, and to keep the container cool until the experiment.
2. Bring the completed Food Checklist.
3. Please wear a shirt that can be rolled up for blood pressure measures.

IF YOU MUST CANCEL PLEASE PROVIDE AT LEAST 24 HOURS OF NOTICE

IF YOU HAVE ANY QUESTIONS, PLEASE CALL:
(301) 295-3522 or 295-3270 (ask for Lisa Mezzacappa)

Security Desk: Bldg. B, Level G



Food Checklist

Please circle any of the following items which you consumed the night before you collected your morning urine.

Coffee number of cups _____

Tea number of cups _____

Cola number of cups _____

Chocolate, cocoa, wine, beer/alcohol, decaffeinated coffee.

Breads containing raisins, prunes, orange peel, banana, or pineapple.
Cheese bread, nut bread containing walnuts.

Raisin bran.

Desserts containing walnuts, sour cream or fruits, such as fruit cake, plum pudding, mince pie.

Banana, avocado, pineapple, canned figs, raisins, plums and prunes.
Oranges, orange juice, fruit cocktail with pineapple.

Tomato, broad beans (fava beans), eggplant or any vegetable in cheese sauce.

Chicken liver, herring, smoked or pickled fish, brain, aged cheese, sour cream, anchovies.

Cheese omelets, spanish omelets with aged cheese.

Macaroni and cheese, spaghetti in tomato sauce.

Walnuts, chocolate or coffee flavored candy, candy containing walnuts

Catsup, chili sauce, olives, vanilla.

Do you smoke? YES NO

If yes, approximately how many cigarettes have you smoked since you awoke this morning? _____

Please list any medications that you are currently taking:

Calendar

On the calendar below, please mark the best days and times for you to come in for the initial individual session (if the pre-arranged time has to be canceled) and for the second group discussion session. Experiments can be run at any time, morning, afternoon, evening and on weekends. A complete listing of the times that you are able to run will facilitate our scheduling of the group discussion session. In addition, the scheduled day and time of your initial individual session is marked below.

ACTIVITY SCHEDULE						MARCH 1993																																																																																																								
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MARCH 1993

7540-01-232-0517
For 1994 Order 7540-01-232-0518

SEXUAL HARASSMENT IS A FORM OF DISCRIMINATION

OPTIONAL FORM 67
January 1993 5010-108-101

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APRIL 1993

7540-01-232-0517
For 1994 Order 7540-01-232-0518

KNOW WHAT YOUR AGENCY'S ALTERNATE AT THE TIME

OPTIONAL FORM 67
January 1993 5010-108-101

Checklist for mailing back questionnaires

Please make sure that the following questionnaires are mailed back in the post-paid envelope within one week:

_____ California Psychological Inventory- orange answer sheet

_____ California Psychological Inventory- blue test booklet

_____ The Social Network Index

_____ The Questionnaire

_____ The Inventory of Limbic Languidness

_____ The Work and Family Orientation Questionnaire

_____ The Cognitive Style and Personality Questionnaire

_____ The Preferred Group Member Questionnaire

_____ Calendar

Thank you very much for your time and effort. We look forward to seeing you at the individual and group discussion sessions.

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