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by

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Abstract

From a large number of college students two groups of white female volunteers were selected on the basis of their reported height and weight: an overweight group (N = 28), consisting of persons at least + 11% overweight, and a normal weight group (N = 25) consisting of persons within $\pm$ 5% of normal weight. Heart rate was monitored for a six minute baseline period and a one minute period during which each person was approached by a confederate to a distance of 30.48 cm, 60.69 cm, or 99.06 cm. All participants completed a Comfortable Interpersonal Distance Scale (CID), the Impression Formation Questionnaire (IFQ), and Self-Monitoring of Expressive Behavior Scale (SM). Analysis of variance indicated that overweight and normal weight persons approached to the closest distance differed in terms of percentage increase in heart rate (F (1, 47) = 3.26, $p < .05$). Analyses of CID and SM scores were not significant. A discriminant analysis of trait dimensions on the IFQ by weight revealed that overweight persons compared to normals significantly differed in their perceptions of the confederate (χ^2 (8) = 20.41, $p < .01$). Overweight persons generally perceived the confederate in a more positive manner than did normal weight persons. Normal weight persons did, however, perceive the confederate as more genuine, conventional, and humorous than did overweight persons. Overweight persons rated the confederate significantly more sociable than did normal weight persons (F (1, 47) = 5.01, $p < .05$). Overweight persons who were approached to the closest distance rated the confederate as more self-assertive than did normal weight subjects (F (2, 47) = 9.20, $p < .001$). Approach distance was a significant factor (F (2, 47) = 5.42, $p < .01$) in that persons in the close approach distance condition rated the confederate as more competitive than did subjects in the far approach distance.

Personal space is distinguished from territoriality in that personal space has no fixed geographic reference points and moves with the individual (Sommer, 1959). Personal space, Sommer (1969) noted, is sometimes described as a "bubble" or "breathing room." According to him, personal space can be described as the emotionally charged zone around each person which helps to regulate spacing. Evans and Howard (1973) suggested that personal space is a "functional mediating cognitive construct which allows the human organism to operate at acceptable stress levels and aids in the control of intra-species aggression" (p. 340). As Altman (1975) said, persons use past experiences in order to build cognitive models and expectations about future experiences. These past experiences and expectations result in the development of patterns of personal spacing which one person utilizes when interacting with another. Personal space exists only when another person is present and is sensitive to the affective relationship between the two persons (Ashcraft & Scheflen, 1976).

The concept of personal space has its roots in zoological and ethological descriptions of an animal's use of territory. Howard (1920/1963) an ornithologist, first used the concept "territoriality" to describe the normal spacing of birds. Hall (1966) defined territoriality as the behavior by which an animal claims and defends a geographic area against members of its own species. Territory establishment functions as an important behavioral system which allows adequate spacing and insures that both species and environment are preserved. Heideger (cited in Hall, 1966) used the term "personal distance" to describe the minimum distance within which animals may approach each other before the approach is viewed as threatening and flight occurs. Heideger described

the regulatory function of personal distance on the social organization and behaviors of species. Flight distance is the acceptable closeness by another animal that still allows escape. If that distance is lessened so that escape is impossible, then the distance is labeled fight or attack distance. Whenever there is a flight reaction, a critical distance is present which is the narrow zone between flight and attack distance and is so precise it is measurable in centimeters (Heideger, cited in Hall, 1966).

Hall (1966) described the importance of distance regulation in animals and humans. He coined the term "proxemics" to encompass the "interrelated observations and theories of man's use of space as a specialized elaboration of culture" (Hall, 1966, p. 1). He viewed man's use of space as a way of communicating with others. According to Hall, the affect between individuals is a decisive factor in the distance used in their interactions.

Hall (1966) described four spatial zones used in social interaction: intimate distance, personal distance, social distance, and public distance. The four distances are further divided into a close and far phase and are identified by distance, amount, and kind of information available to the interactants.

Intimate distance (close: less than 6 inches; far: 6 to 18 inches) involves physical contact and acute sensory involvement. In intimate distance, sight is distorted, strong olfactory cues are present, and texture of the skin is easily seen, and the voice is usually held at a low level. Hall described this zone as one where lovemaking, wrestling, and comforting may easily take place. It is typically reserved for intimates.

Personal distance involves the distances between 1 and 4 feet. Close personal distance (1 to 2 feet) still allows the exchange of touch, smell, and visual cues. Facial hair, pores, and facial musculature are visible. Body heat may be a part of the milieu. The far phase (2 to 4 feet) is just beyond easy touching distance. In this zone, hair color, skin texture, and facial features are readily observed; voice cues are rich. Subjects of personal interest are typically discussed at this distance.

The zone of social distance is defined as between 4 and 12 feet. In the close phase of social distance (4 to 7 feet), little information can be gained from olfactory or tactile cues. The visual range typically encompasses the head and upper trunk. Hall found that this distance is usually maintained in business offices and public settings. The far phase (7 to 12 feet) is considered more formal. Fine visual details of the face are lost, but the whole body is easily seen. At this distance eye contact is usually necessary for interaction. This distance allows individuals to work in the presence of others without feeling compelled to converse.

The final zone, public distance, is typically reserved for public meetings, courtrooms, and for interactions with high status persons. The close phase (12 to 25 feet) of public distance enables an alert individual to take evasive or defensive action. Grammatical and syntactical shifts in speech occur at this distance and speech becomes more formal. Fine visual detail is lost and the body begins to appear two dimensional; it is possible to see other persons in the peripheral field of vision. The far phase of public distance (25 feet or more) is usually maintained with public figures. Persons are no longer seen

individually, but rather as part of the setting. Body stance and gestures as well as enunciation become the important features of communication.

Personal space has been investigated across a variety of demographic, psychological, and environmental characteristics. It has been demonstrated that females require less personal space than males (Hartnett, Bailey, & Gibson, 1970; Horowitz, Duff, & Stratton, 1964; Leibman, 1970; Sommer, 1959, 1969; Willis, 1966); and that opposite-sex pairs permit closer approach than do same-sex pairs (Evans & Howard, 1973; Kuethe, 1962a, 1962b; Kuethe & Weingartner, 1964). Leventhal, Matturo, and Schanerman (1978) concluded that subjects who have a positive attitude toward another individual allow that person to approach more closely. It has been pointed out that cultural background (Hall, 1966; Watson, 1970) as well as peer group affect personal space. When two people are of different ages, greater personal space is required (Willis, 1966). Meisels and Guardo (1969), studying children between the ages of 8 and 14 years, reported that children require more space as they grow older. They found that personal space regulations are established around the ages of 10 to 12 for same-sex dyads, and for opposite-sex pairs at around 8 years of age. Research has also shown that higher status individuals maintain greater personal space (Howells & Becker, 1962). Hare and Bales (1963) found that individuals who are in leadership roles are accorded and maintain greater personal distance from others in the group. It has been suggested that past experiences in a room result in the need for less personal space (Edney, 1972; Sommer, 1959, 1969). Tasks requiring cooperation between persons result in side-by-side seating, and competitive tasks result in

persons seating themselves facing one another (Cook, 1970; Norum, Russo, & Sommer, 1967).

The relationship between personal space and various personality characteristics has also been investigated. Findings suggest that extroverts maintain less personal distance than do introverts (Patterson & Holmes, 1966; Williams, 1971). Bailey, Hartnett and Gibson (1972) found that high-anxious male subjects underestimated interaction distance more than their non-anxious partners, and also preferred more distance. Patterson (1973) also reported that high-anxious persons position themselves at a greater distance than low-anxious persons. Dosey and Meisels (1969) concluded that persons placed in an experimentally induced stressful condition maintained greater personal distance than persons in a non-stressful condition.

Research has shown that affect plays an important role in determining personal space. Persons who are friends and those who wish to convey a positive attitude choose smaller personal distance (King, 1966; Mehrabian, 1968, 1969; Patterson & Sechrest, 1970). Rosenfeld (1965) found that individuals who were asked to role-play an individual seeking approval approached confederates closer than individuals asked to role-play "approval avoidance." It has been suggested that a curvilinear relationship exists between persuasibility and distance of the persuader (Mehrabian & Williams, 1969): at greater and closer distances, persuasion is not as successful as at median distances. Storms and Thomas (1977) reported that subjects spent more time talking to a complimentary evaluator if the evaluator was positioned close rather than far away. It appears that situations calling for approval cause the individual to adopt different personal space requirements.

Patterson (1976) proposed that the valence and intensity of one person's reaction to another depends on two factors: physical distance and the person's perception of the negative or positive stimulus properties of the other. He suggested that closeness to a person produces physiological arousal, behavioral responses indicating increased arousal, and self-reports and ratings of increased arousal. According to Patterson, the arousal experienced by a subject becomes labeled by cues associated with the interacting person: the subject evaluates the interacting person as positive and labels the arousal as positive, or as negative and labels the arousal as negative. In personal space research, negative arousal is typically identified as an intrusion. According to Sommer (1969), intrusion is the unacceptable encroachment into a person's self-boundaries. When an individual's personal space is violated, stress is typically reported; moreover, less eye contact, body shifting, stilted conversation and actual flight may be the overt reactions to the intrusion (Felipe & Sommer, 1966; Patterson, Mullens, & Romano, 1971). Burgoon and Jones (1976) defined intrusion as the existence of arousal with accompanying reports and behavioral observations of negative affect. They proposed that the effects of violations of personal space are a function of (1) the amount of deviation from normative personal space, (2) the reward-punishment power of the intruder, and (3) the threat threshold of the person intruded upon. Past experience, stereotypical attitudes, and expectations provide the cues of the intruder's reward-punishment power and the individual's (person intruded upon) threat threshold.

A number of researchers have utilized measures of physical arousal in studies of personal space. McBride, King, and James (1965) measured

galvanic skin responses of persons being approached by another. Greater galvanic skin responses were recorded at one to three feet than nine feet, and with a frontal approach rather than a side or back approach. Dabbs (1971) investigated palmar sweating as a measure of arousal in a study with two conditions of interaction (argue or talk) and two environmental conditions (large or small room). He found the greatest amount of palmar sweating occurred in the talk-large room. Although subjects in the argue-small room condition reported feeling less friendly, more irritated, and more pressured by their partner, palmar sweating was the lowest in this condition. Dabbs suggested that the argue condition provided a structured task which allowed individuals to escape from the arousing aspects of physical closeness while the talk condition did not. Palmar sweating was greater in all conditions after subjects were left in the cubicle with an instruction sheet explaining that they would soon have a discussion with another person than at the beginning of the actual interaction. Dabbs suggested that this finding was due to "beginning the experiment" and probably confounded the experimental conditions. Another point, not considered by Dabbs, is that being seated in a cubicle with the experimenter is, in itself, a condition that produces arousal.

Efran and Cheyne (1974) reported no differences in heart rate due to increased proximity. In their study, heart rate was monitored while subjects either walked between two confederates (intrusion), walked past two confederates, or walked past inanimate objects. In addition to heart rate, facial expressions of subjects were recorded by a camera with a telephoto lens and, as expected, subjects' expressive behaviors indicated increased affective arousal when forced to walk between two

confederates. Subjects described less positive moods in the intrusion condition; however, heart rate increases of 42% were present in all three groups. To explain these findings, the investigators suggested that the participation in the research perhaps created maximum physiological arousal in all subjects, so that differential treatment effects were masked. Perhaps both Dabbs (1971) and Efran and Cheyne (1974) would have found differential arousal in the different experimental conditions if they had not confounded the conditions of the task with anticipation of imminent interactions with another person. Another consideration is the lack of adequate baseline data in these two studies. For example, in both studies, the subjects were reading instructions or involved in a bogus task while "baselines" were being taken. Had genuine baseline data been obtained, the effects of the various experimental conditions might have been more meaningfully assessed. Thayer (1967) suggested that self-report of arousal may in some cases be a better indicator of arousal than physiological measures such as heart rate changes, palmar sweating, or galvanic skin response. However, Thayer (1970) suggested that since selected variables such as skin conductance and heart rate are correlated (.62) with reported arousal, the best measure of arousal may be obtained by the combined use of both physiological measures and self reports. Measures of overt behavior and expressed feelings in the Dabbs (1971) and Efran and Cheyne (1974) research indicated that closeness and intrusions increase arousal; in both studies, negative affect was reported by ratings and subjects' post-experimental comments. Subjects used such words as "embarrassed," "uncomfortable," and "awkward" in the Efran and Cheyne study, and "more pressured," "unfriendly," and "irritated" in the Dabbs study. Kleck, Ono, and Hastorf (1966) measured galvanic skin

responses of subjects who were interviewed by a confederate who appeared in a wheelchair with a simulated left leg amputation, or the same confederate without a handicap. Subjects in the handicapped condition showed significantly greater change in skin resistance than did subjects in the non-handicapped condition. Kleck et al. found that persons who were interviewed by the "handicapped" confederate became more aroused (as measured by galvanic skin response), demonstrated less variability in their behavior, expressed opinions that were less representative of actual belief, and terminated the interview more quickly than did the non-handicapped interviewer's subjects. Other studies, (Kleck, 1966; Kleck, 1968; Kleck, Buck, Gollier, London, Pfieffer, & Vudcevic, 1968) have also found that subjects appear and report to be less comfortable with confederates who are stigmatized in some manner than with normals. Comer and Piliavin (1972) also found that physically disabled persons maintained greater personal space from a "handicapped" interviewer than from a normal interviewer. The physically disabled persons also showed less variability in verbal output with the "handicapped" interviewer but even greater discomfort (motoric inhibitions, less smiling behavior, less eye contact) and verbal reports of discomfort with the normal confederate. Worthington (1974) reported that persons at an airport terminal would not approach as closely a man in a wheelchair who sought directions as they would a normal man.

Stereotypical attitudes towards others can, of course, be positive or negative, and stereotypes encompass an assortment of groups. Some individuals are attributed a multitude of personality and behavioral characteristics by the simple fact of being German, female, or black (Snyder, Tanke, & Berscheid, 1977). Additionally, it has been shown that stereotypes may cause the target person (stereotyped individual) to behave in a

manner which confirms the stereotype. Snyder et al. conducted a study involving opposite-sex dyads whose contact with each other was limited to a 10-minute telephone conversation. After a male received biographical information on his female telephone partner and viewed either an attractive or unattractive photograph of her, the male rated his initial impression of his partner's intelligence, physical attractiveness, social adeptness, and other trait adjectives of the physically attractive stereotype. Then the 10-minute telephone conversation took place. Males who viewed attractive photos behaved differently in their conversations than did males who viewed unattractive photos. Observer-judges rated the taped conversations of both male and female voices on such items as animation, enthusiasm, enjoyment, and intimacy. Males in the attractive-photo-condition and their female counterparts were rated higher than the pairs in the unattractive-photo-condition. The researchers suggested that the initial impression of the males created by the attractive or unattractive photo nurtured the behavioral confirmations of the females in the conversations that followed. The attractive-photo-condition females fulfilled the stereotype held by the males regardless of their actual attractiveness.

Snyder and Swann (1978) reported that participants using social interaction to test hypotheses about target individuals tended to search for behavioral evidence that supported an experimentally induced hypothesis. In a series of investigations, female college students were provided with a hypothesis about a personal attribute of a target person. In Investigation 1, participants were instructed to assess the extent to which target behavior matched either the prototypical introvert or extrovert. In one condition, the subjects were provided with a bogus

personality profile that identified that person as an extrovert or introvert; subjects were asked to assess how well the profile fit. An equal number of participants were provided with a global personality description and were asked to assess the extent to which the target person was described by the global description as either an introvert or extrovert. The researchers found that subjects systematically formulated hypotheses and selected strategies that confirmed both the bogus profile and the global profile. It was found in subsequent investigations, that the confirmation of the hypothesis constrained the interaction in such a way that the target's behavior (as rated by observer-judges) appeared to confirm the participant's initial hypothesis. Snyder and Swann (1978) suggested that preferential search for hypothesis-confirming evidence and the interpersonal consequences of such strategies may be an important reason for stereotype persistence and resistance to change.

Research has shown that stereotypical attitudes develop early in life. Dion and Berscheid (1974) found that children 4 to 6 years of age perceived attractive children as more independent and socially adept; unattractive children were perceived as exhibiting more aggressive behavior and being more dependent. Goldman and Lewis (1977) reported that physically attractive college students were rated more socially skillful and likable by opposite-sex partners interacting via telephone conversations than unattractive students. As in the Snyder et al. (1977) study, voices were isolated and rated by observer-judges. In the Goldman and Lewis study, attractive and unattractive students were selected and rated for attractiveness prior to the research, thus attractiveness was not "manipulated" as in the Snyder et al. (1977) research. Goldman and Lewis (1977) suggested that the attractive

stereotype may produce a self-fulfilling prophecy.

Of interest are the stereotypes attributed to stigmatized individuals. Goffman (1963a) described a stigmatized person as one who has a personal attribute or characteristic which is discrediting in the eyes of others. Stereotypical attitudes in general and especially toward stigmatized persons are usually simple, overgeneralized, often inaccurate, and usually negative. Gurwitz and Marcus (1978) showed male and female college students videotaped interviews of men who were either described as homosexual or heterosexual. Half the subjects for each condition were told that they would be interacting with the target person later and half were not given such an expectation. It was found that all subjects attributed less likability to the homosexual than the heterosexual male. Males who viewed the "homosexual" and were led to expect an interaction attributed less likability to him than males who did not expect such an event. Interestingly, females who expected an interaction attributed more likability to both target persons than those who did not expect such an event. It would appear that females expecting an interaction were more influenced by concern for the socially appropriate response than the males.

Scheier, Carver, Schulz, Glass, and Katz (1978) studied reactions toward the elderly and paraplegic individuals. They hypothesized that personalizing a stigmatized individual so that he was not presented as part of a stereotypical group would result in a more favorable attitude toward that person. In their first study, subjects read a bogus transcript and rated a target person, who was described as either 75 or 23 years of age, on a number of descriptive dimensions. The target person was portrayed in either a favorable or unfavorable manner. As

predicted, subjects who read favorable transcripts rated the target person more positively than those subjects who read unfavorable transcripts; the 75-year-old was rated more positively than the 23-year-old in the favorable condition. The 75-year-old who was portrayed in an unfavorable manner was rated more positively than the 23-year-old who was portrayed unfavorably. In the second study, the same basic procedure was used. The target person was described as an undergraduate who was either paraplegic or normal. Again, half the subjects in each target condition received a favorable transcript and half received an unfavorable transcript. The subjects rated the handicapped person more favorably than the normal in both conditions.

In a study with female college students, Carver, Glass, and Katz (1978) asked subjects to rate transcripts of a target person who was described as handicapped, black, or non-handicapped with no mention of race on 11 dimensions of polar-opposite adjectives. A bogus pipeline technique was used in one group, with subjects being told that the physiological equipment used measured both the strength and direction (positive or negative) of arousal. The control group received no such information. Both groups rated the handicapped person more favorably than the black individual, who, in turn, was rated more favorably than the nonstigmatized person. However, subjects in the bogus pipeline condition rated the black less favorably than did the control group subjects. Carver et al. (1978) suggested that subjects who were led to believe that their ratings would be verified perhaps gave ratings that were more representative of actual attitudes. They also suggested that high ratings of handicapped persons were due to the rater's belief that the handicapping condition is beyond their control; whereas, the

stereotypical motivational deficient attributed to blacks (that the black could avoid "if he/she wanted to") was a factor in lower ratings of blacks. The findings in this study and in Scheier et al. (1978) led the investigators to suggest that while people may have a favorable feeling about stigmatized individuals, it does not necessarily follow that interactions with the stigmatized are desired or that people will feel comfortable during such interactions.

Abroms and Kodera (1979) suggested that the acceptance of a handicapped person may depend, in great part, on the degree that the handicap interferes with daily life. College students were asked to rank in order of "acceptability" 15 common handicap conditions. The conditions that were ranked higher in acceptability were ulcers, asthma, diabetes, and arthritis. The lowest ranked conditions were blindness, cancer, mental illness, cerebral palsy, and mental retardation. The conditions ranked higher in acceptability appear to be those that are more easily controlled through medication and intervention while the lowest ranked conditions are not. It also appears that the lowest ranked conditions are more stigmatizing.

Donaldson (1980) reviewed a number of studies dealing with attitude change toward and acceptance of handicapped persons. The review pointed out that unstructured exposure of normals to handicapped individuals may allow the inadvertent reinforcement of already present stereotypes, because the handicapped person may present him/herself in a stereotypical manner. Comer and Piliavian (1972) investigated the manner in which handicapped persons interact with normals and other handicapped persons. They suggested that physically handicapped individuals "manage the interaction with normals by fulfilling the perceived

expectations of normals" (Comer & Piliavian, 1972, p. 38). They found that physically disabled persons interacting with a physically normal confederate exhibited strained behavior, avoided eye contact, and ended the conversation earlier than when they were interacting with a "physically handicapped" confederate. Davis (1961) interviewed physically handicapped persons and reported that they develop strategies to disavow their handicapped status. They interact in a way that leads normals to "normalize" the handicapped individual so that his or her handicap status is no longer considered. The strategies and management abilities of the stigmatized are sometimes successful and always individually attained. Goffman (1963b) proposed that the essential strategy of the observably stigmatized is one of tension control during an interaction. Such individuals cooperate with normals by acting as if the stigma is irrelevant to the content of the interaction; or, stigmatized persons may introduce the stigma as a topic of conversation in hopes of reducing its significance as the topic of suppressed concern.

Jacobs (1974, pp. 69-82) used information obtained through an interview to describe how a person became aware of the stigma of being overweight and the attempts made to deal with the problems it creates. The interviewee, a young woman who had been obese since infancy, was not aware of her discrediting condition until she entered public school. Her attempts to manage her stigma involved establishing her academic worth, claiming sickness to avoid physical activities, covering up with loose clothing, and denying that normal weight friends were desired. As a result, she alienated herself from normals. Richman and Harper (1980) investigated MMPI profiles of cleft lip/palate individuals and individuals with permanent orthopedic problems. Young adults with

orthopedic disabilities scored higher on scales reflecting embarrassment, feelings of alienation and minimization of social contact. It would seem that being overweight and having orthopedic disabilities are more encompassing and less "acceptable" than partial disabilities such as having a cleft palate.

If a visible and encompassing disability such as an orthopedic problem is related to alienation and little social contact, then the visible and encompassing stigma of excess weight may also result in social isolation. Understanding the dynamics of excessive weight, the effects of being overweight on overweight persons, and the problems this stigma creates in social interactions appears complex. Allon (1975) considered the dynamics of the overweight stigma from four perspectives in American society: in religion, it is the sin of indulgence; in medicine, it is an incurable disease; in the courts, it is a cause of discrimination in employment, promotion, and admission to college; and in aesthetics, it is ugliness. Dwyer and Mayer (1975) and Bruch (1975) emphasized the frustrating condition of adolescent obesity and the social pressure that being overweight places on the adolescent female in this culture. They pointed out that females are vulnerable to feelings of insecurity and distorted self-concept as a result of the stigmatizing condition of excess weight. Wooley, Wooley, and Dyrenforth (1979) in a review of behavioral treatment and issues of obesity treatment acknowledged the prejudice against being overweight and the consequences of negative attitudes about obesity. One consequence is the self-hate and humiliation of obese persons who have been involved in numerous weight reduction programs with no success. Wooley et al. (1979) expressed the need to remove social prejudice toward obesity and to set

goals of weight loss procedures that improve body image, increase socialization, and provide training in "interaction skills aimed at discouraging others from behaving in belittling ways" (p. 25). The dread of fatness may in part contribute to the rise of anorexia nervosa (Boskind-Lodahl & Sirlin, 1977).

Overweight individuals have been the object of a great deal of research in recent years. Variables of interest have included food intake, behavior modification of eating behavior, and psychosocial variables related to obesity. Individuals are generally defined as obese if their weight exceeds the ideal weight standards in relation to height standards by 15% (Schachter, Goldman, & Gordon, 1968). Normal weight range is defined as weight in relation to height that is not more than $\pm$10% of ideal weight. The Metropolitan Life Insurance Company New Weight Standards for Men and Women (1959) and an adapted form of the Metropolitan Standards, the Fogarty International Center Conference on Obesity Recommended Weight in Relation to Height Table (Bray, 1975), are frequently employed standards for weight measurement.

That overweight persons in our society are stigmatized is supported by a good deal of research. Maddox, Back, and Liederman (1968) suggested that negative attitudes toward overweight persons seem to arise out of the belief that these people are personally responsible for their physical condition. Maddox and Liederman (1969) found that physicians described their overweight patients as "ugly" and "weak-willed." Staffiere (1967) reported that elementary school boys endorse such negative adjectives as "dirty," "stupid," and "mean" to describe endomorphic silhouettes. In an investigation where females aged 7 to 11 were instructed to choose adjectives to describe varying same-age

silhouettes of various body builds (Staffiere, 1972), significantly more negative adjectives were attributed to overweight silhouettes than to other silhouettes. Wolfgang and Wolfgang (1971) had males place representations of themselves, using the stick figure method, at a comfortable distance from representatives of obese persons, drug users, normals, and police. They were additionally asked to write down the thoughts they would have if they met such a person. It was found that males placed themselves farther from obese figures and drug users than normals, and their statements about obese persons contained twice as many negative statements as compared to those statements about normal weight individuals. Lerner (1973) found that elementary children instructed to place a marker at a comfortable distance from drawings of endomorphic, mesomorphic, and ectomorphic boys maintained greater distance from endomorphs than from the other two body types.

Schachter (1971) has described human obesity as deviant, and obese persons as being peevish, irritable, lacking in emotional control, preferring to be left along, and finicky about food. His interest and contributions in the area of obesity have encouraged a great deal of research. Schachter (1971) developed a theory of obesity based upon the responsivity of individuals to internal and external stimuli. He found that obese persons are more responsive to external food cues and less responsive to internal cues of hunger than normal weight persons. Other researchers have investigated responsivity of overweight individuals in behaviors not involving food intake. For example, Rodin (1974) reported that obese individuals are more sensitive to high-salient (prominent) external cues in the environment than normals. It was reported that external cues presented during reaction time and

proofreading studies adversely affected obese persons' performance more than normals. The prominent cues were emotionally arousing tapes supplying information regarding leukemia and descriptions of the aftermath of Hiroshima; low-salient cues were taped recitations of random numbers and a taped description of a seashell. The findings were that obese persons demonstrated slower reaction times and poorer performance in proofreading when listening to the emotionally arousing tapes than did normal weight persons. There were no differences in the low-salient cue conditions.

In another study (Yaremko, Fish, & Price, 1975), overweight and normal weight women were classically conditioned to an aversive stimulus (shock). It was found that the obese women exhibited greater galvanic skin response across habituation, acquisition, and extinction than did normal weight women. The researchers considered the results of this experiment as further evidence that overweight subjects are more externally oriented than normals and that such an external orientation is present not only in skeletal behaviors, as other investigators have found, but also in at least one autonomically mediated response system.

Pliner (1973a) had obese and normal weight males listen to tones produced at rates of 40 to 80 per minute at either 45 or 90 db. The subjects were asked to estimate the duration of the auditory stimulus. Obese subjects overestimated the duration of the 90 db. tone as compared to normals, and underestimated the duration of the 45 db. tone. Pliner suggested that cue salience (that is, the loudness of the tone) determined the responsiveness (time estimation) to that cue, and that these findings support the hypothesis that obese persons are more externally responsive to salient cues than are normal weight persons.

Pliner (1973b) also found that the thinking behavior of obese subjects is more influenced by external cues than normal subjects. Obese and normal weight males were required to immerse one hand in 0-4° C ice water during one of three conditions. In the high-salience condition, subjects viewed a slide of a beach or mountain locale during the immersion; in the low-salience condition, subjects were read a description of the high-salience slides; and in the no-salience condition, no stimulus was presented. The obese persons reported spending more time thinking about the viewed high-salience scene than did normals; additionally, they had greater pain latency than normals when the high-salience condition was presented.

In another series of studies (Pliner, Meyer, & Blankstein, 1974), hospitalized obese children responded more quickly to comforting after blood samples were taken and stopped crying sooner than did hospitalized normal weight children, indicating that the obese children were more responsive to the external cue of persons in the environment. The researchers noted that the two groups, matched for seriousness of illness and length of hospital stay, did not differ in their demonstrated reluctance to have blood samples drawn. In the second part of this study, Pliner et al. (1974) had obese and normal weight male students rate slides on 7-point scales of paired adjectives such as dislike-like, tensing-relaxing, ugly-beautiful. The overweight subjects rated a slide of a scantily clad female more positively than normal weight males and a slide of human organs on an autopsy table more negatively than normal weight males. No differences between the two groups were reported on a neutral slide of a mountain glacier. The researchers concluded that obese subjects are more responsive to both positive and

negative affective stimuli than normals but do not differ from normals when the cue does not involve affect.

McArthur, Soloman, and Jaffee (1980) had obese and normal weight subjects rate their happiness, annoyance, and fear when viewing positive, neutral, or negative affect slides. The researchers arranged the facial muscles of the subjects to resemble those of a smile, neutral expression, or frown on the pretense of measuring electrical impulses of facial muscles. The subjects were then show slides of humans in "sad" postures for negative affect, animals at play for positive affect, and microorganisms for neutral affect. The arranged facial expression influenced the ratings of the normal weight subjects but did not have a demonstrated effect on obese subjects. McArthur et al. (1980) concluded that the overweight are less emotionally responsive than normals to proprioceptive stimulation of facial muscles. The obese in this study did not manifest more emotional responsivity to the external stimuli (slides) than the normal weight persons. Failure to find differences in the responsivity to the slides between groups may have been due to the less extreme valence of the slides used in this study as compared to the slides used in Pliner et al. (1974). The failure to find responsivity to proprioceptive manipulation supports the view that obese persons are not as sensitive to internal state cues as are normal weight persons.

Rodin and Slochower (1974) conducted a study comparing incidental learning and compliance of normal weight and obese females. The incidental learning task involved the subject teaching a confederate a list of concrete nouns or nonsense syllables under three levels of distraction:

no distraction (subjects read out the list behind a partition); low distraction (subjects were instructed to play the role of a teacher); and high distraction (subjects were instructed to note shifts in the learner's body position, eye contact, and verbal comments). Obese and normal subjects were then tested on the word list they had taught the confederate. The obese females showed greatest incidental learning of concrete nouns in the no distraction and low distraction conditions, and poorest incidental learning of the nonsense syllables under high distraction conditions. Normal weight subjects showed no detrimental effects of distraction on the incidental learning of nonsense syllables, and were able to recall more of the concrete nouns in the high distraction condition. After the subjects were tested, they were required to interact with the confederate who then acted in either a nice, neutral, or unpleasant manner. Following the interaction, the confederate asked the subject to do a small favor, and the compliance rates were recorded. Obese subjects complied more to the request from normals than from obese confederates, while normal subjects showed no difference in compliance to either obese or normal confederates. Obese subjects were more compliant for the nice confederate than for the neutral or unpleasant confederate, but there was no difference in normals' compliance as a function of the confederate behavior manipulations. Obese and normal subjects were asked on a post-compliance questionnaire why they thought the confederate acted as she did. Obese subjects attributed the confederate's behavior to her (subject's) obesity regardless of the confederate's behavior. The researchers suggested that obese and normal individuals differ in both attention and cognitive processes as well as in their social responsiveness.

In another compliance study (Elman, Schroeder, & Schwartz, 1977) the results suggested that obese persons may be no more susceptible to social influence than normals. Male college students observed obese and normal weight confederates comply with a request to volunteer for up to 10 hours of participation in another experiment. In one condition, the obese or normal confederate was merely present when the experimenter asked if the subject wished to volunteer for participation in another study. In the other condition, the question was asked of the confederate first and the confederate always volunteered for the maximum 10 hours. Obese subjects in the modeled compliance condition with a normal weight confederate volunteered for significantly more hours than obese subjects with an obese confederate. Normal weight subjects volunteered for more hours with an obese confederate than with a normal confederate. There was no difference in compliance when both the confederate and subjects were of the same weight group and no difference in compliance with the "confederate merely present." The investigators suggested that there was a reciprocal influence between obese and normal persons due to the deviance of the obese person, regardless of whether he was the confederate or subject, and that obese individuals are not always as compliant as some research has suggested.

DeJong (1980) found that adolescent females considered obese females deviant but liked them better if the obesity was due to a condition beyond their control. In DeJong's study, subjects read handwritten personal statements of four different target females; they were asked to rate their impressions of and liking for a target person, and to assess how similar the person was to themselves. The personal statements differed only in statements about weight, and the presence or absence of a thyroid condition. The obese target person was described

as either obese due to a thyroid condition or obese with no medical problem stated. The normal weight target person's personal statement contained mention of a thyroid condition or made no mention of any medical problem. The obese target with a thyroid problem was liked better than the one without a medical reason, and the normal weight person without a medical problem was rated higher than the one with a thyroid problem. In general, the obese person with a thyroid problem was as well liked as the normal with no medical problem. DeJong concluded that the perception of the source of responsibility plays a large role in the reactions of normals to the physical stigma of obesity. The research of Elman et al. (1977) suggested that while both males and females may view obesity as a deviance, females may additionally view it as the result of self-indulgence and lack of control. Women may also view another woman's obesity as a personal threat: a reminder of what can happen if they should be self-indulgent.

The research of McArthur et al. (1980), Pliner (1973a, 1973b, 1976), Pliner et al. (1974), and Rodin and Slochower (1974) has examined the consequences of obesity in regard to responsivity to external stimuli. As Pliner (1976) commented, the responsiveness of the obese to external stimuli of a salient nature does not shed any light on the causal relationship between obesity and externality. She concluded that three possibilities exist: obesity causes externality, externality causes obesity, or both obesity and externality are caused by some other variable. Externality may distinguish obese individuals from normal weight individuals, but whether externality causes obesity, the reverse, or some other variable causes both, it is very likely that the stigma of obesity plays an important role in the social behavior of obese individuals.

As Goffman (1963b) stated, the stigmatized are adept at managing their deviance and appear very sensitive to their effect on normals. If identified as deviant, one may become more sensitive to cues in the environment and react more strongly to affective stimuli.

Snyder (1974) developed the Self-Monitoring Scale of Expressive Behavior (SM), a paper and pencil measure of the extent to which individuals can and do monitor their self-presentation, expressive behavior, and nonverbal affective display. The SM is designed to discriminate between persons whose expressive behavior is a function primarily of external environmental cues of others and persons whose expressive behavior reflects internal cues (e.g., affective states). Younger and Pliner (1976) and Pliner (1976) administered the SM scale to obese and normal weight high school and college males. As predicted, obese subjects made significantly higher scores on the SM than did normal weight subjects. These researchers investigated the predictive value of the SM in regard to the amount of excess weight. Although the SM scores were not found to be predictive, the researchers pointed out that the lack of significance might be attributed to the small sample size ($\underline{N}$ = 14). Younger and Pliner (1976) suggested that obese persons may score higher on the SM due to an interaction between general orientation to external cues and deviant status. The SM may predict deviant status, but in an either/or condition rather than degree of overweight (deviant status). It may also be possible that the SM contains too few (10) items to use for predicting degree of overweight.

Research has already been described suggesting that obese persons are stigmatized, and that negative stereotypes are attributed to them. It has been generally found that greater personal space is maintained

in actual interactions and hypothetical interactions of normals with stigmatized individuals (Comer & Piliavin, 1972; Kleck et al. 1968; Wolfgang & Wolfgang, 1971; Worthington, 1974). Comer and Piliavin (1972) also found that stigmatized person maintained greater distance from a stigmatized interviewer than a normal interviewer. Hayduk and Mainprize (1980) investigated blind individuals' personal space and found that blind persons (i.e., deviant) have space needs no different from sighted persons. The space needs were determined by having a person approach while calling out random numbers. The subject asked the person to stop when he/she felt the approach distance was uncomfortable. The investigators suggested that the stigma effect may require the stigmatized individual to observe the spatial responses of normals to them and, as a result, blind individuals have not internalized spatial avoidance.

No research has been reported on the personal space needs of overweight individuals. Unlike the blind person, overweight persons are able to observe the spatial responses of others to them. What is typical spacing for normal weight individuals may not be typical for overweight individuals. In the present study, overweight and normal weight females were approached by a normal weight confederate to one of three distances (20.48 cm, 60.69 cm, and 99.06 cm), and heart rate changes were recorded. Following an interaction of approximately two minutes, the subjects completed the Self-Monitoring Scale, the Comfortable Interpersonal Distance Scale, and an adapted form of the Impression Formation Questionnaire.

The hypotheses tested were: (a) Heart rate change (as measured by percentage increase from baseline) is greater for overweight than normal

weight subjects at all distances, with the greatest changes occurring at the closest distance; (b) Personal space need, as measured by the CID, is greater for overweight subjects than for normal weight subjects. Overweight subjects who are approached the closest express the greater distance needs as measured by the CID; (c) Overweight subjects rate the approaching female less favorably on the Impression Formation Questionnaire at all distances than do the normal weight subjects, with overweight subjects in the closest distance condition rating the approaching female least favorably; and (d) Overweight subjects score higher than normal weight subjects on the Self-Monitoring Scale.

Method

Subjects

The subjects were 53 white female volunteer, 28 overweight and 25 normal weight, between the ages of 19 and 23 and currently enrolled in undergraduate classes at Georgia Southern College. The researcher visited classes and asked volunteer females to fill out a questionnaire which was later used to select appropriate subjects (see Appendix A). A total of 173 white females between the ages of 17 and 34 years completed the preliminary volunteer subject selection questionnaire. This total volunteer sample is described in Table 1. Three subjects who reported being overweight and four normal weight subjects were rejected because of a stated chronic health problem. Based on the volunteers' reported weight and height, deviation from average weight expressed in percentage was computed using Bray's adapted form of the Metropolitan Life Insurance Company New Weight Standards for Men and Women (1959). Appendix B contains the Bray guidelines.

Table 1

Distribution of Total Volunteer Sample (N = 173)

Deviation of Reported Weight from Average Weight

Deviation from Average Weight (expressed in percentage)	Percentage of Sample
Greater than 10% overweight	17%
6% to 10% overweight	8%
Within $\pm$ 5% of average weight	42%
6% to 10% underweight	16%
Greater than 11% underweight	17%

Note. Deviation from average weight, expressed in percentage = $\frac{\text{Reported weight minus average weight}}{\text{Average weight for height and sex}}$ X 100 (Bray, 1975).

Originally it was expected that the overweight groups would be composed of persons at least 15% overweight and the normal weight group composed of persons whose weight was ± 10% of average weight. However, it was necessary to change the criteria, based on subject availability, so that the groups selected were as follows: overweight (N = 28), all at least 11% overweight; normal weight (N = 25), all within ± 5% of average weight.

The normal weight subjects and overweight subjects chosen for the study were between the ages of 19 and 23 years with an average age of 19.6 years. The normal weight groups reported an average weight of 121.12 pounds (54.94 kg), and the overweight group reported an average weight of 142.89 pounds (64.81 kg) with a range of percentage overweight of 11% to 42%. Both the subjects' reported and actual weight means as well descriptions of report accuracy are shown in Table 2.

A paid female confederate approached all subjects, each at one of three distances. The confederate was an undergraduate, 23 years of age, and 4% overweight; she was not informed of the hypotheses being examined concerning weight. The confederate was trained to be consistent in her behavior and manner of presentation, regardless of closeness of approach. Throughout all sessions she wore the same dress and had the same hairstyle.

Materials and Apparatus

Heart rate was measured by a pulse transducer (Harvard Model 361) and a Biograph (Harvard Model 2120). The Biograph was located in a room adjacent to the experimental room. Since the pen recording of the Biograph was audible in the experimental room, an audio generator (BRS/LVE Model Au-9021-1105) was used to produce white noise to mask

Table 2

Reported Weight and Actual Weight of Subjects

	Overweight Subjects N = 28	Normal Weight Subjects N = 25
Mean Reported Weight	142.89 lbs. (64.81 kg)	121.12 lbs. (54.94 kg)
Mean Actual Weight	155.61 lbs. (70.58 kg)	121.44 lbs. (55.08 kg)
Percentage Who Overestimated	7 %	36 %
Percentage Who Underestimated	93 %	56 %
Percentage Who Estimated Accurately	0 %	8 %

the sounds. A Biotachometer (Narco Biosystems BT 1233) was used in the experimental room after placement of the pulse transducer to confirm that the transducer was operative.

The 2.7 m x 3.2 m experimental room contained two armless chairs and a 50.8 cm x 76.2 cm table placed against the wall beside the participant's chair (see Figure 1). The confederate's chair was positioned at a slight angle at the end of the table facing the participant's chair. Distance of 20.48, 60.96, and 99.06 cm were unobtrusively marked on the floor for the confederate's use in placing her chair at the appropriate distance.

The Comfortable Interpersonal Distance Scale (CID), a paper and pencil measure of personal distance consisting of eight 80 mm radiating lines (see Appendix C) was used. It has been demonstrated that the CID is a reliable and valid instrument (Duke & Norwicki, 1972; Leventhal, Matturo, & Schanerman, 1978). The CID instructs the participant to imagine she is at the center and to mark on a designated line the point at which she would prefer a stimulus person to halt. The distance in millimeters between the mark and the center is the measurement of comfortable distance.

Additionally, a test consisting of 27 bi-polar trait adjectives found in the Impressions Formation Questionnaire (IFQ) devised by Snyder et al. (1977) and originally selected by Dion, Berscheid, and Walster (1972), was used to measure the perceived attractiveness of the confederate (see Appendix D). One item (safe/dangerous) was omitted and another item (socially adept/socially inept) was included; thus, the form varies slightly from the items of the IFQ.

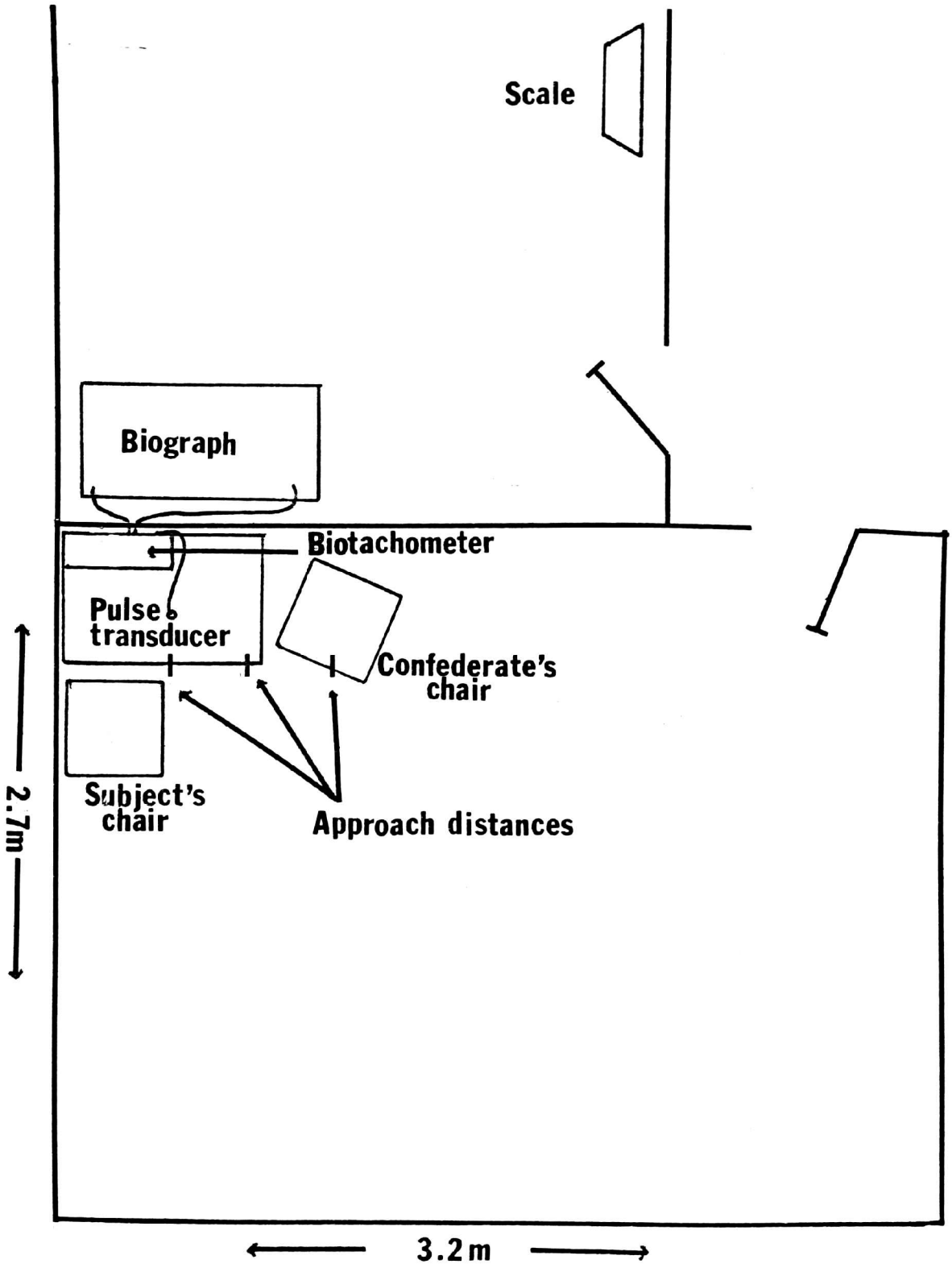

Figure 1. Diagram of the experimental and adjacent researcher's room.

Snyder's (1974) Self-Monitoring of Expressive Behavior Scale (SM) (see Appendix E) was administered to all participants. The SM measures the extent to which individuals monitor their self-presentation, expressive behavior, and affective display. It contains 25 statements that are answered true or false. High self-monitoring individuals are those who score < 15; those scoring > 9 are low self-monitors.

Procedure

All participants were told upon arrival at their scheduled session that the study was designed to gather physiological and related information on college females. All participants were asked to sign an informed consent statement (see Appendix F). Each participant was then escorted to the experimental room by the researcher and the procedure was explained (see Appendix G). The pulse transducer was attached to the participant's left forefinger. After the researcher verified via the Biotachometer that proper contact was made, the Biotachometer was turned off and the researcher left the room. A 6 minute recording period followed. Dembroski, MacDougall, Herd, and Shields (1979), investigating heart rate changes of Type A and B subjects during cold pressor tests under different instructional conditions, used a 4 minute period to establish baseline. In the present study, a longer recording interval was chosen to maximize the possibility of getting an accurate baseline heart rate measure. For this study, baseline heart rate is defined as the number of beats per minute for the 60 second interval beginning at 3.5 minutes and ending at 4.5 minutes within the 6 minute recording period.

At the end of the baseline period, the confederate entered the room and began to speak while she approached the subject. She carried

instructions for the rest of the experimental session (see Appendix H) in her hand. While she spoke, the confederate moved her chair to the preselected distance which was determined randomly with the constraint of equal numbers in all groups. The approach distances of 30.48, 60.96, and 99.06 cm used are the medians of the far intimate, the close personal, and the far personal distances described by Hall (1966); these distances have been used by a number of researchers (Kleck et al., 1968; Leibman, 1970; Storms & Thomas, 1977). To facilitate discussion of the different approach distances, 30.48 cm will be called the close distance, 60.69 cm the near distance, and 99.06 cm the far distance. The confederate's monologue (see Appendix I) lasted approximately 2 minutes, 20 seconds. When the monologue was completed, the transducer removed, and the instructions for the remainder of the session handed to the subject, the confederate left the room. The participant then completed the three scales in this order: Comfortable Interpersonal Distance; Impression Formation Questionnaire; and Self-Monitoring of Expressive Behavior. When these were completed, the participant brought them to the researcher in the outer room. The researcher then asked the subject to step on the scale for a confirmation of height and weight reported on the subject selection questionnaire. Session height and weight were recorded. To allow for clothing weight, a value of three pounds was subtracted from each subject's session weight. Answers to several questions concerning weight and degree of acquaintance with the confederate (see Appendix J) were recorded. Subjects were thanked and told they would be given a summary of the findings at a later time.

Results

The mean reported weight of the overweight group was 142.89 pounds (64.81 kg), SD = 20.51; the post-session mean actual weight was 155.61

pounds (70.58 kg), SD = 17.00. The mean reported weight of the normal weight group was 121.12 pounds (55.08 kg), SD = 7.96; and the post-session weight was 121.44 pounds (55.08 kg), SD = 4.25. Group differences between reported weight and actual weight taken at the post-session interview were examined by a t test (t (51) = 3.38, $p < .001$). The actual weights of the two groups are also significantly different (t (51) = 4.26, $p < .005$).

Analysis of the informal post-session questions reveals that 76% of the normal weight group considered themselves overweight and reported that weight control has been a concern for an average of the last 28 months (range = 0 to 168 months). All overweight subjects except one said that weight control is a problem and has been for an average of the past 59 months (range = 0 to 180 months). None of the participants reported knowing the confederate although one reported "seeing her around."

Percentage of heart rate change from baseline and deviation from average weight expressed in percentage for all subjects are not significantly correlated (Overweight group: $r = .04$, $p > .05$; normal weight groups: $r = .02$, $p > .05$).

The baseline heart rate for normal weight subjects is 79.92 beats per minute (SD = 13.04), and the overweight subjects' heart rate is 80.36 beats per minute (SD = 11.47). The hypothesis that heart rate percentage change from baseline to the one minute condition in which the confederate approached would be greater for overweight subjects and greatest at the closest distance was examined by the 2 x 3 (weight x approach distances) analysis of variance (see Table 3). No significant differences in percentage change of heart rate were found

Table 3

Analysis of Variance of Percentage Change in Heart Rate of Overweight and Normal Weight Subjects at Approach Distances During One Minute Approach Condition

Source	SS	df	MS	F
Weight	5.92	1	5.92	.13
Distance	34.62	2	17.31	.38
Weight x Distance	190.45	2	95.22	2.07
Error	2164.82	47	46.06	
Total	2395.64	52	46.07	

although there are clear changes in the visual display at the time of the confederate's entry and presence in the experimental room (see Figure 2).

The total 7 minute heart rate recording session was divided for analysis as follows:

Last 10 seconds of baseline = Baseline
First 10 seconds of approach (0 to 10 secs.) = Interval 1
Second 10 seconds of approach (11 to 20 secs.) = Interval 2
Third 10 seconds of approach (21 to 30 secs.) = Interval 3
Fourth 10 seconds of approach (31 to 40 secs.) = Interval 4
Fifth 10 seconds of approach (41 to 50 secs.) = Interval 5
Sixth 10 seconds of approach (51 to 60 secs.) = Interval 6

Figure 3 summarizes mean heart rates across all of these intervals.

Analyses of variance (2 x 3, with weight and distance of approach as variables) were done on percentage change in heart rate on all intervals (see Tables 4-9). The only significant finding for percentage change in heart rate is an interaction (F (2, 47) = 3.26, $p < .05$) during Interval 4 (see Table 7 and Figure 4). Further examination of the simple main effects of weight and distance reveals no significant differences (see Tables 10 and 11).

Heart rate of subjects during the seven 10 second intervals were also examined. A series of analyses of variance (with weight and approach distance conditions as factors) were examined at each of the seven intervals (see Tables 12-18). There is a significant interaction of weight x distance in heart rate of the two groups during Interval 3 (F (2, 47) = 3.55, $p < .05$). An investigation of the simple main effects

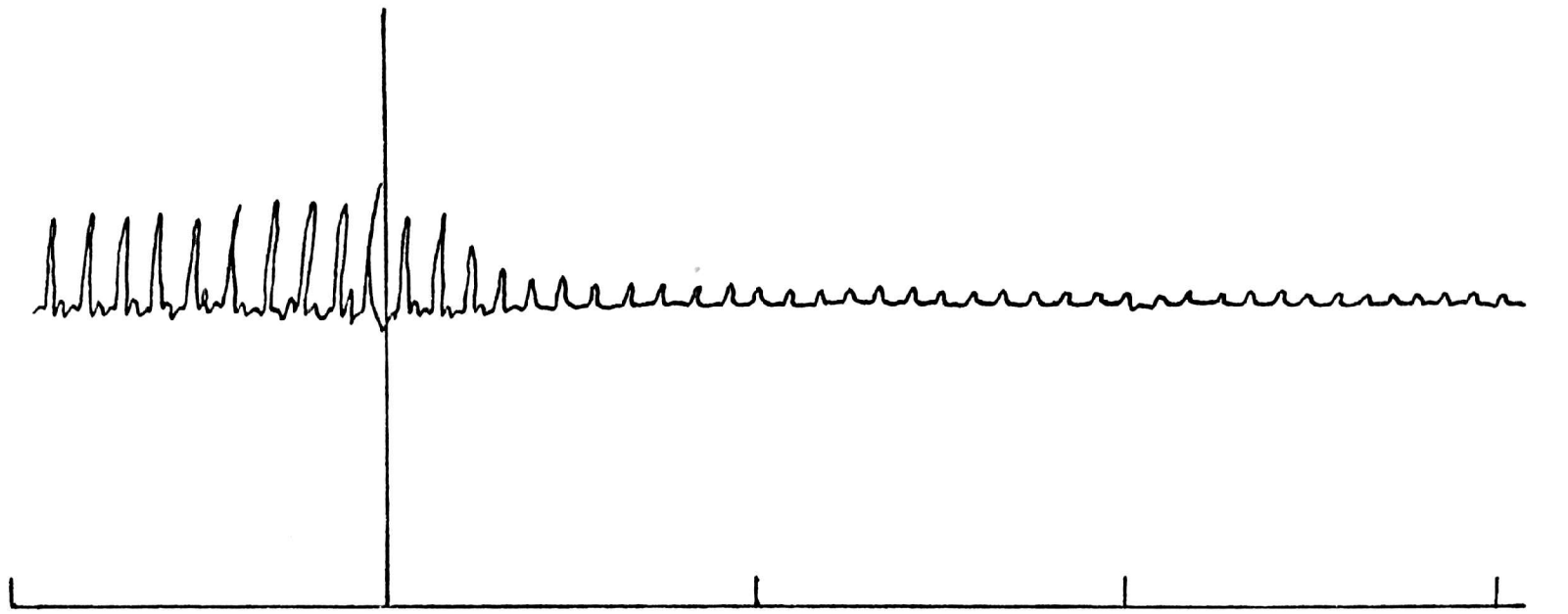

Figure 2. Reproduction of 18% overweight subject's heart rate during last ten seconds of baseline and during the first thirty seconds of the approach distance condition.

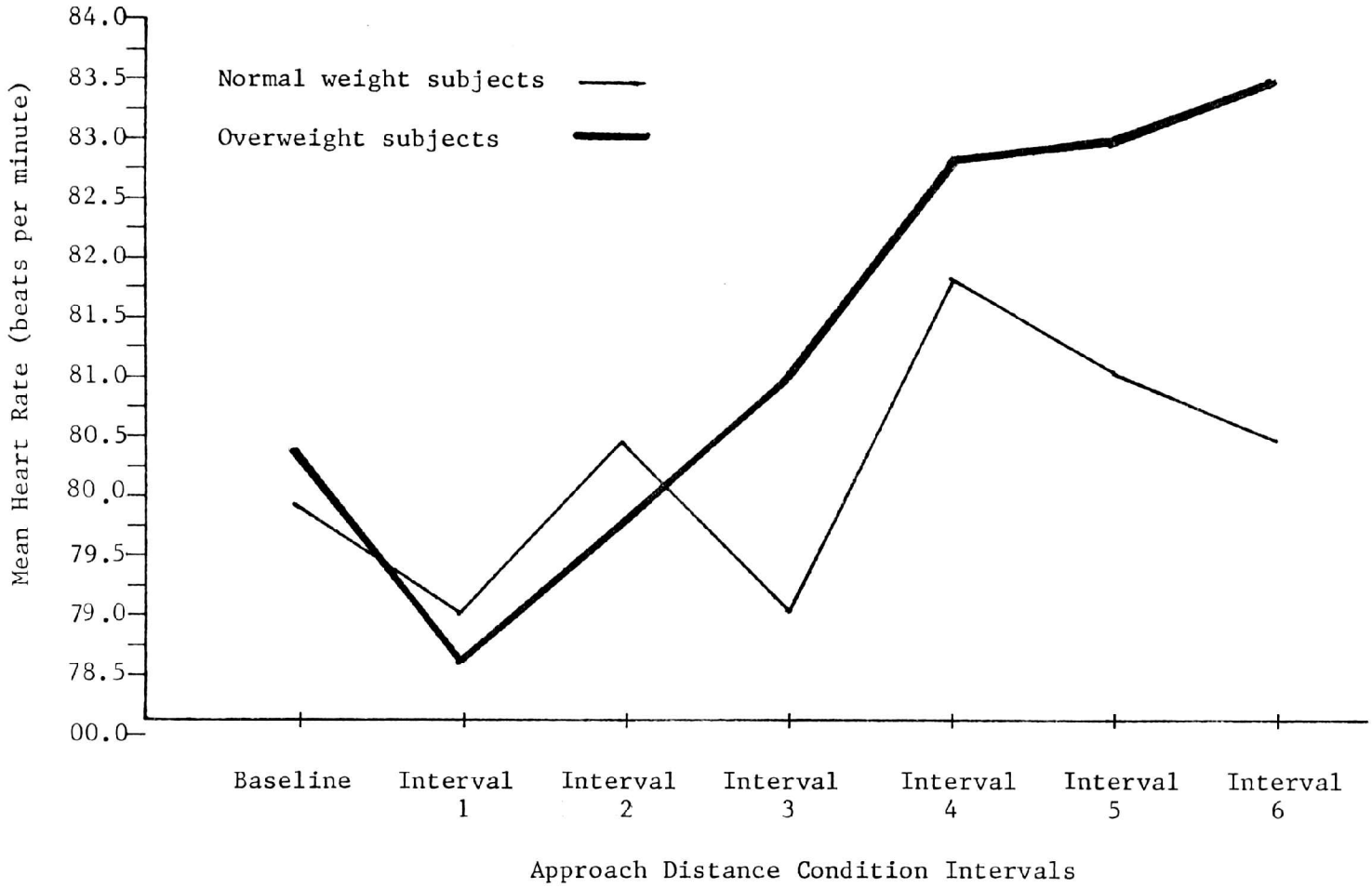

Figure 3. Mean heart rate for normal weight and overweight subjects at baseline and 10 - second intervals during the one minute approach distance condition.

Table 4

Analysis of Variance of Percentage Change in Heart Rate of Overweight and Normal Weight Subjects at Three Approach Distances During Interval 1

Source	SS	df	MS	F
Weight	9.46	1	9.46	.18
Distance	91.81	2	45.91	.88
Weight x Distance	47.32	2	23.66	.45
Error	2464.23	47	52.43	
Total	2615.72	52	50.30	

Table 5

Analysis of Variance of Percentage Change in Heart Rate of Overweight and Normal Weight Subjects at Three Approach Distances During Interval 2

Source	SS	df	MS	F
Weight	38.48	1	38.48	.45
Distance	16.29	2	8.14	.12
Weight x Distance	188.01	2	94.01	.26
Error	3145.42	47	66.92	
Total	3389.52	52	65.18	

Table 6

Analysis of Variance of Percentage Change in Heart Rate of Overweight and Normal Weight Subjects at Three Approach Distances During Interval 3

Source	SS	df	MS	F
Weight	65.95	1	65.95	.63
Distance	205.84	2	102.92	.98
Weight x Distance	451.53	2	225.77	.13
Error	4911.10	47	104.49	
Total	5624.84	52	108.17	

Table 7

Analysis of Variance of Percentage Change in Heart Rate of Overweight and Normal Weight Subjects at Three Approach Distances During Interval 4

Source	SS	df	MS	F
Weight	12.06	1	12.06	.09
Distance	264.37	2	132.19	1.03
Weight x Distance	835.56	2	417.78	3.26*
Error	6029.47	47	128.29	
Total	7139.35	52	137.30	

* $p < .05$.

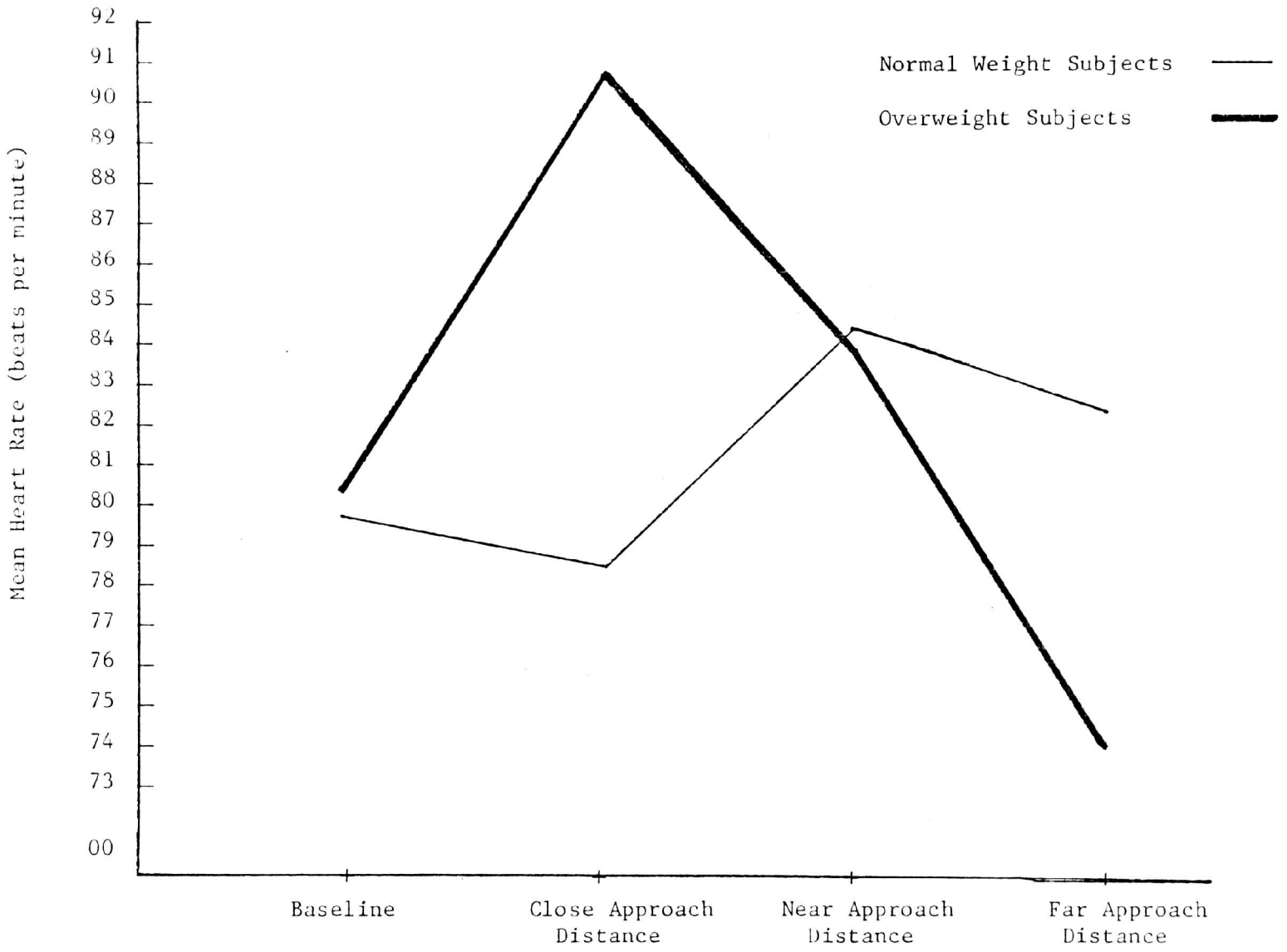

Figure 4. Mean heart rate of normal weight and overweight subjects at baseline and Interval 4 (31 to 40 seconds) of the approach distance conditions.

Table 8

Analysis of Variance of Percentage Change in Heart Rate of Overweight and Normal Weight Subjects at Three Approach Distances During Interval 5

Source	SS	df	MS	F
Weight	71.47	1	71.47	.47
Distance	103.36	2	51.68	.34
Weight x Distance	408.71	2	204.36	1.36
Error	7080.56	47	150.65	
Total	7659.94	52	147.31	

Table 9

Analysis of Variance of Percentage Change in Heart Rate of Overweight and Normal Weight Subjects at Three Approach Distances During Interval 6

Source	SS	df	MS	F
Weight	133.69	1	133.69	1.03
Distance	467.12	2	233.56	1.80
Weight x Distance	750.41	2	375.21	2.88
Error	6113.41	47	130.07	
Total	7446.02	52	143.19	

Table 10

Analysis of Simple Main Effects of Weight on Percentage Change in Heart Rate at Levels of Distance During Interval 4

Source	SS	df	MS	F
Weight at Close Distance	611.32	1	611.32	3.80
Weight at Near Distance	20.90	1	20.90	.17
Weight at Far Distance	215.40	1	215.40	2.21
Error/Close Distance	2572.55	16	160.78	
Error/Near Distance	1996.01	16	124.75	
Error/Far Distance	1460.91	15	97.39	

Table 11

Analysis of Simple Main Effects of Distance on Percentage Change in Heart Rate at Levels of Weight During Interval 4

Source	SS	df	MS	F
Distance at Overweight	978.95	1	489.48	2.30
Distance at Normal Weight	120.98	2	60.49	.68
Error/Overweight	4083.93	25	163.36	
Error/Normal Weight	1945.54	22	88.43	

of the significant interaction reveals that groups at the close distance compared to other distances are significantly different (F (1, 47) = 7.76, $p < .05$) and the effects of distance at the overweight level of weight is also significant (F (2, 47) = 5.53, $p < .01$). The interaction is presented in Table 15, Figure 5, Tables 19, and 20. A significant interaction is also present in Interval 4 (F (2, 47) = 4.09, $p < .05$). The weight x distance interaction effect of weight on heart rate was examined; there is a significant simple main effect of weight at the close approach distance (F (1, 47) = 7.24, $p < .05$). The effect of distance at the overweight level of weight is also significant (F (2, 47) = 7.00, $p < .005$). Table 16, Figure 6, and Tables 21 and 22 summarize the findings reported for Interval 4. A significant interaction is also present (F (2, 47) = 4.18, $p < .05$) during Interval 6 (see Table 18 and Figure 7). Similarly, analysis of the simple main effect of weight at the close distance is significant (F (1, 47) = 9.02, $p < .01$) and the simple main effect of distance at the overweight level of weight is significant (F (2, 47) = 7.56, $p < .005$). Simple main effects analyses of Interval 6 are reported in Tables 23 and 24. No other interval analysis is significant.

Scores of the two groups on the Comfortable Interpersonal Distance Scales were examined initially by a t test to determine if the overweight and normal weight subjects differed in their distance needs. No significant differences were found (t (50) = .47, $p > .05$). Overweight persons' mean CID score was 11.07 mm, and normal weight persons' mean score was 10.8 mm. A group x distance analysis of variance on the data was not significant (see Table 25).

Table 12

Analysis of Variance of Baseline Heart Rate of Overweight and Normal Weight Subjects

Source	SS	df	MS	F
Weight	1.90	1	1.90	.01
Distance	140.16	2	70.08	.45
Weight x Distance	139.00	2	69.50	.44
Error	7357.10	47	156.53	
Total	768.79	52	146.90	

Table 13

Analysis of Variance of Heart Rate of Overweight and Normal Weight Subjects During Interval 1

Source	SS	df	MS	F
Weight	1.00	1	1.00	.01
Distance	130.27	2	65.14	.54
Weight x Distance	225.52	2	112.76	.93
Error	5693.60	47	121.14	
Total	6050.72	52	116.36	

Table 14

Analysis of Variance of Heart Rate of Overweight and Normal Weight Subjects During Interval 2

Source	SS	df	MS	F
Weight	8.07	1	8.07	.07
Distance	196.72	2	98.36	.87
Weight x Distance	359.68	2	179.84	1.58
Error	5331.56	47	113.44	
Total	5895.70	52	113.38	

Table 15

Analysis of Variance of Heart Rate of Overweight and Normal Weight Subjects During Interval 3

Source	SS	df	MS	F
Weight	55.39	1	55.39	.62
Distance	238.38	2	119.19	1.34
Weight x Distance	632.29	2	316.15	3.55*
Error	4182.29	47	88.98	
Total	5103.70	52	98.15	

* $p < .05$.

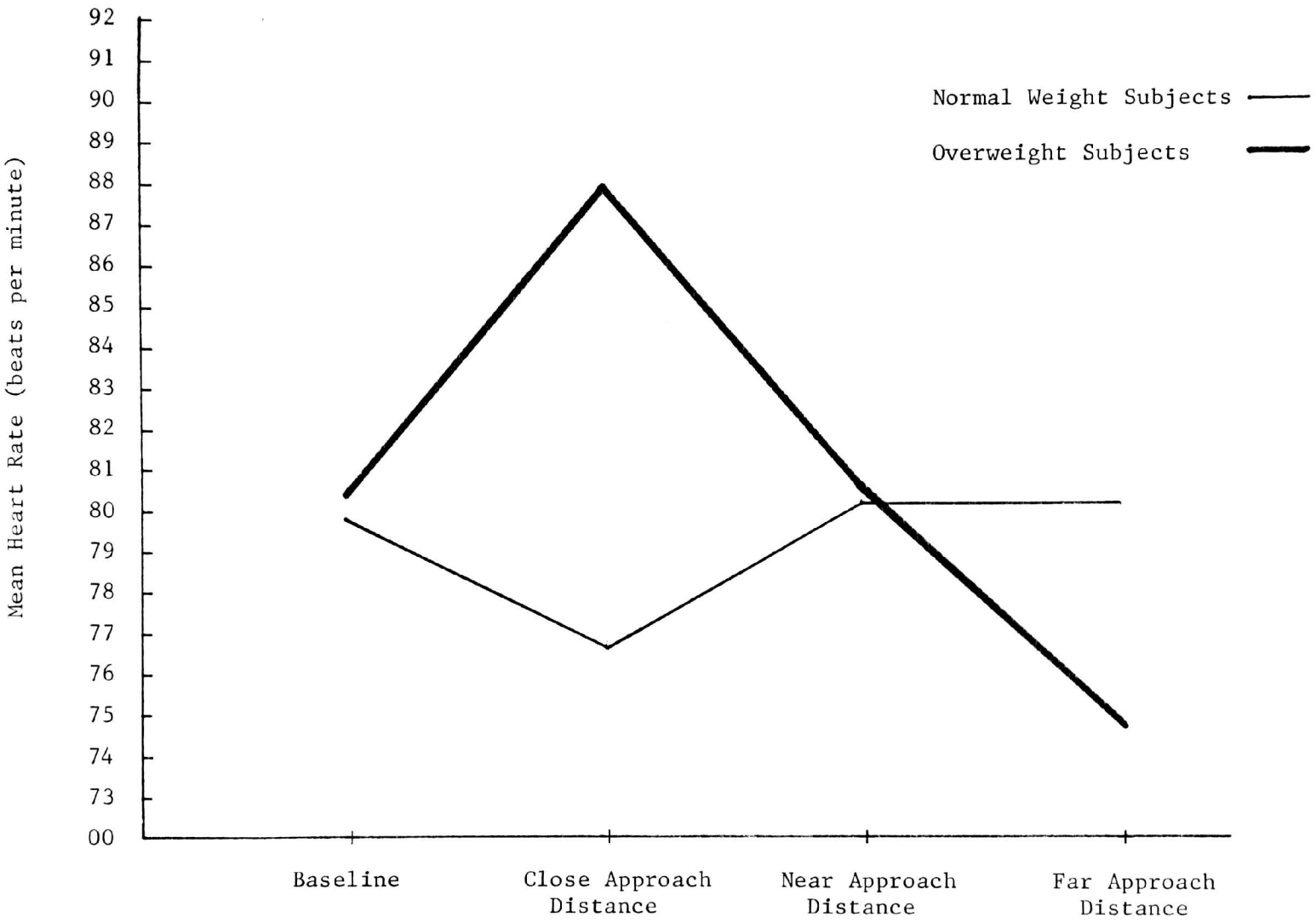

Figure 5. Mean heart rate of normal weight and overweight subjects at baseline and Interval 3 (21 to 30 seconds) of the approach distance conditions.

Table 16

Analysis of Variance of Heart Rate of Overweight and Normal Weight Subjects During Interval 4

Source	SS	df	MS	F
Weight	16.31	1	16.31	.14
Distance	489.54	2	244.77	2.13
Weight x Distance	940.17	2	470.09	4.09*
Error	5405.50	47	115.01	
Total	6850.87	52	131.75	

* $P < .05$.

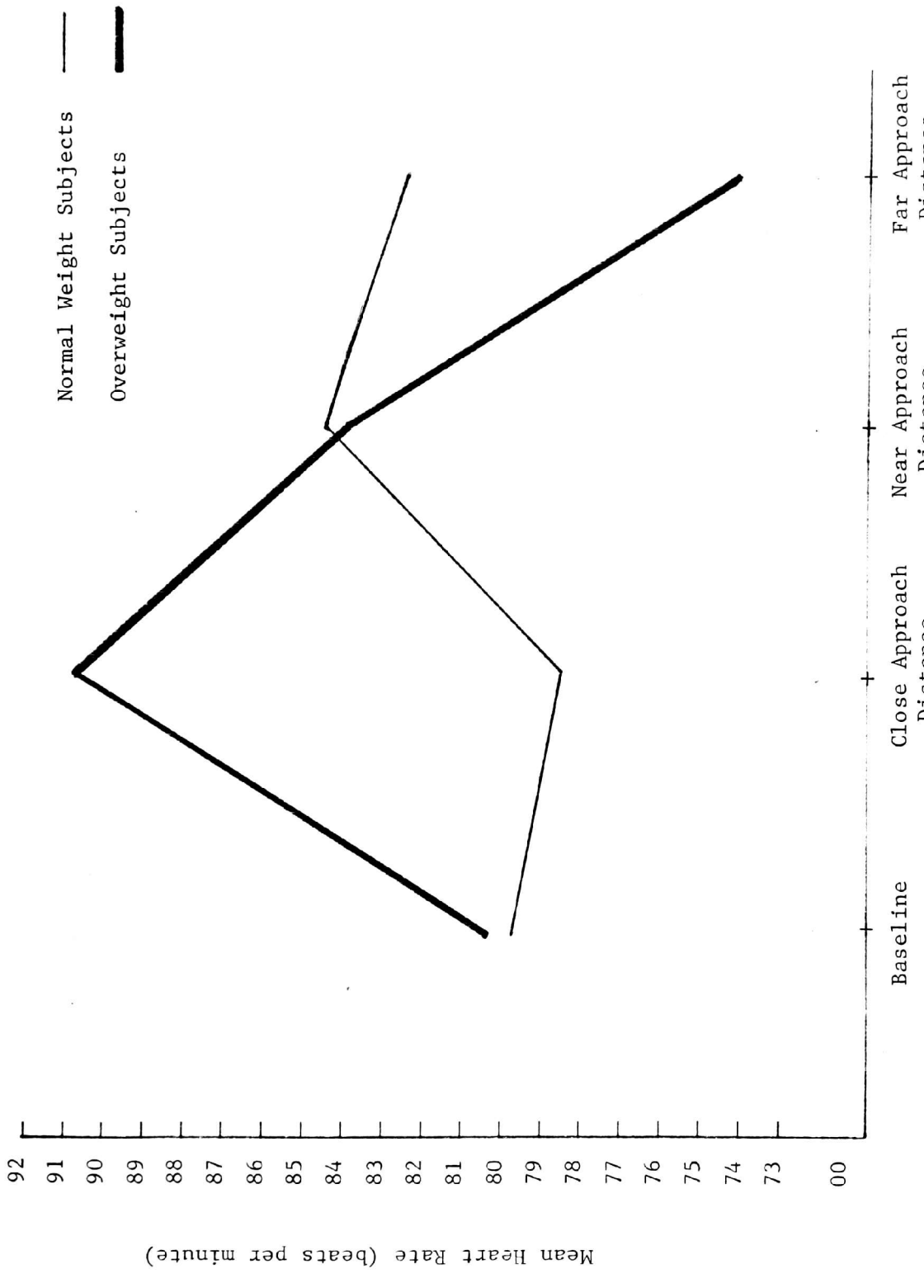

Figure 6. Mean heart rate of normal weight and overweight subjects at baseline and Interval 4 (31 to 40 seconds) of the approach distance conditions.

Table 17

Analysis of Variance of Heart Rate of Overweight and Normal Weight Subjects During Interval 5

Source	SS	df	MS	F
Weight	53.88	1	53.88	.41
Distance	304.42	2	152.21	1.17
Weight x Distance	544.25	2	272.13	2.09
Error	6123.40	47	130.28	
Total	7026.11	52	135.12	

Table 18

Analysis of Variance of Heart Rate of Overweight and Normal Weight Subjects During Interval 6

Source	SS	df	MS	F
Weight	104.75	1	104.75	.96
Distance	480.37	2	240.18	2.19
Weight x Distance	917.13	2	458.56	4.18*
Error	5158.00	47	109.74	
Total	6651.17	52	127.91	

* $p < .05$.

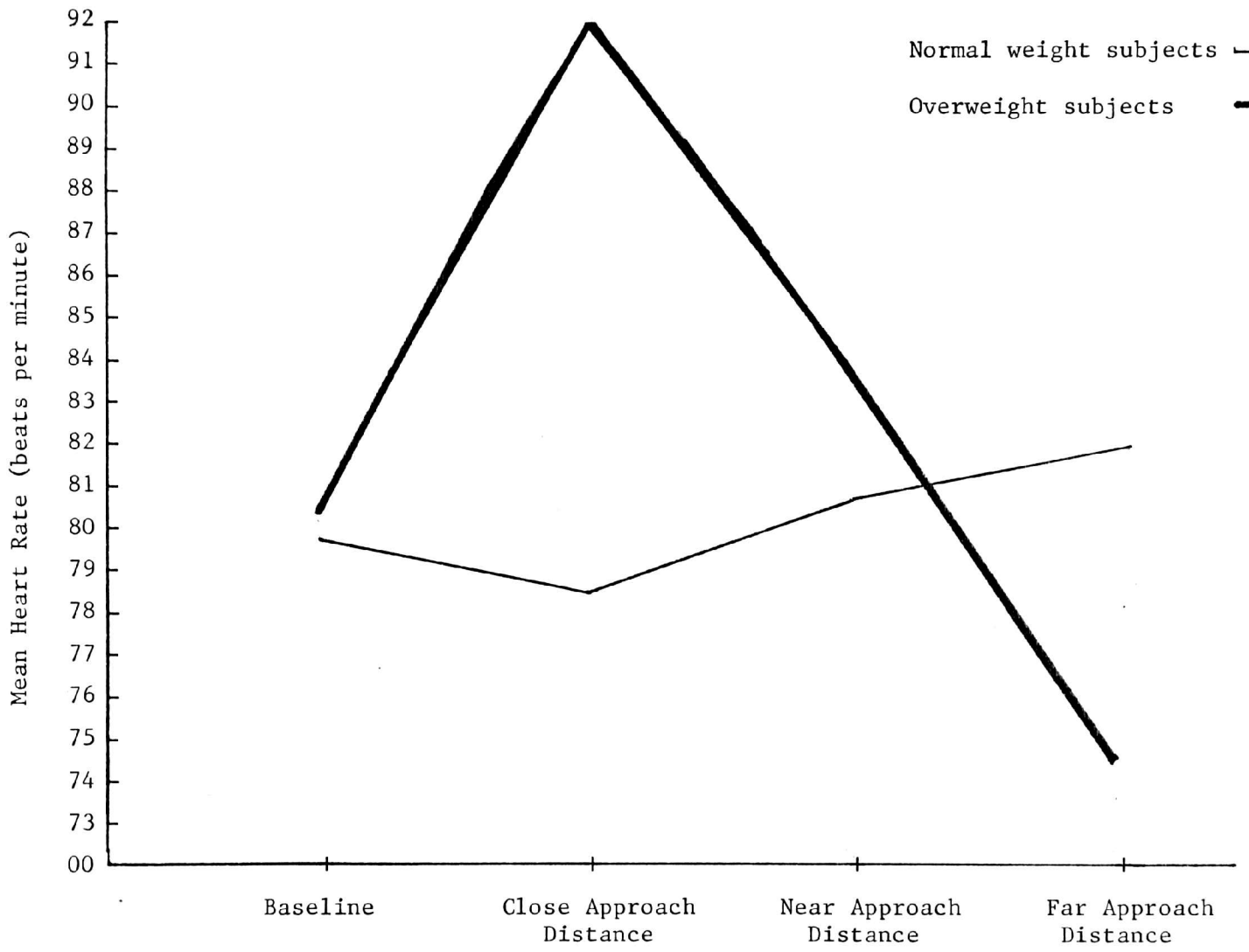

Figure 7. Mean heart rate of normal weight and overweight subjects at baseline and Interval 6 (51 to 60 seconds) of the approach distance conditions.

Table 19

Analysis of Simple Main Effects of Weight on Heart Rate at Levels of Distance During Interval 3

Source	SS	df	MS	F
Weight at Close Distance	555.56	1	555.56	7.76*
Weight at Near Distance	.10	1	.10	.00
Weight at Far Distance	132.03	1	132.03	1.31
Error/Close Distance	1144.89	16	71.56	
Error/Near Distance	1521.90	16	95.12	
Error/Far Distance	1515.50	15	101.03	

* $p < .05$.

Table 20

Analysis of Simple Main Effects of Distance on Heart Rate at Levels of Weight During Interval 3

Source	SS	df	MS	F
Distance at Overweight	805.60	2	402.80	5.53*
Distance at Normal Weight	65.07	2	32.54	.30
Error/Overweight	1822.40	25	72.90	
Error/Normal Weight	2359.89	22	107.27	

* $p < .01$.

Table 21

Analysis of Simple Main Effects of Weight on Heart Rate at Levels of Distance During Interval 4

Source	SS	df	MS	F
Weight at Close Distance	648.00	1	648.00	7.24*
Weight at Near Distance	2.50	1	2.50	.02
Weight at Far Distance	306.00	1	306.00	2.58
Error/Close Distance	1432.00	16	89.50	
Error/Near Distance	2191.50	16	136.97	
Error/Far Distance	1782.00	15	118.80	

* $p < .05$.

Table 22

Analysis of Simple Main Effects of Distance on Heart Rate at Levels of Weight During Interval 4

Source	SS	df	MS	F
Distance at Overweight	1267.86	2	633.96	7.00*
Distance at Normal Weight	161.86	2	80.93	.57
Error/Overweight	2264.00	25	90.56	
Error/Normal Weight	3141.50	22	142.80	

* $p < .005$.

Table 23

Analysis of Simple Main Effects of Weight on Heart Rate at Levels of Distance During Interval 6

Source	SS	df	MS	F
Weight at Close Distance	722.00	1	722.00	9.02*
Weight at Near Distance	40.00	1	40.00	.31
Weight at Far Distance	259.88	1	259.88	2.18
Error/Close Distance	1280.88	16	80.00	
Error/Near Distance	2088.00	16	130.50	
Error/Far Distance	1790.00	15	119.33	

* $p < .01$.

Table 24

Analysis of Simple Main Effects of Distance on Heart Rate at Levels of Weight During Interval 6

Source	SS	df	MS	F
Distance at Overweight	1354.86	2	677.43	7.56*
Distance at Normal Weight	42.64	2	21.32	.16
Error/Overweight	2240.00	25	86.60	
Error/Normal Weight	2918.00	22	132.64	

* $p < .005$.

Table 25

Analysis of Variance of Comfortable Interpersonal Distance Scores of Overweight and Normal Weight Subjects

Source	SS	df	MS	F
Weight	18.88	1	18.88	.33
Distance	161.86	2	80.93	1.40
Weight x Distance	39.80	2	19.90	.34
Error	2658.03	46	57.78	
Total	2872.52	51	56.32	

It was hypothesized that overweight subjects would rate the confederate less favorably than would the normal weight subjects on the adjective dimensions on the Impression Formation Questionnaire. Contrary to the hypothesis, overweight persons tended to perceive the confederate more positively than normal weight persons. Median ratings of the 27 trait dimensions by groups at the three different approach distances are presented in Figures 8-10. A linear combination of eight trait dimensions significantly distinguished between groups (χ^2 (8) = 20.41, $p < .01$). Overweight subjects perceived the confederate as more sociable, sexually warm, self-assertive, interesting, and exciting than did normals; normal weight subjects perceived the confederate as more genuine, conventional, and humorous than did overweight subjects (see Table 26).

Each of the 27 bipolar adjectives was entered in group x condition analysis to determine if weight, distance and/or an interaction of weight and distance were significant. Three of the 27 dimensions are significantly different for groups, distances, or group x distance interaction. The rating of Unsociable/Sociable is significantly different for groups (F (2, 47) = 5.01, $p < .05$) (see Table 27). Overweight subjects: $\bar{X} = 4.57$; normal weight subjects: $\bar{X} = 3.76$.

A significant interaction of weight x distance (F (2, 47) = 3.22, $p < .05$) occurs for the rating of Self-assertive/Submissive (see Table 28 and Figure 11). The effect of approach distance on the rating is also significant (F (2, 47) = 6.57, $p < .01$) (see Table 28). The simple main effect of distance at the overweight level is significant (F (2, 47) = 9.20, $p < .001$); the effect of weight on ratings is not significant (see Tables 29 and 30). Overweight persons tended to rate the confederate (except for the far distance) as more self-assertive ($\bar{X} = 2.39$) than did normal weight persons ($\bar{X} = 2.68$).

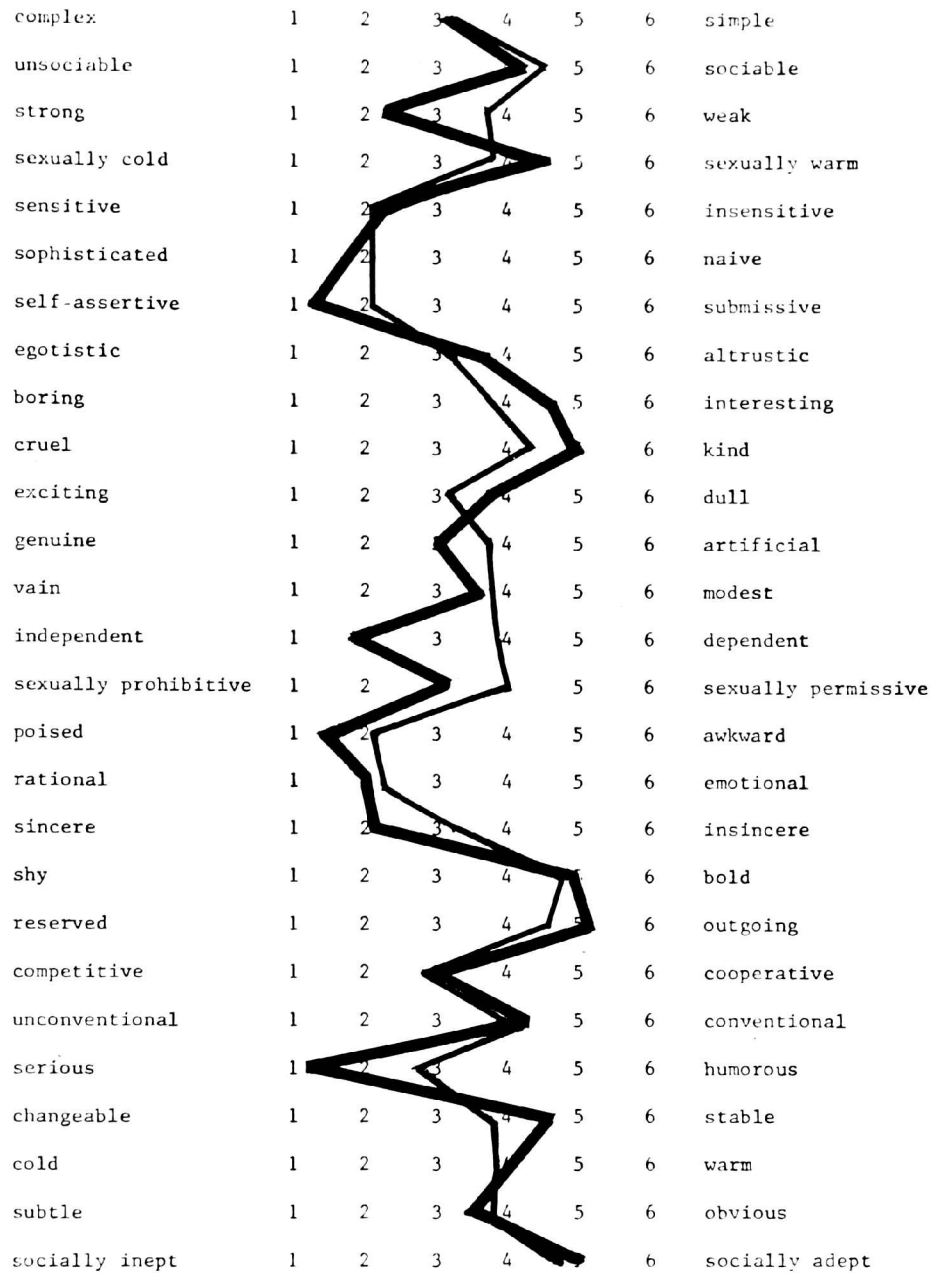

Figure 8. Median ratings on Impression Formation Questionnaire of the confederate by overweight (▬) and normal weight (——) subjects during the close approach distance.

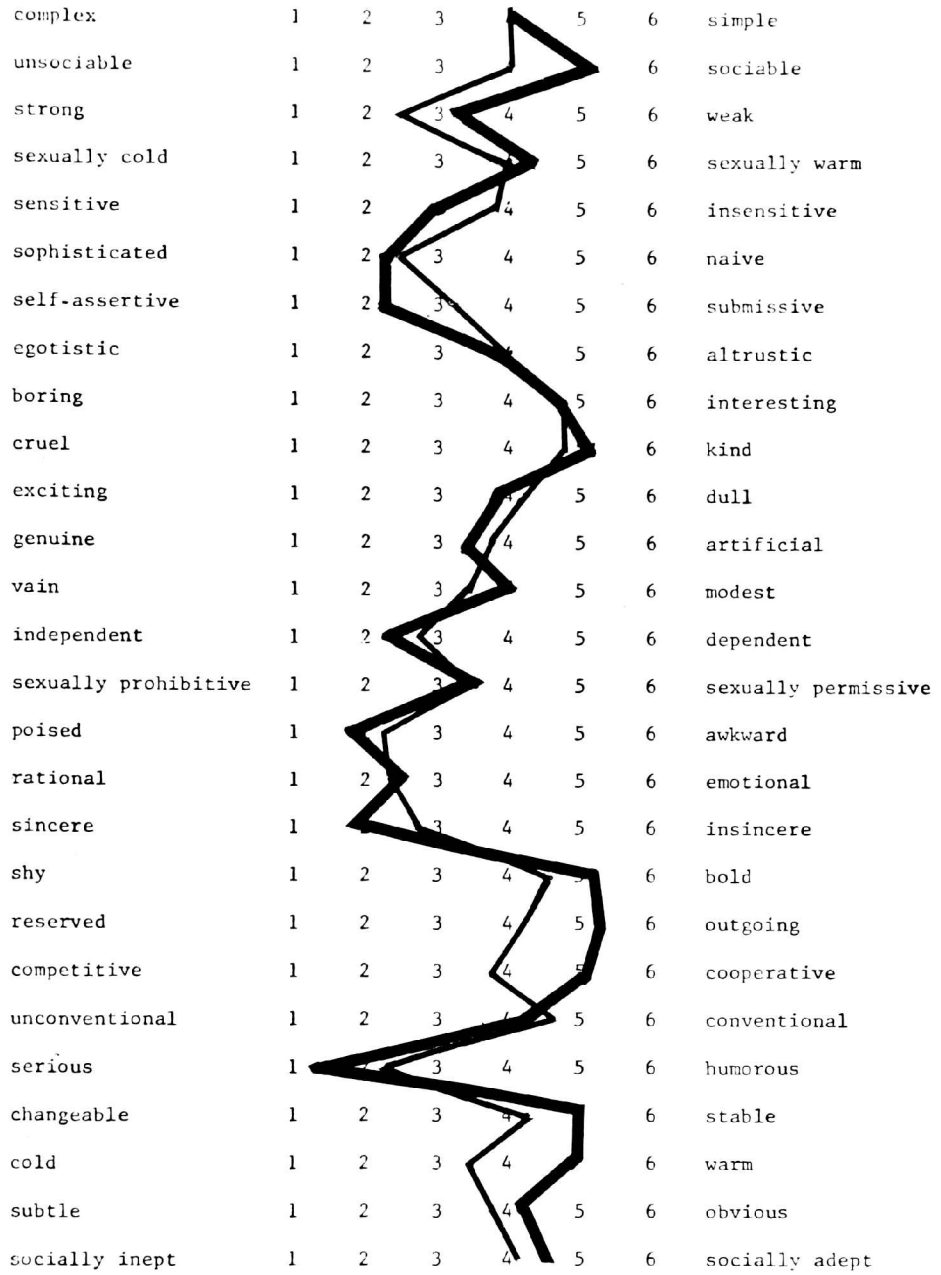

Figure 9. Median ratings on Impression Formation Questionnaire of the confederate by overweight (▬) and normal weight (——) subjects during the near approach distance.

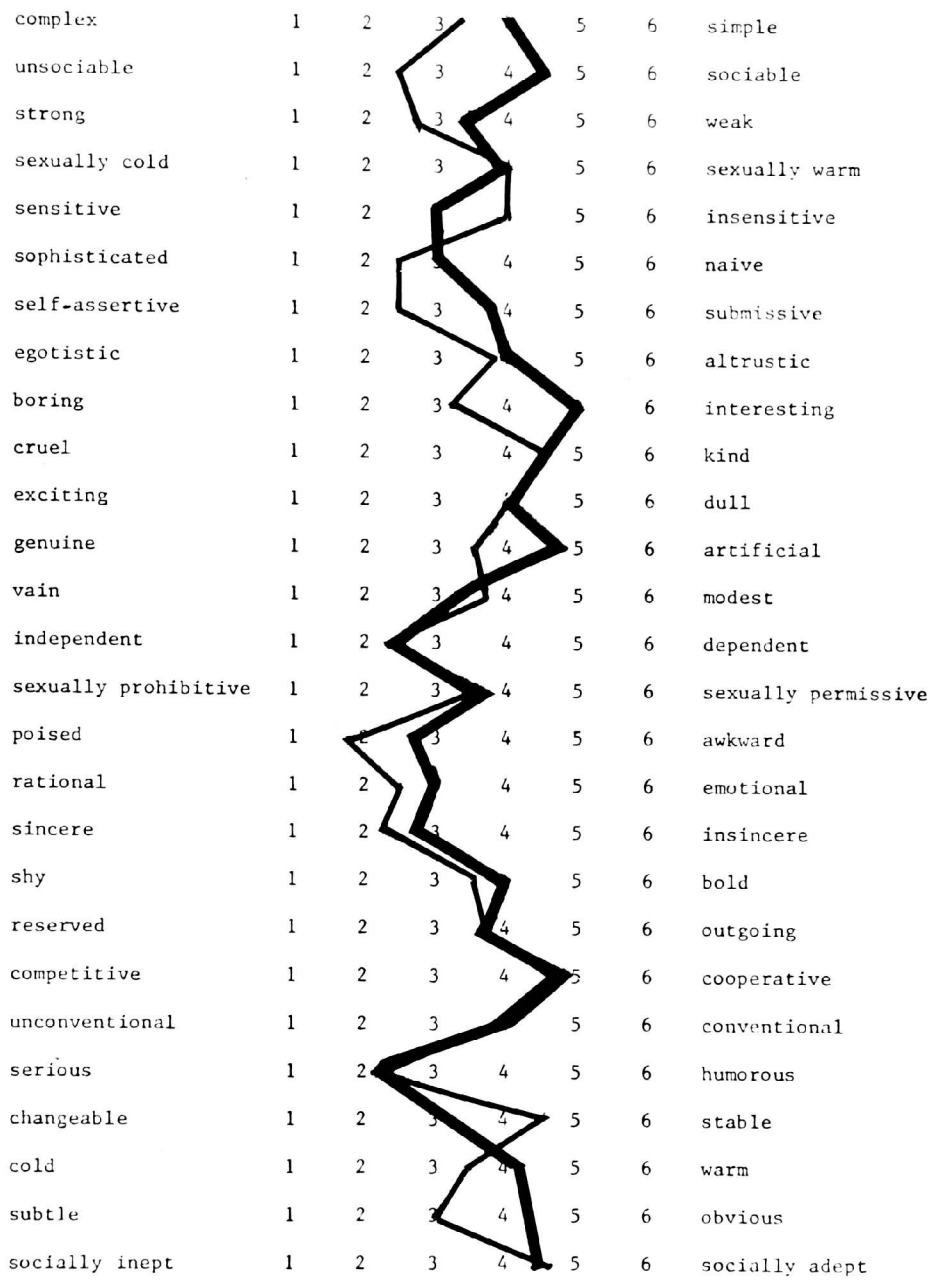

Figure 10. Median ratings on Impression Formation Questionnaire of the confederate by overweight (▬▬) and normal weight (——) subjects during the far approach distance.

Table 26

Trait Descriptors of the Impression Formation Questionnaire

(traits arranged from most to least discriminating)

Trait	Group Rated Higher
Sociable	Overweight
Sexually Warm	Overweight
Self-assertive	Overweight
Interesting	Overweight
Exciting	Overweight
Genuine	Normal Weight
Conventional	Normal Weight
Humorous	Normal Weight

Table 27

Analysis of Variance of the Unsociable/Sociable Rating of the Confederate by Overweight and Normal Weight Subjects

Source	SS	df	MS	F
Weight	8.70	1	8.70	5.01*
Distance	8.00	2	4.00	2.31
Weight x Distance	3.90	2	1.95	1.12
Error	81.30	47	1.73	
Total	101.90	52	1.96	

* $p < .05$.

Table 28

Analysis of Variance of the Self-assertive/Submissive Rating of the Confederate by Overweight and Normal Weight Subjects

Source	SS	df	MS	F
Weight	1.09	1	1.09	.88
Distance	16.21	2	8.10	6.57**
Weight x Distance	7.94	2	3.97	3.22*
Error	57.98	47	1.23	
Total	83.22	52	1.60	

* $p < .05$.

** $p < .01$.

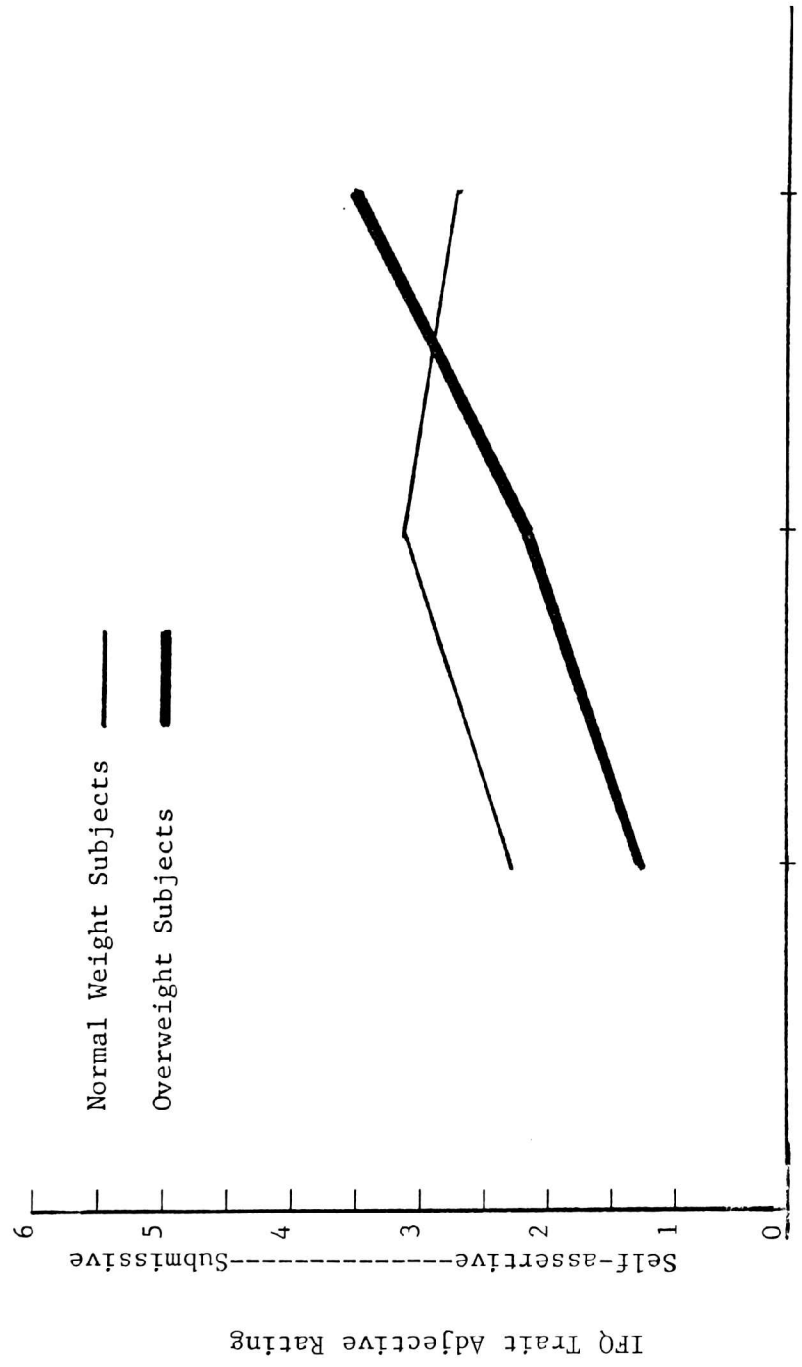

Figure 11. Interaction of weight and distance on IMF rating of self-assertive/submissive trait adjective by normal weight and overweight subjects at the approach distance condition.

Table 29

Analysis of the Simple Main Effects of Distance on the Self-assertive/Submissive Rating of the Confederate at Levels of Weight

Source	SS	df	MS	F
Distance at Overweight	20.63	2	10.32	9.02*
Distance at Normal Weight	3.51	2	1.76	1.29
Error/Overweight	28.04	25	1.12	
Error/Normal Weight	29.31	22	1.36	

* $p < .001$.

Table 30

Analysis of the Simple Main Effects of Weight on the Self-assertive/Submissive Rating of the Confederate at Levels of Distance

Source	SS	df	MS	F
Weight at Close Distance	2.72	1	2.72	3.70
Weight at Near Distance	3.80	1	3.80	2.97
Weight at Far Distance	2.75	1	2.75	1.60
Error/Close Distance	11.78	16	.74	
Error/Near Distance	20.48	16	1.28	
Error/Far Distance	25.47	15	1.78	

The groups' rating of the Competitive/Cooperative trait is also significantly different (F (2, 47) = 5.42, $p < .01$). Table 31 contains the analysis. Mean ratings on the dimension are significantly different for the close approach compared to the far approach ($\overline{CR}_{NK}$, $p < .05$). Subjects in the close approach distance condition rated the confederate as more competitive ($\overline{X}$ = 3.17) than did subjects in the far approach distance condition ($\overline{X}$ = 4.49).

It was hypothesized that overweight and normal weight persons would differ on the number of high self-monitoring statements endorsed. A t test on the scores of the two groups reveals no significant difference (t (51) = .41, $p > .05$); overweight subjects' mean score is 12.4 and normal weight subjects' mean score is 11.9. However, a group x condition analysis on SM scores (see Table 32 and Figure 12) shows that the distance manipulation does have an effect on subjects' responses (F (2, 47) = 3.31, $p < .05$). The scores of subjects at the far distance ($\overline{X}$ = 11.5) are significantly different from subjects' scores at the near distance ($\overline{X}$ = 13.5) when compared ($\overline{CR}_{NK}$, $p < .05$).

Discussion

In the present study, significant differences were found between overweight and normal weight subjects on several variables of interest: percentage change in heart rate and heart rate, reported weight, and ratings of the confederate. On other variables, personal distance needs and monitoring of expressive behavior, no differences were found.

Overweight participants reported significant underestimations of their actual weight. This result conflicts with those of Wing, Epstein, Ossip, and LaPorte (1979), who found a high correlation (.98) between reported and actual weight. It is unclear in the Wing et al. study

Table 31

Analysis of Variance of the Cooperative/Competitive Rating of the Confederate by Overweight and Normal Weight Subjects

Source	SS	df	MS	F
Weight	.68	1	.68	.38
Distance	19.54	2	9.77	5.42*
Weight x Distance	5.07	2	2.54	1.41
Error	84.71	47	1.80	
Total	100.00	52	1.92	

* $p < .01$.

Table 32

Analysis of Variance of Self-Monitoring of of Expressive Behavior Scale Scores of Overweight and Normal Weight Subjects

Source	SS	df	MS	F
Weight	1.93	1	1.93	.14
Distance	91.85	2	45.93	3.31*
Weight x Distance	20.28	2	10.14	.73
Error	625.14	47	13.88	
Total	766.79	52	14.75	

* $p < .05$.

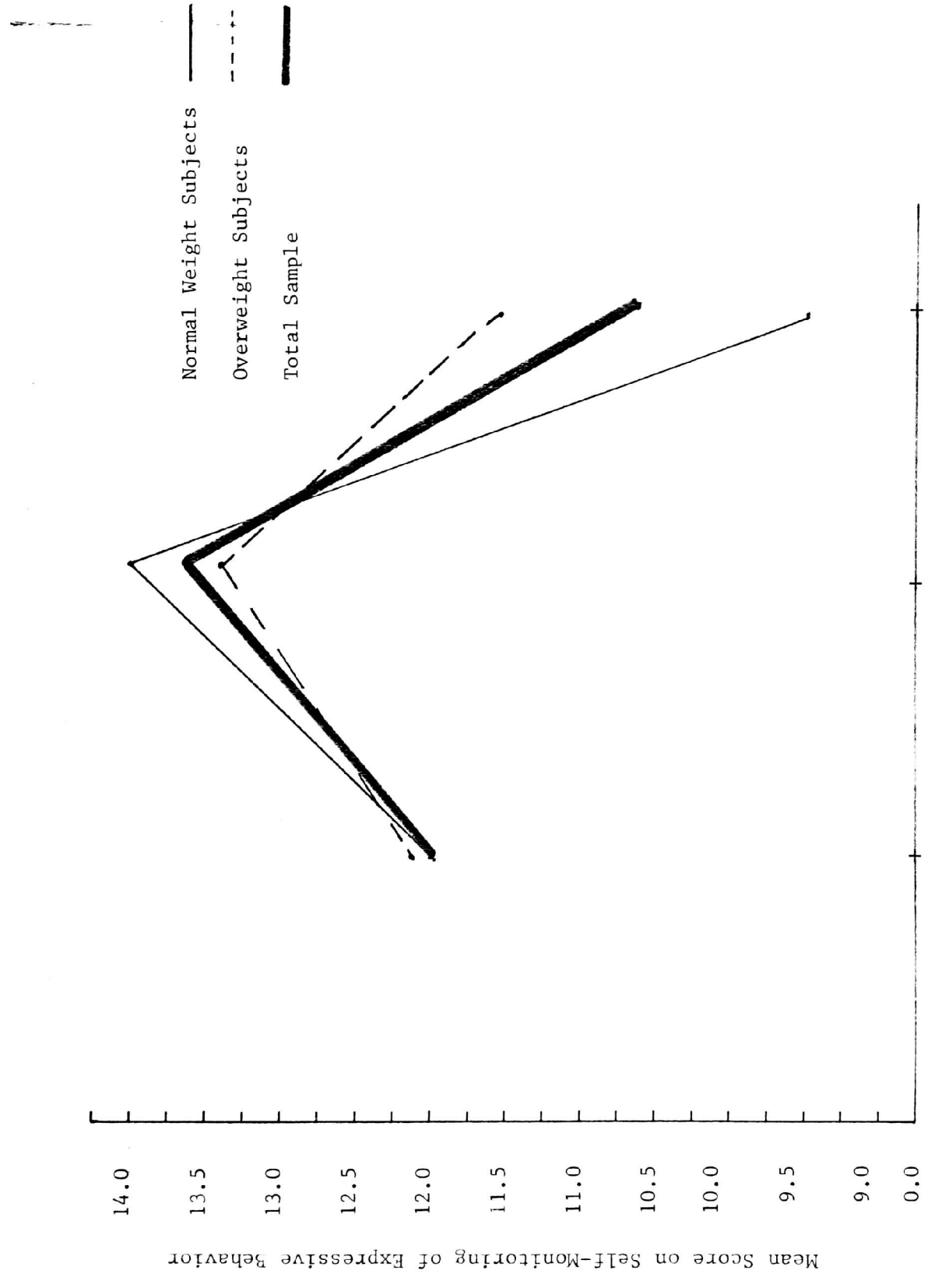

Figure 12. Mean scores on Self-Monitoring of Expressive Behavior Scale of normal weight and overweight subjects at the approach distance conditions.

whether subjects responded individually or in small groups to a questionnaire in which weight and height questions were included. These researchers did find that females above the median weight of the sample tended to report underestimations ($\overline{X}$ = 7.9 lbs. (3.58 kg)) of their weight. Schachter et al. (1968) reported that school records and class surveys of weight and height were undependable, but they attributed the lack of dependability to dated records (i.e., the weights and heights of students could have changed since the records were collected). In the present study, subjects completed the subject selection questionnaire in a group setting approximately three weeks before the study began. It may have been that the overweight persons were less truthful than they would have been if they had been tested individually or if they had been told that actual weight measures would be taken. It is reasonable to assume, as Allon (1975), Boskind-Lodahl and Sirlin (1977), and Dwyer and Mayer (1975) reported, that the social stigma of being overweight deterred the overweight person from being truthful about their weight. It may be that overweight persons avoid getting on the scale, and therefore do not know their actual weight.

It was predicted that there would be a significant difference between overweight and normal weight groups in percentage change of heart rate at the different approach distances of the confederate. As indicated in Table 3, these groups did not differ significantly. Since this finding was incongruous with the reading of heart rate (see Figure 2), post-hoc analyses were done. Time-series analyses of heart rate in 10-second intervals of the total 60-second approach distance condition were conducted to determine whether heart rate changes of short duration are masked by the longer one minute condition.

Each participant's heart rate for the last 10 seconds of baseline and for each 10-second interval of the condition was obtained and multiplied by 6 to arrive at beats per minute. Examination of the approach distance variable during successive 10-second intervals did reveal significant differences in percentage heart rate change between groups, with the overweight persons at the close distance having greater increases at Interval 4 (31-40 second interval of the approach distance condition) as described in Table 7 and Figure 4. Interestingly, there were no significant differences during Intervals 5 and 6, although the overweight subjects' mean heart rate continued to accelerate while normal weight subjects' mean heart rate decelerated (see Figure 3). The lack of significant differences at these intervals may be due to the increased variability of overweight subjects' heart rate. Because mean heart rate increased for the overweight subjects during the last half of the 60-second interval and decelerated for the normal weight subjects during that same time, analyses of variance were conducted to determine if actual heart rate was significantly different during baseline and during Intervals 1-6. A significant interaction of group x distance between groups was found at Intervals 3, 4, and 6 (see Tables 15, 16 and 18). These results better describe the two groups' heart rate during time intervals of approach distance. The finding of increased heart rate with closer approach is consistent with the results reported by Efran and Cheyne (1974), Kleck et al. (1966) and McBride et al. (1965) who found increased arousal during intrusion situations.

Examination of the mean heart rate during Intervals 1-6 does suggest differences in the effect of the approach distance by the confederate on the two groups. As seen in Figure 3, overweight subjects'

mean heart rate dropped below that of normal weight subjects' during the first two 10-second intervals; note that overweight subjects' heart rate continued to accelerate throughout the remaining five intervals. Normal weight subjects' mean heart rate showed the following pattern: a drop during Interval 1, a rise during Interval 2, a drop during Interval 3, a rise during Interval 4, and finally, a drop during Intervals 5 and 6. The picture was one of alternating deceleration and acceleration for normal weight persons while overweight persons' heart rate accelerated following an initial drop. One possible explanation is that overweight persons are focusing attention on the confederate who is a salient stimulus. Orienting to an important stimulus is typically accompanied by a deceleration in heart rate and then acceleration in heart rate when attention is focused inwardly (e.g., when the subject is muscularly tense, stressed, or in an aversive situation) (Stroufe & Waters, 1977). The salience for the overweight persons may have been the weight of the confederate which was in contrast to their own weight. McArthur et al. (1980) and Rodin and Slochower (1974) reported that differences in weight of subjects was related to increased responsivity of overweight subjects to normal weight subjects in terms of compliance and modeling (i.e., contrast in weights). These investigators also found that overweight subjects attributed the confederate's behavior to their own overweight status. The effect of the approach distance is significant only during the close approach by the confederate. It appears that overweight persons are differentially responsive to the stimulus which is "salient" during the close approach but not during the other approach distances. This finding is consistent with

Elman et al. (1977) who reported that the "confederate merely present" did not affect compliance; it is also consistent with those of McArthur et al. (1980) who suggested that failure to find differences in responsivity to positive and negative affective slides was due to the nature of these stimuli (not extreme enough).

Another possible explanation of the increase in heart rate for the overweight subjects may be that though the stimulus was salient (for weight) in the close distance approach, the overweight subjects could have perceived a "flight or fight" situation and were neither able to flee or fight. Kleck at al. (1966), Patterson et al. (1971), and McBride et al. (1965) found that intrusion (close approach) is stressful and accompanied by increased physiological arousal. It has been reported that overweight persons are not approached as closely as normal weight persons (Lerner, 1973; Wolfgang & Wolfgang, 1971); therefore the close approach might well be stressful to overweight persons but not to normal weight persons.

The findings with the Impression Formation Questionnaire (IFQ) may suggest whether overweight subjects were reacting to a salient stimulus and/or an intrusion condition. When the discriminant analysis of the Impression Formation is considered, it appears that overweight subjects described the confederate as attractive, but on three dimensions they described her in less positive terms. The confederate was viewed by the overweight persons as less genuine, unconventional, and serious rather than humorous compared to the normal weight subjects. In the Snyder et al. (1977) study, the attractive-photo-condition subjects were rated as sexually warm, sociable, humorous, competitive, interesting, and exciting, compared to the unattractive-photo-condition (Tanke, Note 1). Only the trait dimension of genuine does not appear

in the Snyder et al. discriminant analysis, though it appears in the present discriminant analysis (see Table 26). The trait dimension of humorous, although a poorer discriminator of groups in the present study, was reversed (i.e., the overweight subjects described the confederate as more serious than humorous while subjects in the attractive-photo-condition of Snyder et al. described the "attractive person" on the phone as more humorous than serious). Since the overweight subjects generally described the confederate much like the attractive-photo-condition subject, the reversed rating may be due to the overweights previous experience with normal weights. Overweight persons may feel that persons interacting with them act in a constrained manner (i.e., serious) much like the subjects interacting with the "stigmatized confederates" of the studies of Kleck (1966, 1968) and Kleck et al. (1968).

As reported earlier in Tables 28 and 31, the distance that the confederate approached affected how self-assertive and competitive she was rated. A weight x distance interaction was present for the self-assertive rating. Overweight persons who were approached to the close distance viewed the confederate as more self-assertive than overweight persons who were approached to the near and far distances. It may be that overweight persons are not accustomed to people being assertive with them. Related research concerning affect and treatment of stigmatized persons suggests that people may not show their attitudes or act as they normally do when interacting or describing hypothetical interactions with a stigmatized individual (Carver et al., 1978; Scheier et al., 1978). It may also be the case that overweight subjects who rated the confederate higher on self-assertiveness were judging her behavior as "not submissive" which can perhaps be

considered the opposite of self-assertive. Studies in personal space manipulation have shown that a close approach is suggestive of dominance (Hare & Bales, 1963; Howells & Becker, 1962; Patterson & Sechrest, 1970). Since the confederate delivered a fluent monologue, approached and sat directly in front of the participant, she certainly did not appear submissive.

As with the dimension of self-assertiveness, the dimension of competiveness also showed a main effect of the distance of approach. Subjects who were approached to the close distance perceived the confederate as more competitive than subjects approached to the far distance. This finding is consistent with the research dealing with seating position. For example, Cook (1970) and Norum et al. (1967) reported that persons participating in a competitive task chose face-to-face seating while cooperative tasks resulted in side-by-side seating.

If overweight persons are not generally approached as closely as normals (Lerner, 1973; Wolfgang & Wolfgang, 1971), then they might be expected to report different personal distance needs as measured by the Comfortable Interpersonal Distance Scale (CID). The analysis of the CID responses in the present study indicated that overweight persons do not differ from normal weight persons in personal distance needs. This finding can perhaps be explained by those of Hayduk and Mainprize (1980). They found that blind persons (another deviant group) reported personal distance needs no different from those of sighted individuals. Recall that the task on the CID is to indicate an approach distance where one feels uncomfortable. This fact leads one to conclude that althought overweight persons are generally maintained at greater distances than normals, it is because normals need

to maintain the greater distance from overweight persons, rather than vice-versa. If overweight persons are accustomed to interactions from a greater distance, then a close approach may well be arousing to them. The present heart rate analyses suggests this; it is supportive of other studies (Kleck et al., 1966; Patterson et al., 1971).

Finally, scores of the two groups on the Self-Monitoring of Expressive Behavior (SM) do not differ significantly. Even if there had been no distance manipulation, there may not have been significant differences between the two groups. Pliner (1976) has suggested that there are less differences on the SM between persons who are only slightly overweight and their normal weight counterparts than between more extremely overweight persons and their normal weight counterparts. The fact that the criterion for selection of overweight subjects was lowered from 15% to 11% overweight may have mitigated against finding significant differences between groups. That is, there were few obese persons in this present study.

In summary, no significant difference was found when percentage change in heart rate for the overweight and normal weight groups was analyzed for the entire one minute interaction with the confederate. Additionally, there were no significant differences between the two groups in interpersonal distance needs (measured by the CID) or in the reported self-monitoring of expressive behavior (measured by the SM).

A significant difference was found between overweight and normal weight persons when reported weight versus actual weight was examined, with overweight persons significantly underestimating their weight.

Post-hoc analysis of the one-minute interaction with the confederate, divided into successive 10-second intervals, revealed significant differences in percentage heart rate change during Interval 4 (31 to 40 seconds) of the interaction. Overweight persons approached to the close distance had higher percentage change in heart rate compared to baseline heart rate than did the other participants. Subsequent analysis of heart rate during intervals of the confederate's interaction reflected significant differences between the two weight groups. Overweight persons' heart rates were greater than normal weight persons' heart rates during Interval 3 (21 to 30 seconds), Interval 4 (31 to 40 seconds), and Interval 6 (51 to 60 seconds). Overweight persons' heart rates were greatest at the close approach distance compared to the far distance.

Overweight persons' trait ratings of the confederate differed from those of normal weight persons on eight of the IMF dimensions. When ratings by the two weight groups were analyzed by a discriminate analysis using weight as the criteria, it was found that overweight persons perceived the confederate as more sociable, assertive, interesting, and exciting than did normal weight persons. Overweight persons compared to normal weight persons also perceived the confederate as less genuine, less humorous, and less cooperative.

Approach distance effects were also found. The distance that subjects were approached affected the ratings of the confederate on the trait dimension of cooperative/competitive. Participants who were approached to the close distance perceived the confederate as less cooperative than did persons approached to the far distance. Approach distance also affected the ratings of the confederate on the

self-assertive/submissive trait dimension. Participants who were approached to the close distance perceived the confederate as more assertive than did participants approached to either the near or far distances. Overweight persons who were approached to the close distance tended to perceive the confederate as more assertive compared to overweight persons who were approached to the near and far distances.

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Appendix A

Subject Selection Questionniare

Name _____

Age_____

Height_____

Weight_____

Race _____

Landrum Box _____

Phone _____ If in dorm, room number _____

How would you describe your general health: Circle best description.

POOR FAIR GOOD EXCELLENT

Do you have any chronic health problem such as diabetes, hypertension, epilepsy, or thyroid disorder: If so, please explain briefly.

When is the best time during the day or evening to contact your for possible participation in this study? _____

I am seeking female volunteers to act as subjects for a master's thesis. My area of interest deals with heart rate so I will be recording your heart rate and asking you to respond to some questionnaires. There is no discomfort and you should find the experience interesting. All sessions will take place in the Psychology Department and your session will take about 25 minutes.
Not all of you who volunteer will be contacted because I must randomly select from the total number of possible subjects. I will be in contact with you, if you are chosen, early next week. Please answer all the questions on the sheet. I will be glad to answer any questions you might have.

Thanks,
Ruth Ann Rogers
Psychology Department
681-5530

Appendix B

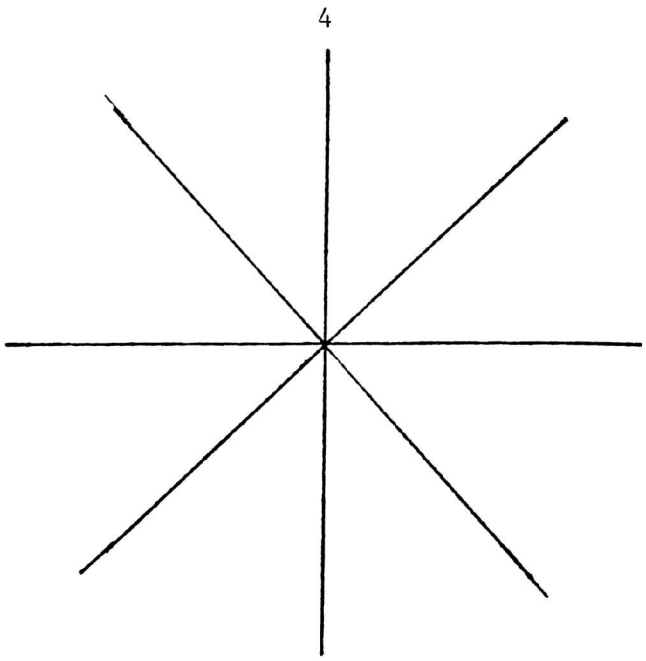
Guidelines for body weight. Adapted from the recommendations of the Fogarty Center Conference, 1973 (Bray, 1975).

Non-metric		Men			Women		
		Weight (lb)*			Weight (lb)*		
Height		Average	Acceptable weight		Average	Acceptable weight	
Ft	in						
4	10				102	92	119
4	11				104	94	122
5	0				107	96	125
5	1				110	99	128
5	2	123	112	141	113	102	131
5	3	127	115	144	116	105	134
5	4	130	118	148	120	108	138
5	5	133	121	152	123	111	142
5	6	136	124	156	128	114	146
5	7	140	128	161	132	118	150
5	8	145	132	166	136	122	154
5	9	149	136	170	140	126	158
5	10	153	140	174	144	130	163
5	11	158	144	179	148	134	168
6	0	162	148	184	152	138	173
6	1	166	152	189			
6	2	171	156	194			
6	3	176	160	199			
6	4	181	164	204			

*Height without shoes, weight without clothing

Appendix C

You are to imagine that you are sitting at the center of the diagram below. You are facing entrace 4. Imagine the student who talked to you and removed the pulse sensor approaching you on radius 4. Place a mark bisecting radius 4 where you would prefer that student to halt (that is, where you think you would begin to feel uncomfortable with that person's closeness).



Appendix D

Impression Formation Questionnaire

Below there are a number of trait scales. Please rate your impression of the student who talked to you and removed the pulse sensor by circling the appropriate number. Beneath each trait scale is a confidence scale. Use this to rate how confident you are that the student is actually the way you rated her. Please be as frank as possible in your ratings; no one besides the researcher will see them.

COMPLEX	1	2	3	4	5	6	SIMPLE
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
UNSOCIABLE	1	2	3	4	5	6	SOCIABLE
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
STRONG	1	2	3	4	5	6	WEAK
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
SEXUALLY COLD	1	2	3	4	5	6	SEXUALLY WARM
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
SENSITIVE	1	2	3	4	5	6	INSENSITIVE
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
SOPHISTICATED	1	2	3	4	5	6	NAIVE
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
SELF-ASSERTIVE	1	2	3	4	5	6	SUBMISSIVE
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
EGOTISTIC	1	2	3	4	5	6	ALTRUSTIC
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
BORING	1	2	3	4	5	6	INTERESTING
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
CRUEL	1	2	3	4	5	6	KIND
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT

(CONTINUED ON FOLLOWING PAGE)

EXCITING	1	2	3	4	5	6	DULL
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
GENUINE	1	2	3	4	5	6	ARTIFICIAL
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
VAIN	1	2	3	4	5	6	MODEST
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
INDEPENDENT	1	2	3	4	5	6	DEPENDENT
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
SEXUALLY PROHIBITIVE	1	2	3	4	5	6	SEXUALLY PERMISSIVE
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
POISED	1	2	3	4	5	6	AWKWARD
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
RATIONAL	1	2	3	4	5	6	EMOTIONAL
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
SINCERE	1	2	3	4	5	6	INSINCERE
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
SHY	1	2	3	4	5	6	BOLD
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
RESERVED	1	2	3	4	5	6	OUTGOING
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
COMPETITIVE	1	2	3	4	5	6	COOPERATIVE
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
UNCONVENTIONAL	1	2	3	4	5	6	CONVENTIONAL
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
SERIOUS	1	2	3	4	5	6	HUMOROUS
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
CHANGEABLE	1	2	3	4	5	6	STABLE
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
COLD	1	2	3	4	5	6	WARM
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
SUBTLE	1	2	3	4	5	6	OBVIOUS
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT
SOCIALLY INEPT	1	2	3	4	5	6	SOCIALLY ADEPT
NO CONFIDENCE	1	2	3	4	5	6	VERY CONFIDENT

Appendix E

Self-Monitoring Scale

Below are 25 items which may or may not describe how you generally are. Please answer "True" to those statements that you feel describe you and "False" to those statements that do not describe you. If you have any doubt and think that the statement does not apply to you at all, please circle the statement number and then mark "True" or "False" depending on whether it is more true than false or more false than true.

_____ 1. I find it hard to imitate the behavior of other people.

_____ 2. My behavior is usually an expression of my true inner feelings, attitudes, and beliefs.

_____ 3. At parties and social gatherings, I do not attempt to do or say things that others will like.

_____ 4. I can only argue for ideas which I already believe.

_____ 5. I can make impromptu speeches even on topics about which I have little information.

_____ 6. I guess I put on a show to impress or entertain people.

_____ 7. When I am uncertain how to act in a social situation, I look to the behavior of others for cues.

_____ 8. I would probably make a good actor.

_____ 9. I rarely need the advice of my friends to choose movies, books or music.

_____ 10. I sometimes appear to others to be experiencing deeper emotions than I actually am.

_____ 11. I laugh more when I watch comedy with others than when alone.

_____ 12. In a group of people I am rarely the center of attention.

_____ 13. In different situations and with different people, I often act like very different persons.

_____ 14. I am not particularly good at making other people like me.

_____ 15. Even if I am not enjoying myself, I often pretend to be having a good time.

_____ 16. I'm not always the person I appear to be.

_____ 17. I would not change my opinions (or the way that I do things) in order to please someone else or win their favor.

_____ 18. I have considered being an entertainer.

_____ 19. In order to get along and be liked, I tend to be what people expect me to be rather than anything else.

_____ 20. I have never been good at games like charades or improvisational acting.

_____ 21. I have trouble changing my behavior to suit different people and different situations.

_____ 22. At a party I let others keep the jokes and stories going.

_____ 23. I feel a bit awkward in company and do not show up quite so well as I should.

_____ 24. I can look anyone in the eye and tell a lie with a straight face (if for a right end).

_____ 25. I may deceive people by being friendly when I really dislike them.

Appendix F

Informed Consent

I have voluntarily agreed to participate in this study. I understand that the general data gathered will be used as part of a Master of Arts degree thesis, but that individual's participation and performance scores will be kept in confidence. I understand that I will not be harmed in any way.

My heart rate will be measured for a short period of time (about five minutes), and I will be asked to complete three brief questionnaires. I understand that I have the right to withdraw from participation at any time.

Date _____ Name_____

Appendix G

Procedure

Please sit in this chair with both feet on the floor. I am going to place this pulse sensor on your forefinger so that I can monitor your heart rate. There will be no discomfort. I use a gel that softens your fingertip so that the signal comes through better. This cable leads to a recording panel in the next room. This instrument (Biotachometer) is used to confirm that I have a good signal and then will be turned off. Place your arm through this strap. It is not meant to hold your arm down, but merely to remind you not to move. Any movement or speaking will interfere with the recording that I am taking. Is that comfortable? Now I will leave the room so that I can monitor the apparatus which prints out a record of the heart rate. This will take about 5 minutes then we have some questionnaires for you to fill out. OK? Are there any questions? Thanks.

Appendix H

Instructions for the Remainder of the Session

In the drawer to your left are three folders numbered "1", "2", and "3" which contain questionnaires. I would like you to read the instructions printed at the top of the questionnaires and respond to each. Please look at the folders in order: 1, 2, 3. When you have completed all three questionnaires, please bring them out to me.

Thank you,

Ruth Ann Rogers

Appendix I

Session Monologue

Instruction to Confederate:

Enter room, close door, place finger to lips, smile with lips closed. Walk toward subject with facial expression neutral and begin speaking. Place the chair at the predetermined distance. Be careful and don't bump the table or the subject. Speak as you normally would, try to remain as consistent in timing and facial expression as possible.

> Please don't move or speak. As you know, the signal being picked up by the pulse sensor is easily disturbed. Movement or speech appears on the heart rate recording in the next room and will interfere with the recording of heart rate. Ms. Rogers will be happy to show you your heart rate printout. If you are interested in seeing it, there is a sheet posted by her desk in the next room where you can write your name, landrum box and phone number. As soon as the whole experiment is finished, she will contact you and set aside a time when you can come in.
>
> Psychology graduate students who are conducting research and undergraduates in experimental psychology rely on other college students to volunteer as subjects. This study had over 200 volunteers. Most of the students who participate in these studies are interested in the field of psychology even if their major is in business, physical education, or political science. Here at Georgia Southern, there are several psychology graduate students who are either designing, testing, or writing up the results of their projects. Generally, a thesis takes at least two quarters; sometimes as much as a year. Research can be done in a room like this or out in the field. Field studies are slightly more difficult to do correctly because it is hard to keep everything constant in the environment except for the part you are interested in measuring. Here in this room, for example, such things as lighting, temperature, and sound can be held constant and the researcher is able to assume that all subjects in the experiment were exposed to the same level of light, the same degree of temperature, and the same amount of sound or silence.
>
> It takes about 5 minutes for the heart rate to stabilize after you have been moving about. There is also a standing heart rate and resting heart rate.

Resting heart rate requires that the subject be reclining. Heart rate differ for men and women and for adults and children. Children's rate is the fastest heart rate and men have the slowest heart rate. Females within your age range average about 83 beats per minute. As you get older, the heart rate slows somewhat. Heart rate, as well as other physiological measures, has been used in psychological studies for many years. Often the measure is paired with psychological tests or verbal reports. Generally, heart rate measure outside of medical research is pretty unsophisticated. When this part of the session of over, Ms. Rogers has some instructions for the rest of the session. The time should be up about now. Let me remove the pulse sensor and you may slip your arm from the restraining belt. Here are the instructions for the rest of the experiment. Thank you. (Hand instruction sheet, smile as previously described. Leave room and close door.)

Appendix J

Post Session Questionnaire

Subject_____ Date_____

Session Height_____ Session Weight_____

Do you consider yourself overweight or underweight? Yes___ No___

If yes: length of time weight has been a problem _____ Years

_____ Months

Would you describe the student who talked to you as a

Friend Acquaintance Stranger?

Are you enrolled in a psychology class that gives credit for your participation in this study: _____Class _____Instructor