1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

 

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Communication, Joint Creativity and Gender

by

Karen Hicks, B.A.

**Thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfilment of
the requirements for the degree of
Master of Arts**

Department of Psychology

Carleton University

Ottawa, Ontario

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"In comparison with an individual activity, the effectiveness of every joint problem-solving endeavour was higher in our experiments. This finding is not new; it was known to social psychologists long ago. But it should be also noted that social psychology obtains contrary facts as well. The effectiveness of joint activity obviously depends on many factors. Relations of communicators, the way activity is organized, the group structure, etc. should be noted among them. Nevertheless, the data obtained allow us to suggest that formation of a "common fund" of concepts, ideas, methods of problem-solving, i.e., the formation of a kind of interpersonal psychological "community" is a condition which increases effectiveness of activity."
(Lomov, 1979, p.222)

Abstract

A primary purpose of this experiment was to compare joint performance with individual performance on a creative story construction task; as well, gender differences in both attributions to geometrical objects in an animated cartoon and influence in the story construction were examined. One hundred subjects were randomly assigned to be either an experimental Joint Condition (Thirty male/female dyads), or one of two control conditions, Coactive and Alone (10 males and 10 females in each). Subjects viewed the Heider-Simmel film, after which they wrote a story about it and made attributional ratings of the interacting geometrical objects based on the Semantic Differential. They then re-wrote their stories and re-rated the figures, Joint subjects working jointly, Coactive and Alone subjects again working individually. Joint subjects rated themselves and their partners on task and socio-emotional behaviours and influence occurring during the joint task. Other naive subjects later judged the stories' quality.

Although joint stories were judged overall to be more creative than the individual stories within dyads, there were no differences between joint stories and second draft stories of Coactive and Alone condition subjects.

Generally, there were no gender differences in attributions to the figures in the film. However, females changed their ratings significantly more than males,

especially in the Joint and Coactive conditions, indicating that females were more affected by the presence of an opposite sex subject than males were; this was interpreted as involving females' greater perspective-taking.

Males and females did not differ in the amount of task behaviours they were perceived to have contributed; however, males perceived females to exhibit more socio-emotional behaviours than females perceived themselves to make. As anticipated, perceived task behaviours were highly associated with attributed influence and perceived socio-emotional behaviours less so. Males and females did not differ in the amount of influence they had over their partner in the joint rating task, but there was some evidence of males' being more influential in the joint story construction; however, both males and females perceived themselves to have more influence than their partners, which may reflect the self-centered bias.

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Communication, Joint Creativity and Gender

Research on the relation between communication and cognition has taken a different focus in different cultural contexts. In North America, social psychology has focused primarily on the study of the behaviour and mental processes of the individual, to the relative deemphasis of "shared processes". A major American textbook on social psychology of the 1980's still defined the discipline "the scientific study of personal and situational factors that affect individual social behaviour" (Shaver, 1987, p.2). The study of communication, its processes and its influence on the cognitions of the persons involved in joint activity receives relatively little attention in North America.

Soviet social psychology stood in striking contrast (Strickland, 1984). In the USSR, social psychology's emphasis lay not with the individual but with society, social groups, and "joint mental processes" and in these contexts communication has been a main concern (Strickland, Lockwood & Trusov, 1986). Communication (obshchenie) is one of the basic principles of analysis of Soviet social Psychology (Lomov & Kol'tsova, 1984). Soviet social psychologists argue that the development of a person as a social being occurs not only through her own activity or through passive reception of instructions from others, but through active communication with other people. Communication was viewed by the Soviets as being an

undetachable part of human life (Lomov, 1979) because the communication process influences and changes people's mental processes themselves. It is not merely a quantitative influence whereby "two heads are better than one", two people having more ideas than one; rather, it is a qualitative influence in that the dynamics of the mental processes are changed through communication (Lomov & Kol'tsova, 1984). Communication does not just allow for more ideas to be contributed, it causes the participants to analyze their ideas differently than they would if working alone. Because of the Soviet's emphasis on joint communication processes, some of their research in this domain will be discussed.

Research on Communication in the Soviet Union

A significant person in the development of Russian psychology was the prominent scientist, V. M. Bekhterev. He was one of the first to attempt a scientific study of social psychological phenomena, making extensive use of experimental methods, and insisting on an objective approach to the study of mental phenomena through studying behaviour accessible for observation and recording. He was particularly interested in suggestibility and the influence of one person on another. During the late 1800's and early 1900's he conducted many experiments on the study of various forms of collective activity as compared to individual effort. He was one of the first in the world to initiate

research into the problem of communication and to devise methods for its experimental study (Budilova, 1979).

Bekhterev applied his tests on collective activity to many areas, such as collective reproduction of details and observations, collective moral attitudes toward behaviour, collective creative ability, and the influence of the individual personality on the collective attitude towards an object. All his experimental tests follow the general format of: (1) individual descriptions, (2) collective discussion, and lastly (3) individual revision (Bekhterev, 1924, Moran translation).

For example, one of his studies examined the effects of joint communication and memory (Bekhterev, 1924). A stimulus picture was shown to a group for 20 seconds and then removed. Each individual recorded what they saw and the best judgment (most correct recalled, least errors) was read aloud and an oral collective discussion took place. All subjects then revised their own account, writing down any possible deviations in their original opinion. Bekhterev then recorded the number correct and incorrect again and noted which individuals were helped or hindered by working in the collective and how, finding that, generally, individual efforts are improved through communication.

He found that the collective can exert a definite influence on individual judgment. The accuracy of responses increases. He concludes that "the individual personality

gains in the collective and is enriched, since it produces many more details more precisely than would be individually possible without participating in the collective. Even those who could produce almost nothing produced more correct details after the discussion" (Bekhterev 1924, p.22).

He believed that collective activity possessed a certain superiority over individual activity and states that what the collective can reproduce certainly represents a quantitative gain and, to a certain extent, a qualitative gain. Bekhterev (1924) says: "In our tests, by working out and solving a general problem, the collective demonstrates itself as a positive factor, criticizing individual opinions, rejecting all extremes, and even stopping at an individual suggestion, if that suggestion fully conforms to the problem's purpose" (p.37). Furthermore, "...the best individual expressions are supported and pushed forward prominently. Conversely the incorrect and erroneous efforts of individual persons are completely rejected or improved to a greater or lesser degree... the final result of collective activity appears more or less consistent and undoubtedly gains in comparison with the mutually contrary activity of the persons constituting the collective" (p.39).

Until recently, the work of Bekhterev has been carried on by Soviet social psychologists like Lomov (Lomov, 1979; Lomov & Kol'tsova, 1984). This was the major research activity of the social psychology unit at the USSR Academy

of Sciences. Lomov studied the effects of communication in dyadic groups, how it regulates subjects' activity, i.e., goal-directed behaviour. Lomov presents us with the notion that the nature of the mental processes are determined by the person's activity, particularly when the activity involves communication. He describes results from several sets of exploratory studies, wherein he examined different strategies for the solution of three different types of task, under conditions of individual or joint effort. The qualitative change that communication causes in mental processes is evident in the studies by Lomov.

For example, Lomov (1979) has studied recall by adult subjects of narrative poetry they had learned as youths. He compared recall of the poem by one individual with recall by communicating pairs of subjects, and he described a joint strategy that is more emotional and effective than the individual effort. With individual reproduction, Lomov noted that subjects would often be able to reproduce exactly the beginning and sometimes the end of the poem. He also noted substitution and transposition of words and the substitution of a verbatim account of a passage with a summary of its meaning. With the joint effort, exact reproduction was more evident throughout the poem as subjects used mutual correction and joint search strategies for remembering forgotten words and phrases. Lomov noted that in the joint reproduction, subjects tried harder, not

giving up as quickly, and they were more confident of their accuracy. Communication also changed the search strategy for forgotten words to one that was more effective. Subjects working in dyads were able to reproduce a significantly greater portion of the poem as compared to subjects working individually (Lomov, 1979).

Lomov replicated the work of Bekhterev. In sum, his studies show that communication increases accuracy and effectiveness and produces greater motivation and feedback, which increases performance. The number of correct responses in joint activity is greater than the sum of the individual contributions, and the experience is judged more positively under joint conditions than in the individual condition. Lomov concludes that communication influences mental processes and suggests it may affect the basic sensory unit as well.

More recently, Lomov and Kol'tsova (1984) have referred to results confirming the superiority of learning under conditions of communication.

Western Research on Communication

The results of such Soviet research on the effects of communication have sparked an interest in the U.K. and Canada. Many of the studies following this line of inquiry investigate the effects of joint communication on memory, but many of the conclusions apply to the effects of communication on performance in general.

Johnston and Strickland (1985) examined the performance on a task of joint recall of a vivid, affect-laden passage and a factual passage under conditions of face-to-face interaction or audio only. They found that face-to-face recall gave better results over both passages, suggesting that face-to-face interaction somehow generally supports enhanced recall in a joint-recall task.

Hinsz (1990) found that in a recognition memory task, groups have better memory than individuals; two heads are indeed better than one (Stephenson et al., 1983). This is not surprising since groups have a greater pool of information to draw upon. What is interesting is the finding that the actual process of memory recall changes when in an interacting group. Group communication led to more effective decision making and better judgments. Groups had more correct responses and less errors, and greater confidence, but had more implication errors and tended to exaggerate the response pattern (similar to polarization effects). Stephenson et al. (1986) studied individual and collaborative recall in a simulated police interrogation, and discovered that individuals expressed more sentiment, attributed motives more and also gave more reconstructions than dyads or groups, processes which detracted from recall accuracy. Dyads and groups gave more complete, concise and similar accounts, having reached consensus as to what to leave in.

Recently, Edwards and Middleton (1986, 1987) have offered some novel research and theorizing on collective memory and discourse. They stress the importance of natural discourse as a vehicle for bridging the gap between the individual and the social, and like the Soviets they emphasize the social nature of mentality. Following the work of Bartlett (1932), they argue that we are inherently social beings, that our mind works in ways to organize material so as to best adapt to a social world, and that the royal road to an understanding of ordinary mentality and its social basis is via the study of everyday discourse. They suspect that the social nature of mental activity might be best revealed through joint interactive communication. When performing some task like remembering, what takes precedence is what is important to the person, what is significant and needs to be communicated, as opposed to accurate representations.

In a task such as recalling a story, communicative joint efforts are influencing what is recalled (Edwards and Middleton, 1986). Edwards and Middleton (1986) believe that remembering and relating a story to someone else is like inventing one's own story; subjects are not just relating the story but rewriting it: it is a communicative transaction that is governed by discourse conventions. Differences between individual and joint efforts could be the result of embellishments, inferences and conventions

made in discourse. They found that in joint written accounts there were more reconstructions and omissions of irrelevant detail, more continuity and coherence, and additions and paraphrases to make sense of the story. Communication allows for personal opinion and restructuring to enter, and judgments and influences are more likely to take place.

A variety of processes occurring in joint tasks in general can be derived from the studies by Edwards and Middleton (1986). Participants define and frame the task, locating themselves and their views within it. With participants oriented within a sequential narrative which has reached a certain point, individual contributions may be challenged, agreed upon, rejected or relocated in the narrative. This is a social process in which individual perspectives become ratified as joint perspectives, and is subject to social influence and negotiation as mutual understanding and a consensus of events is made.

Many of the studies comparing group and individual performance do not include control groups that perform individually in all tasks. Typically, subjects perform first as individuals then as dyads or groups. Is there something inherent in communication and shared activity that produces qualitative differences in mental processes and the task product? Perhaps it is having a second opportunity at a task (practice effect) that leads to improvement in joint

activity over tasks done alone. It is also possible that subjects' activity changes as a function of the presence of others. If subjects working individually are instructed to act as if they are working with someone else, would their performance be like that of those working jointly? Aboud, in response to Lomov (1979) raised this issue, when she asked: "I wonder if you would get the same results if you made the people think by themselves the way they are thinking with the group. So, if they were doing the task by themselves, make them verbalize, or make them draw the picture as if they were drawing it for someone else." (p.224).

Individual vs Group Creativity

If there is something inherent in joint activity that produces qualitatively superior results, does this hold for all joint tasks? Perhaps with creative tasks this finding is not as apparent as with other types of tasks on which this research has primarily focused, primarily, memory tasks. One can readily see why memory would be enhanced by the effects of joint activity and how different strategies and mental processes may be utilized: a recollection is correct or incorrect, subjects can correct each other and use joint search strategies to remember forgotten words and phrases. However, with a creative task, such as composing a story about ambiguous stimuli, two opposing hypotheses about the effects of joint activity are plausible.

First, we might find that creative tasks may be comparable to other joint activity tasks, resulting in superior joint activity compared to the individual. Perhaps subjects will be able to produce more ideas jointly, and be more creative.

On the other hand, performance on the creative task may be hindered by joint activity, as is found with research on brainstorming which compares the individual to a group. Taylor (1958), compared individuals' to four person groups' performance on a brainstorming task. He found that while interacting groups generated ideas in a ratio of 2:1 over individuals, when those individuals were randomly combined into statistical aggregates and redundant ideas discarded, these "statisticized groups" did far better than the real groups, producing 68 novel ideas as compared to 37. Furthermore, content analysis revealed superior quality in the statistical groups in comparison to members of the interacting groups. Brown (1988) concludes that brainstorming is actually more beneficial when carried out individually, then as a group discussion. Bekhterev (1923) himself reports that the more intelligent/creative the individual, the more he/she is hindered by working in a collective, and is best left to work alone.

Diehl & Stroebe (1987), in reviewing research comparing individual and group performance on brainstorming, indicated that 17 out of the 21 studies they reviewed found the

performance of nominal (statistical) groups superior to that of real groups. Interestingly, the remaining four studies (Cohen, Whitmyre & Funk, 1960; Pape & Bolle, 1984; Torrance, 1970, Experiments 1, 2), all involving two-person groups, found no difference. This suggests that the productivity loss found in brainstorming groups may not be as evident in joint task performance.

Diehl & Stroebe (1987) discussed and tested three interpretations for productivity loss in brainstorming groups, which would further lead one to suppose that dyadic reasoning would not fair as poorly to that of groups. The first interpretation is production blocking, whereby it is argued (Lamm & Trommsdorf, 1973; as cited by Diehl & Stroebe, 1987) that the cause of group inferiority is the rule that only one group member speaks at a time, presumably causing delays in each member's opportunity to speak. The second interpretation mentioned is "free-riding", a variety of social loafing (Latane, Williams & Harkins, 1979) in which members of a group are less motivated because other members are also contributing and they expect their ideas to be pooled (lowering identifiability of individual contributions), therefore producing less than they would as individuals. Also contributing to group members' tendencies to free-ride is members' feelings that their contributions are dispensable. Diehl & Stroebe (1987) cite Harkins & Petty's (1982) finding that an increase in dispensability

lowered brainstorming productivity. The third interpretation discussed by Diehl & Stroebe (1987) involves evaluation apprehension; they propose that the fear of negative evaluations from other group members prevents subjects working in groups from presenting more original ideas. Diehl & Stroebe (1987), in comparing the three interpretations empirically, found that evaluation apprehension is not responsible for the productivity loss in brainstorming groups. Free-riding accounted for less than one tenth of the variance, and the authors suggested that it can only be a minor cause of the productivity loss in brainstorming groups. The one interpretation most strongly supported by their data was production blocking. They give an interpretation of blocking in terms of motivational processes, integrating both production blocking and social loafing interpretations. They suggest that individuals feel obligated to continue the task for the entire allotted time, whereas group members can relax and let others do the talking. Diehl & Stroebe indicated that both production blocking and social loafing would be more apparent with increasing group size; therefore, we can expect detrimental effects of group problem solving to be minimized in joint activity as compared with larger interacting groups. Also, the fact that subjects in joint activity must "work together" to produce a joint solution might prevent them from considering each other social threats.

In conclusion, it appears that the study of communication and joint activity is an important area of study in social psychology, one that gives insight into the social nature of human cognition beyond what a focus on the individual can provide, and needs to be addressed to a greater extent than heretofore. The present study hopes to clarify the consequences of joint communication and joint task construction and will go beyond mere memory, focusing on joint activity in a creative task. In addition, greater experimental control will be gained by the inclusion of control groups whose members complete the experimental tasks as individuals only. Also, individual factors which may affect the joint task activity, such as the gender of the participants and their level of influence, will be examined.

Gender Differences in Interaction Style

The study of group dynamics and joint communication has long been used by Soviet social psychologists, and increasingly by North Americans, to provide a different means by which to analyze the mental processes that occur within people. However little research has been devoted to the role that gender of the communicating parties plays in these processes. An interesting social psychological question is how the gender make-up of a group affects the communication that occurs within it.

Researchers have demonstrated that gender does have an effect on group interaction. Studies examining gender

differences in interaction style have typically used Bales' (1950, 1970) method for analyzing contributions to group discussion, which utilizes categorizes of task and socio-emotional behaviours. In these studies, women generally exhibit greater amounts of agreement and other positive social behaviours, such as relieving group tension; in contrast, men engage in greater amounts of disagreements and task behaviours, such as giving opinions, suggestions and directions (Piliavin & Martin, 1978; Mabry, 1985).

One explanation for this difference is in terms of status expectations. Berger, Cohen, and Zelditch (1972) argue that status associations are involved in the organization of social interaction; gender can act as a diffuse status characteristic from which a number of assumptions about sex-related characteristics are inferred. Men, generally, have higher status than women in society. High status group members are believed to be more competent and will generally be expected to take the opportunity to perform more task-related contributions to the group discussion, will receive more expressions of approval and agreement, emerge more often as leaders, and have more influence. (Bales, 1950; Berger, Cohen, & Zelditch, 1972; Meeker & Weitzel-O'Neil, 1977).

Competitive or dominating behaviour is legitimate for men and other high status group members but is illegitimate for low status members and women (Meeker & Weitzel-O'Neil,

1977). If information is provided a priori about members' competence, performance expectations are established on that information rather than on external status cues such as sex (Wood & Karten, 1986), and gender differences disappear.

Gender differences in positive social behaviour have also been linked to status. It has been suggested that women may try to gain acceptance from other group members by engaging in high amounts of positive social behaviour, and that such behaviour may communicate to others that female members are not competing for status but are simply trying to help the group achieve its goals (Meeker & Weitzel-O'Neil, 1977; Ridgeway, 1978).

The status explanation suggests that gender differences would be larger in mixed-sex groups than in same-sex interactions. However, gender differences in interaction style may be larger in same-sex groups under some circumstances. Same-sex groups have been found to evidence more stereotypic behaviours than mixed-sex ones. Women tend to be particularly social and emotional in interactions with other women and men least so in interactions with other men. Women exhibit more positive socio-emotional behaviour than men in same-sex groups; in mixed-sex groups, both men and women behave more like members of the opposite sex (Carli, 1989; Piliavin & Martin, 1978). It appears, then, that different norms do operate in same-sex interactions than in mixed-sex interactions, and that these norms lead to a

pattern of behaviour that is most social in groups of women and least social in groups of men. It is likely that different schemas and expectancies are associated with same-sex interactions than with mixed-sex interactions.

Eagly's (1987) theory emphasizes gender roles and the gender typing of the task-oriented and socially oriented behaviours that follow from these roles. Societal gender roles, which are those shared expectations that apply to individuals solely on the basis of their socially identified sex, lead people to have different expectations for men's and women's attributes and social behaviour. There is a tendency for people to behave consistently with expectations (see Darley & Fazio, 1980, for a review of research on the "self-fulfilling prophesy"). The mere fact that others are known to hold gender-stereotypic expectations for behaviour fosters the usual task-social specializations of male and female behaviour. Because gender belief systems (Deaux & Kite, 1987), which are sets of beliefs people hold about behaviours of men and women, typically include the stereotype that women are more social and expressive than men, subjects may expect a high amount of social-emotional behaviour among women and very little in interactions among men; these expectancies may be self-fulfilling.

Subjects may have clear expectations about how men and women ought to behave in same-sex groups and may interact in such groups in a way that is consistent with their

stereotype. They may be less sure about the appropriate norms for certain mixed-sex groups and may exhibit behaviour similar to what they expect from their partner. Clearly, as Carli (1989) shows, the gender of the other group members is an important determinant of a person's behaviour. She believes another possible reason that gender differences may be larger in same-sex than in mixed-sex groups is that once subjects start interacting they are likely to model the behaviours of the other group members, thus exaggerating the gender differences in same-sex groups and reducing these differences in mixed-sex groups. Indeed, Carli (1989) found that the sex of the other dyad member determined the style of interaction. Subjects showed more agreement and positive social behaviour when paired with a woman and more disagreement and task behaviour when paired with a man. In same-sex groups females displayed more positive social behaviour and men displayed significantly more task behaviours and disagreements.

Consistent with recent findings of decreased stereotypic behaviour in mixed-sex groups are the results of Bayer (1989), who also manipulated the number of males and females in the mixed-sex groups. She investigated group interactions for 4 person groups of either female majority, male majority, all male or all female, or balanced groups. She had subjects rate group members' interactions on the amount of talking, task-directed behaviour, best ideas, and

concern for group feelings. Although males were rated higher than females on talkativeness, task-direction, and best ideas for both female majority and male majority groups, there were negligible differences between males and females in the balanced groups on these task behaviour items. For the socio-emotional measure, concern for group feelings, however, females received higher ratings than males in all mixed-group compositions.

Gender Differences in Influence

Researchers investigating gender differences in social influence have often reported that women are more easily influenced and less influential than men (Eagly, 1978). Yet Eagly (1978) when examining this research, pointed out that these experiments used topics of little interest to women, or that the conformity was superficial as it was the result of women agreeing in order to relieve tension and preserve social harmony of the group, rather than being a real attitude change. Although there is equivocal evidence to support the notion that men are more influential (Eagly, 1978), a meta-analytic review by Eagly & Carli (1981) has shown that women are more easily influenced. Also, Bayer (1989) found that males exerted more influence than females and were regarded as more influential.

It is likely that behaviours that are either stereotypically feminine or masculine may have an effect on influence. The extent to which a person makes task

contributions and agreement and other positive social behaviour should be positively associated with his or her ability to influence (Carli, 1989). Those who contribute many task behaviours are likely to be considered experts (Bales, 1950) and often emerge as leaders (Eagly 1991). Agreement and other positive social behaviours should communicate an altruistic desire to help the group, and thereby increase a group member's ability to influence others (Meeker & Weitzel-O'Neil, 1977; Ridgeway, 1978). These behaviours may be most effective when the influence agent is of low status, such as a woman attempting to influence a man (Meeker & Weitzel-O'Neil, 1977; Ridgeway, 1978). Women tend to use indirect approaches to influence such as expressing agreement and other positive social behaviour; men often use more direct approaches, such as presenting many arguments or task contributions to support one's own opinion and expressing disagreement with the other's position (Carli, 1989). In mixed-sex dyads, where sex acts as a status clue, females being of lower status may not act too dominantly or assertively since such actions may be construed as an attempt to gain status in the group and risks rejection by group, instead engaging in positive social behaviour (Meeker & Weitzel-O'Neil, 1977). In same-sex groups sex does not serve as a diffuse status characteristic, conveying no information about ability or competence. This suggests that in mixed-sex but not same-

sex groups, women would be given fewer opportunities to make task contributions, would receive less support for their contributions, and be less influential than men. Typically, interactions considered indicative of task-directed contributions (opinions, suggestions, talkativeness) or offering the best ideas are associated with greater influence; interactions representative of positive social-emotional behaviour (agreement, tension releasers, solidarity) or the asking of questions are related to lesser influence (e.g., Bales, 1950, 1970; Bayer, 1989; Carli, 1989). Since men are more apt to interact in a direct task orientation and women in a more indirect socio-emotional way, we would expect men to have more influence than women.

Looking at the relationship between interaction styles, gender identity, and influence, Jose & McCarthy (1988) found that group members high in masculinity were seen by other group members as more talkative and contributing the best ideas. Women and group members with high femininity scores were viewed as being more concerned with group feelings and harmony.

Carli (1989) found only one positive social behaviour - agreement - was related to attributed influence. Contrary to expectation, women did not increase stereotypic feminine behaviour to induce influence on the partner. Rather, both men and women increased stereotypic masculine behaviour in the form of task behaviours and disagreements and decreased

stereotypic female agreements when attempting to influence the partner. Therefore men and women did not actually differ in influence strategy.

What may be operational is the sex composition of the group, which affects interaction style, which in turn may lead to gender differences in influence. Carli (1990) found that women who spoke tentatively were more influential with male partners and less influential with female subjects than those who spoke assertively. Male speakers were equally influential in each condition. Females who spoke tentatively were actually more influential to male audience even though considered less knowledgeable and competent than women speaking assertively.

Carli (1989) observed that although women were more easily influenced than men, this effect was mediated by the partner's behaviour. It was the sex of the partner which determined the style of interaction for the influencer. Subjects attempting to influence a male partner disagreed more than when trying to influence a female partner. Carli concluded that research tends to positively associate influence with the number of agreements made and this creates the stereotype that women are more easily influenced than men.

Another factor mediating the type of influence strategy used and gender differences in influenceability is the type of task. Eagly (1991) acknowledges that if positive social

activities become especially important to the group's success, then women might emerge as leaders more often because of their greater attention to group morale and positive interpersonal relations. According to Mabry (1985), variations in task structure and group composition differentially affect the amount of task and social-emotional behaviours. The level of influence for men and women also should depend on the extent to which successful completion of the groups task requires complex social activity. Tasks such as getting acquainted with other group members or solving a relatively unstructured interpersonal problem may be facilitated by high levels of social activity. Women's positive social activities will presumably become relevant for tasks requiring extensive sharing of ideas (Wood, 1987).

The present experiment involves a joint creative task, to be performed in male/female dyads, which depends on the mutual agreement of the partners. This agreement may cause a stronger need for positive social orientation, which may affect the level of influence by women.

Basic Research in the Attribution of Causality

Heider and Simmel's (1944) classic experimental study of "apparent behaviour" employed a film depicting movements of animated geometric shapes (a large triangle, a small triangle, and a circle), to examine the processes of perception of causes of movement and to demonstrate that

similar processes might be involved in the perception of other human beings. The film was produced to elicit attributions of causality, and the study linked cause-effect attributions to movement-contact combinations of the geometrical objects. Michotte (1963) also convincingly linked specific cause-effect attributions to movement-contact combinations. In his experiments, he found that various combinations of essential variables led to a number of qualitatively different "causal impressions". For example, under one stimulus combination, subjects reported an "entraining effect" (the reactive object is pushed or joined to the active object); under another, they reported a "launching effect" (the active object appears to bump against or collide with the reactive object).

In Heider and Simmel's (1944) study, the subjects were requested to interpret the film by writing down what happened in the film and were asked various questions concerning the three figures. Heider and Simmel (1944) found that the majority of subjects interpreted the movements of the objects as actions of animate beings, attributing human and social motives to them, and they constructed a unified story and central theme by referring to the causes of events as seen in the picture. This finding has been replicated in many different contexts (Allinsmith, 1949; Dagenais, 1989; Greenberg and Strickland, 1973; Oatley and Yuill, 1985; Weber, 1962). These

researchers also found that there were many commonalities in the attributions made about the three figures: most saw the big triangle as male, aggressive, villainous, strong, and forceful; the little triangle as male, heroic, brave, tricky, and protective; and the circle as female, dependent, and fearful.

Greenberg and Strickland (1973) confirmed Heider's conclusion that people often attribute, in a coherent manner, characteristics normally appropriate for social stimuli. They replicated Heider & Simmel (1944) eliciting Semantic Differential ratings from subjects instead of descriptive stories to measure attributional styles, in order to obtain data which could be more readily analyzed statistically. The dependent variable was defined in terms of the evaluative, activity, and potency "dimensions of meaning" from Osgood (1952). Their results supported those of Heider and Simmel (1944), i.e., the qualitative ascriptions correspond with the ways in which Heider and Simmel's subjects describe the objects in their essays. They found that the large triangle was seen as most active, the strongest, and the least good character of the three. The small triangle was seen as moderately active and strong, significantly more so than the circle. The latter figures were located on the good side of the evaluative cluster.

Greenberg and Strickland (1973) suggested that the use of stimuli such as the animated figures used by Heider and

Simmel (1944) offer the advantage of a good projective test combined with total control over stimulus properties and could offer useful information for further study of the problem of person-perception. However, one difficulty with this method was that although their study provided useful information which was readily analyzed in conceptually replicating the findings of Heider and Simmel (1944), they admittedly lost some of the richness of the information provided by the anecdotal style of the latter study by the use of rating scales in place of the freely written, descriptive "stories". The present study employs both measures in order to keep the rich descriptive material found in the stories (which allows the best comparison of individual and joint communication processes) as well as having a more objective measure found in the rating scale.

Sex Difference Research of the Heider-Simmel Film

There does indeed seem to be some agreement among investigators about the types of attributions made by subjects when viewing the film. However it would be interesting to establish conclusively whether or not males and females differ in these common attributions, reflecting gender differences in perception and attribution in general, e.g., would one see sex-role stereotyping and norms influencing attributions? Greenberg and Strickland (1973) included the subject sex as a variable to examine the possible male-female sex differences in attributional style,

but they found only weak evidence of a main effect for subjects' sex ($p < .10$).

Allinsmith (1949) saw sex as an important factor in social perception. He stated that the film points at subjects' needs and identifications. He compared Princeton male and Smith female students' social attributions to the objects in the Heider-Simmel film, believing that differences found might give a clue as to sex differences among the college students sampled. He found that most subjects saw the story as connected and interpreted the actions of the figures as actions of persons, mentioning T and t fighting, chasing, etc. Allinsmith suggested that perhaps men as a group tended to give more concrete descriptors. He found a large difference between males and females, in that virtually all girls reported T's attempt to get out of the "house" (a box, of which one side "opened"), whereas only 1/5 males report this. He found most subjects of both sexes perceived T and t as males and c as female, most perceive T as evil or aggressive and saw t and c as lovers or hero and heroine. He suggested that females would identify with c, males with t and that females would be more aware of T as a threat.

Weber (1962) looked for sex differences in subjects' attributions to the "characters" in the Heider-Simmel film when comparing Dartmouth college males and Mary Hitchcock female nurses. He upheld Allinsmith's conclusions, finding

that the degree of personification was greater for the female groups than in the male groups.

A few studies have investigated gender differences in the Heider-Simmel film in terms of the presence of "care" vs "justice", (Gilligan, 1982). Gilligan (1987) asserts that men and women take different moral perspectives on social events, those of caring and justice. The caring perspective speaks of values of interdependence, interpersonal attachments, responsiveness communication and connection, stressing the relatedness of individuals; the justice perspective speaks of values of equality, reciprocity and rights in terms of duties and obligations, construes people as standing alone and differentiated, and sees the self as separate and objective (Gilligan, 1982). The two perspectives are neither opposite to nor complementary. While a justice perspective is most often associated with males and a care perspective with females, they are viewed as gender-related rather than gender dependent (Gilligan 1987). Gender does not determine which perspective a person will use but, along with situational variables, it does appear to play a role.

Dagenais (1989) investigated sex differences in the level of integrative complexity of causal attributions in response to the Heider-Simmel film. She hypothesized that females would create more integratively complex stories than males, since the predominately female care perspective

stresses the relatedness between individuals and communication as well as attachments; in contrast, the typically male justice perspective sees people as standing alone, differentiated. She did not find any significant differences between males and females for integrative complexity in stories, but did find significant differences in themes of caring vs justice based on Gilligan (1982), with females expressing a greater care orientation and males expressing a greater justice orientation in their stories.

Whalen (1991) also used the Heider-Simmel film to investigate gender differences in attributions in terms of themes of care and justice and found that males' stories contained significantly more justice themes than females' and females' significantly more care themes than males', as judged by naive raters. Whalen also found that naive judges were able to correctly guess the gender of the author of the stories at better than chance accuracy.

These last two honours thesis studies had certain weaknesses; the present study was intended to expand on the tentatively observed gender differences found in the subjects' attributions of the Heider-Simmel film.

General Hypotheses

A. Effects of Communication and Joint Task Performance.

Two contradictory hypotheses about the effects of joint activity appear plausible. The creative story writing task (which also has a memory component to it) may be comparable

to other joint activity tasks, resulting in superior joint activity indexes compared to individual. If so, joint stories should be more creative, accurate, complete, and concise than individual stories (Lomov, 1979; Stephenson et al., 1986). On the other hand, the creative task may be hindered by joint activity, as is found with research on brainstorming comparing individual and group performance (Diehl & Stroebe, 1987). Although the majority of this research has found nominal groups to be superior to interacting groups in performance, studies of two-person groups found brainstorming groups' and nominal groups' performance to be equivalent; therefore, there may be no difference between joint and individual creativity.

If the individual members of the dyad agree on a story or adjective label before discussion (e.g., "the big triangle is violent"), this evaluation may be exaggerated during the joint task, because of the effects of collaboration and greater confidence found in groups (Hinsz, 1990). This resembles the more extreme responses witnessed in the choice shift research and polarization effects (for a review on the polarization effect, see Brown 1988, p.142-158). If the individuals in the dyad initially disagree as to the theme of the story or what adjective labels best describe the figures, they may later, during joint communication, converge in their opinions reaching a common middle ground, or influence attempts will be made (Back,

1951; Edwards & Middleton, 1986).

B. Effects of Gender

It is hypothesized that subjects will make differential attributions to the large triangle, the small triangle and the circle, consistent with Greenberg & Strickland (1973). It was further hypothesized that there would be gender differences in these attributions (weakly supported by Greenberg & Strickland, 1973).

Research supports two opposing hypotheses for the amount of task and socio-emotional behaviours males and females exhibit. Males may exhibit more stereotypically feminine behaviour when interacting with women and females more stereotypically masculine behaviours when interacting with men (Carli, 1989). Subjects in these mix-sex conditions may converge, acting more like their opposite sex partner. Since men and women are expected to behave more similarly when in mixed pairs, gender differences in influence strategy (male-task, female-social) may not be observed. On the other hand we might expect gender stereotypes to come into play simply by having two subjects of different sex in the experiment. The interaction of the two sexes may make their individual gender group membership salient, causing them to act in the in-group normative ways to which they identify. Hence gender stereotypes will be prevalent. Also, subjects may act according to the gender stereotype they may feel is expected from them, making those

expectations self-fulfilling. Stories of subjects will reflect their needs and affective reactions, not the accurate recall of inanimate movements, but a personified account that communicates what is significant for them. Joint communication will reflect the needs and attitudes of the subjects (Edwards & Middleton, 1986); therefore, gender stereotypes and norms should come to the forefront.

The extent to which a subject is influenced by his/her partner should be positively correlated with the dyad member's use of task behaviours and positive social behaviours (Carli, 1989). Perhaps task behaviours will be more associated with influence and men will have more influence (Meeker & Weitzel-O'Neil, 1977). However, the level of influence for men and women should also depend on the extent to which successful completion of the group's task requires complex social activity (Mabry, 1985; Wood, 1987). The present experiment requires mutual agreement of the partners, suggesting a stronger need for positive social orientation, which may affect the level of influence by women. There should be a positive correlation between subjects' perceptions of influence in their subjective ratings of one another and actual influence (whose story and adjective rating is most accepted).

Method

Subjects

One hundred undergraduate students, 50 males and 50 females with a mean age of 21.4 years, volunteered to participate in the experiment in order to receive one credit toward their 49.100 Introductory Psychology course (see appendix A-1 for recruiting announcement). Sixty experimental subjects were randomly assigned to one of thirty mixed-sex dyads (Joint condition). Twenty subjects were randomly assigned to a control group that completed the task alone with a person of the opposite sex in the room (Coactive condition), and another twenty subjects were randomly assigned to another control group in which subjects completed the task alone with no one else in the room except the experimenter (Alone condition). In the second phase of the experiment, 14 males and 14 females with a mean age of 20.8 years were recruited to make judgements on the stories that subjects wrote (see Appendix B-1 for recruiting announcements).

Materials

Materials are presented in Appendixes A and B.

Stimulus

The test stimulus was a videotape of the animated film by Heider and Simmel (1944) which depicts movements of animated geometric shapes. The tape was approximately 2 1/2 minutes in duration shown at standard speed. It was

comprised of three geometrical figures: a large triangle (T), a small triangle (t), and a circle (c), which moved at various directions and at various speeds. The other figure was a large rectangle of which a part of one side opens and closes, like a door.

Procedure

Experimental group

Pairs of students were met by a female experimenter. They were given written instructions that they would be viewing a short, 2 1/2 minute film in which there are three characters: a large triangle (T), a small triangle (t), and a circle (c). They were informed before viewing the film that they would be required to write a short story about what happened in the picture and to rate the three figures on a number of adjective pairs first alone, then jointly (See Appendix A-2). The experimenter then asked the students to provide their signed, informed consent to participate in the study (A3).

The subjects then viewed the Heider and Simmel (1944) film. After the film they were told to turn to the next page of their handbook (A4). The instructions requested the subjects to give a brief account of what happened in the film. The subjects were told to take approximately 5 minutes to do this.

Upon completing their stories, the students then were asked to rate the large triangle (T), the small triangle (t)

and the circle (c) on fifteen bipolar adjective pairs taken from the Semantic Differential (A5-A6). For each figure the 15 adjectives appeared on a single page. Following Greenberg and Strickland (1973), the order of presentation, left-right positions of these bipolar items, and the order in which T, t, and c were evaluated, was randomized across subjects. The subjects were instructed to check the position on the scale that best represented the direction and intensity of their judgement.¹

The subjects then were asked to come together to work as a pair. They were told to turn to the next page of the handbook which instructed them to work together and write a joint story about the events of the film (A7). They were given up to 15 minutes to do this. Upon completion, they then were asked to rate jointly the three figures on the 15 adjective pairs (A8). The joint efforts were recorded by one subject (voluntarily or as delegated by the partner) on a separate sheet of paper provided by the experimenter.

They then were asked to return to their individual seats and answer the questionnaire (A9-A18) in which they rated themselves and their partner on indexes tapping subjects' perceptions of task and socio-emotional contributions and amount of influence. They were also asked to indicate how difficult they found the story writing task, and how they related to the three figures on scales from 1-7 and lastly, to try to describe the process they went through

in accomplishing the joint task.

At the end of the session, the students were debriefed about the nature of the study (A21-22), and thanked for their participation.

Control Groups

Forty subjects were randomly assigned to two control groups that completed the story writing and rating tasks alone both the first and second times. Ten male/female pairs were met by the experimenter and completed the tasks individually with the opposite-sexed subject in the room with them (Coactive condition). Ten males and ten females were met by the experimenter, and participated working alone, with no one other than the experimenter in the room (Alone condition). The control subjects were given exactly the same instruction as the experimental group, except that instead of working as a pair when doing the tasks a second time, they were asked to simply rewrite their story (A19) and re-rate the figures (A20). Before doing the tasks the second time, the subjects working coactively with a person of the opposite sex in the room were given the added verbal instruction to "consider that there is another person of the opposite sex working with you". They were then debriefed about the nature of the experiment (A21-22).

Judging The Stories

In order to search for qualitative differences in the stories subjects wrote, other subjects, 14 males and 14

females, also selected from introductory psychology classes, were recruited to read the subjects' stories and make judgments about them. They too gained 1 experimental credit for their participation.

The judges were greeted by a female experimenter as a group (3-4), given a written account of the nature of the study and instructions detailing their judgment task (See Appendix B-2), after which they gave their informed consent (B3). They then viewed the Heider-Simmel film and made their judgments. One group of 3 subjects judged the stories that subjects in the Joint (experimental) condition wrote. They were presented with 10 sets of 3 stories to read (the individual male and female and joint story in the dyad). They were asked to: (1) rate (blind) the similarity of the individual male and female stories to the joint story, (2) rate the quality of the stories, and (3) guess the gender of the author (B4-B5). Another group of 4 subjects judged the stories subjects in the Alone and Coactive (control) conditions wrote. They each read 10 pairs of stories (individuals' first and second stories) for which they were asked to: (1) rate the similarity of the two stories, (2) rate their quality, and (3) guess the gender of the author (B6, B7). Judges were then debriefed about the nature of the study and thanked for their participation (B8-B9). These groups were recruited four times, each story being rated 4 times, twice by males and twice by females.

Dependent measures

A. The main measure of influence was a brief questionnaire subjects completed after the experiment (Appendix A 9-18). It concerned members' perceptions of their own and other's participation during the discussion and was designed to reveal the subjects' attributions of self and other on task and social-emotional orientations (Bales, 1950) and the level of influence. The subjects rated self and other on 7-point scales concerning talkativeness, quality of ideas, task contribution, concern for feelings, agreeableness, friendliness, and influence.

B. Ratings of the large triangle (T), the small triangle (t), and the circle (c) were made on the bipolar adjective pairs relevant for the activity, potency and evaluative dimensions of the Semantic Differential. Following Greenberg and Strickland (1973) exactly, "Three clusters of five pairs each were selected from Analysis III, reported by Osgood, Tannenbaum, and Suci (1957, p.47) and were most heavily loaded on the particular factor isolated. The items and factor loadings (in brackets) were as follows: from the evaluative dimension, "good-bad" (1.00), "cruel-kind" (.52), "foolish-wise" (.57), "reputable-disreputable" (.68), "sinful-virtuous" (.50); from the activity scale, "active-passive" (.98), "violent-moderate" (.26), "aimless-motivated" (.23), "effortless-laborious" (.25), "slow-fast" (.35); and from the potency scale, "fragile-tough" (.97),

"lenient-severe" (.43), "feminine-masculine" (.47), "cowardly-brave" (.34), and weak-strong" (.46)." (p.29). Each figure was rated on all 15 items.

C. Another set of first year psychology students were recruited to judge the experimental (N=12) and control subjects' (N=16) stories (see Appendix B) in terms of the following:

- (1) How similar each of the individual stories of dyads were to the joint story on a 7-point scale. This is a measure of influence, in that the individual whose story most resembles the joint story may be construed as having had more influence. Different judges rated how similar first and second draft stories (blind) of control subjects were.
- (2) The quality of the individual and joint stories in which judges rated on 7-point scales how good, well written, interesting, innovative, creative, complete and accurate the stories were.
- (3) The guessed gender of the author of the stories.

Results & Discussion

Attributional Ratings

Initial Ratings

A primary hypothesis in this study is that subjects would make differential attributions to the large triangle, the small triangle and the circle, consistent with Greenberg

& Strickland (1973). It was further hypothesized that there would be gender differences in these attributions. No difference in the initial attributional ratings between the 3 conditions (Joint, Coactive, Alone) was anticipated.

In order to test these hypotheses, and to check that subjects in the three experimental conditions did not differ, subjects' initial attributional ratings were considered for each of the 9 figure-dimension combinations. Following Greenberg and Strickland (1973), subjects' scores on the five rating scales representing each of the three attributional dimensions were averaged, with 1 being least and 7 being most "good", "potent", and "active", to form the qualitative attribution measure. A mixed-design 2 (gender) x 3 (condition) x 3 (figure) x 3 (dimension) analysis of variance (ANOVA) was conducted on subjects' initial ratings, with gender (male vs female) and condition (Joint vs Coactive vs Alone) as between-subjects variables, figures (big triangle vs little triangle vs circle) and dimensions (good vs active vs potent) as within-subjects variables.

The outcome of this analysis indicated no significant main effects for gender or for condition, but there was a significant main effect for the figures, $F(2,188) = 25.302$, $p < .001$, and for dimensions, $F(2,188) = 13.70$, $p < .001$, as well as an interaction between the figures and rating dimensions, $F(4,376) = 159.771$, $p < .01$. Results of the simple effects analysis confirm that subjects attributed

significantly different characteristics to the objects, each figure x dimension effect was significant, $p < .001$. Tukey's HSD test indicated significant mean differences between the figures on each dimension. On the evaluative scale the small triangle ($M = 25.94$) and the circle ($M = 25.56$) are rated similarly and significantly "better" than the large triangle ($M = 12.82$), $p < .01$. On the activity dimension, the large triangle ($M = 25.32$) and small triangle ($M = 24.72$) are rated similarly, both significantly "more active" than the circle ($M = 20.10$), $p < .01$. On the potency dimension the large triangle ($M = 28.22$) is rated significantly "stronger" than both the small triangle ($M = 22.62$) and the circle ($M = 15.57$), $p < .01$, and the small triangle is rated significantly "stronger" than the circle, $p < .01$.

These results complement the findings of Heider and Simmel (1944) and essentially replicate those of Greenberg & Strickland (1973). The only difference between the present and the previous results is that Greenberg & Strickland found that the large triangle was rated significantly higher on the activity dimension than the small triangle, whereas, here there is no difference between the two.

Intercorrelations between scores on the activity, potency, and evaluative dimensions for the three figures appear in Table 1. The intercorrelations closely resemble those of Greenberg & Strickland (1973), and suggest the appearance of a "dynamism" factor (Osgood, et al., 1957,

p.74), a "coalescence of the second and third factors often observed in judgements of people". Greenberg & Strickland argued that this strengthens the validity of Heider and Simmel's (1944) inference that varying movement-contact combinations of physical stimuli "is useful in investigating the way the behaviour of other persons is perceived"(p.259). Factor analysis of the ratings was not performed since the rating dimensions were preselected precisely because of their loadings on the semantic differential factors.

Table 1

Intercorrelations Between Rating 1 Scores on the Activity, Potency, and Evaluative Dimensions for the Three Figures

Figures	T	t	c
Activity X Evaluation	.12	.15	.08
Potency X Evaluation	-.20	-.03	-.13
Activity X Potency	.41*	.67*	.54*

*p<.01 for df=98

Change in Ratings

Another area of interest in the study concerns possible changes in subjects' rating the figures on the Semantic Differential a second time. When the many possible ways

that ratings can change are combined with the number of factors in the study, it makes for a complex data analysis/interpretation task. When subjects work jointly, or just with another person in the room, a number of possible outcomes may occur.

Zajonc (1965) (as cited in Hewstone, et al., 1988) theorized that the mere presence of another person creates arousal in subjects, which enhances the probability of emission of dominant responses. A dominant response is described as the response which prevails, i.e., which takes precedence in a subject's response repertoire in a given stimulus situation. Therefore we might expect the second ratings of subjects in the Joint and Coactive conditions to change more than those of Alone subjects, and that the second rating would be more extreme than the first. This tendency might be expected to be more pronounced for ratings on the evaluative dimension, to the extent that the "good-bad" reaction is emotionally based, and if the emotional response qualifies as "dominant".

An alternative to this "dominant response facilitation" hypothesis is to anticipate that working jointly or in the presence of another person causes people to be generally more variable in an unsystematic way, and thus that their ratings might change more, in either direction from their initial response, than those of subjects who are re-rating the figures alone. This is a plausible conjecture,

especially if subjects in the Joint condition are taking the perspective of their opposite sex partner (as they must to some degree for interaction in the dyad to be coherent), and consequently changing in an "imagined" (or real) direction and if it is this perspective-taking that produces the outcome of the joint task rather than something mysterious involved in the processes of joint activity. Indeed this consideration was the main incentive for including a Coactive control group, whose members were asked, before rating the figures a second time, to consider that they were working with someone of the opposite gender, and to whom this "as if" set was made salient by having a member of the opposite sex present. If people were taking the perspective of the opposite sex, then one would expect the second ratings of subjects in the Joint and Coactive conditions to be more variable, and change more than when Alone, but in no particular quantifiable direction, since we do not know what expectancies guide the subjects' perspective-taking ratings.

There were a number of possible ways to analyze the data in order to determine if and how ratings changed from the initial rating to the second, and whether or not there were differences between the three experimental conditions and for males and females. One way was to simply use rating 1 and rating 2 scores as an additional factor and a within-subjects variable in a 2 (gender) x 3 (condition) x 3 (figure) x 3 (dimension) x 2 (rating) mixed-design ANOVA.

Here, again, condition and gender are between-subjects variables, and figures, dimensions and ratings are within-subjects variables (repeated measures). The outcome of this analysis revealed a significant effect for figures, $F(2,188) = 30.70$, $p < .001$, and dimensions, $F(2,188) = 17.64$, $p < .001$ as well as an interaction between figures and dimensions, $F(4,376) = 178.425$, $p < .001$. This simply reflects the results for Rating 1, which showed that the three figures are rated significantly differently on the evaluative, activity, and potency dimensions. Tukey's HSD comparison among means indicated the same significant mean differences in ratings between the figures for each dimension as found for subjects' initial ratings. As with the first rating, on the evaluative dimension, the small triangle ($M = 25.72$) and circle ($M = 25.39$) are rated equally high and significantly more so than the large triangle ($M = 12.93$); on the activity dimension, the large triangle ($M = 25.51$) and the small triangle ($M = 24.78$) are rated significantly higher than the circle ($M = 20.23$); on the potency dimension the large triangle ($M = 27.84$) is rated higher than both the small triangle ($M = 23.28$) and the circle ($M = 15.88$), and the small triangle is rated significantly higher than the circle, $p < .01$. The mean ratings for the figures on each dimension do not differ significantly from first to second ratings. Indeed the mean ratings for rating 1 and rating 2 do not differ across conditions, $F(1,94) = .227$, $p > .05$, or

for males and females, $F(2,94) = 1.10$, $p > .05$. However, the fact that the 4-way interaction between gender x rating x figures x dimensions approaches conventional levels of significance, $p = .07$, suggests that there is some effect of subjects rating the figures a second time.

An alternative way of determining whether there were any differences between males and females and the three experimental conditions in the second attributional ratings was to perform an analysis of covariance. Because of statistical issues, this is discussed in an endnote ².

The analysis using rating 1 and 2 as a separate within-subjects factor (or analysis of covariance) does not get at the dynamics involved with change in ratings. Some changes on the rating scale may be positive in direction and some may be negative, thereby cancelling out any overall significant amount of change. If, when working in the presence of another person, people are taking the perspective of another person, the rating change could be positive or negative. If the research question is in terms of "change", then difference scores provide the answer. (Of course problems with difference scores involve ceiling and floor effects or, in general, problems with regression towards the mean.)

In order to determine whether there was a significant change from the first to the second ratings between males and females and between subjects working Jointly,

Coactively, or Alone, the absolute difference score for rating 2 minus rating 1 was calculated³. These scores were then analyzed in a 2 (gender) x 3 (condition) x 3 (figure) x 3 (dimension) mixed-design ANOVA. There was no significant main effect for the three figures in change in ratings. The results indicated a significant main effect for gender; females ($M = 3.88$) changed their ratings more than males did ($M = 2.89$), $F(1,94) = 6.90$, $p < .01$. There was also a significant main effect for experimental condition, subjects in the Joint ($M = 3.9$) and Coactive ($M = 3.68$) conditions change their ratings more than subjects working Alone ($M = 2.57$), $F(2,94) = 4.79$, $p < .01$. The main effect for dimensions was significant; subjects changed their ratings more on the evaluative dimension ($M = 4.05$) than for the activity ($M = 2.86$) or the potency ($M = 3.25$) dimensions, $F(2,188) = 5.37$, $p < .01$. Lastly, there was a significant interaction between gender, condition and dimension, $F(4,188) = 3.363$, $p < .01$.

In order to examine the 3-way interaction between gender x condition x dimension further, the absolute difference scores were analyzed in three separate 2 (gender) x 3 (figure) x 3 (condition) mixed-design ANOVA's for the evaluative, activity, and potency dimensions. Consistent with previous analyses of the attributional ratings, "figures" were included in the analysis, although they were not involved in the 3-way interaction.

In the first analysis of variance using absolute difference scores for the evaluative dimension, there were no significant differences between males and females (overall $M = 4.6$), or between Joint, Coactive and Alone conditions (overall $M = 4.01$), in the absolute amount of change between rating 1 and rating 2. There was a significant interaction between experimental condition and figure rated, $F(4,188) = 2.494$, $p < .05$. Because the effects of the three figures are not involved in the higher order 3-way interaction, this was not pursued further.

For the activity dimension, there was significant main effect for the three experimental conditions, $F(2,94) = 6.32$, $p < .01$, and a significant interaction between gender and condition, $F(2,94) = 4.573$, $p < .01$. The simple effects analysis indicate that the effect for gender in the Coactive condition is significant, $F(1,94) = 7.496$, $p < .01$, and the effect of condition for females is significant, $F(2,94) = 9.545$, $p < .001$. Tukey's HSD comparison among means revealed that females' ratings on the activity dimension changed significantly more when someone of the opposite sex was in the room with them (Joint $M = 3.71$, Coactive $M = 4.4$) than when they were Alone ($M = 1.4$), $p < .05$; in contrast, the change in ratings for males do not differ significantly across conditions (Joint $M = 3.22$, Coactive $M = 2.17$, Alone $M = 2.23$). Females' mean rating change in the Coactive condition was also significantly greater than males' in the

Coactive and Alone conditions, $p < .05$. In summary, for the activity dimension, the finding that people's ratings tend to change more when working in the presence of another person holds for females but not for males.

For the potency dimension, there was a significant main effect for gender, $F(1,94) = 4.66$, $p < .05$ and a significant interaction between gender and experimental condition, $F(2,94) = 3.259$, $p < .05$. The simple effects analysis indicate that, as with the activity dimension, the effect for gender in the Coactive condition is significant, $F(1,94) = 7.438$, $p < .01$, and the experimental condition for females is significant, $F(2,94) = 5.465$, $p < .01$. Newman-Keuls post hoc comparison revealed, as with the activity dimension, females' ratings on the potency dimension changed significantly more when working Jointly ($M = 4.16$) or Coactively ($M = 4.93$), than when working Alone ($M = 2.23$). Although females' change in ratings differs across conditions, males' rating change do not differ significantly for Joint ($M = 3.18$), Coactive ($M = 2.33$) or Alone ($M = 2.67$) conditions. There were also significant differences in the mean rating change for females in the Coactive vs the Alone condition and females in the Coactive condition vs males in the Coactive condition, $p < .05$. In summary, as with the activity dimension, the notion that people's ratings tend to change more when working in the presence of another person, is true for females but not for males.

To summarize the foregoing analyses, there was overall significantly greater change in ratings in the Joint and Coactive conditions than in the Alone condition, female's rating change was significantly greater than males, and there was significantly greater change in ratings for the evaluative dimension than for activity or potency. The data lend support to the hypothesis that people tend to become more variable in their ratings in the presence of another person and hence change their second ratings more than when working alone. However, this seems to be true for females more than for males; the presence of a male in the room affects females' ratings more than the presence of a female affects males' ratings. Perhaps it is that, during second ratings, when subjects are asked to consider that they are working with someone of the opposite sex, and having had this made salient by having them in the room (Coactive), and certainly when actually working with them (Joint), subjects are taking the perspective of the other person, and females are better at this perspective-taking than males are. This implies that shifts in ratings may not be due to the demands of the joint task but that they occur because of the presence of and perspective taking of another person of the opposite sex, and this tendency is stronger for females.

Polarization

Zajonc's hypothesis of heightened dominant responses in the presence of another person (1965) is applicable to

polarization effects. Group polarization refers to an enhancement of an initially dominant position due to group discussion (Myers, 1982; as cited by Hewstone et al., 1988). Many researchers (see Brown 1988 for a review) have found that group decisions are more extreme than the average of the individual group members' pre-discussion decisions. Since there seems to have been general initial agreement between males and females in their attributional ratings of the figures, it is likely that polarization effects would be evident. In order to test for possible polarization effects occurring in the Joint condition ratings, for each dyad the individual male and female pair's pre-discussion scores were averaged and compared with post-discussion joint scores. Polarization was defined operationally as occurring when the second, joint score was greater than the average of the individual dyad members' scores, in the direction already favoured by the dyad. For example, out of a total of 1350 dyad attributional rating cases (30 dyads x 15 ratings x 3 figures) there were 1114 cases which polarization could possibly occur, (i.e., male and female initial ratings were on the same pole of the rating scale). Frequency tallies indicated that 389 out of 1114, or 35% of joint attributional ratings, were polarized. Given that these are non-independent cases, it is necessary to note that on average, each dyad also polarized on 35% of attributional rating occasions. The proportion of rating occasions that

polarized is also greater than each of the other possible outcomes (i.e., one person or both moving towards the opposite pole, only one person becoming more extreme, no change).

The number of polarized joint decisions recalls similar findings in the area of joint memory where dyadic and group decisions are held with greater confidence than individual decisions. Lomov (1979) noted that in joint reproduction subjects were more confident of their accuracy. Hinsz (1990) found that, in recognition memory tasks, communicating groups had greater confidence and tended to exaggerate the response pattern similar to polarization effects. It is as though subjects in agreement with each other become more confident in their opinion, and hence exaggerate it in joint ratings. The fact that over 1/3 of joint ratings polarized indicates the effects of heightening these dominant responses (Zajonc, 1965).

In order to compare the three experimental conditions for the effects of heightened responses in the second ratings, polarization was redefined as occurring when an individual male's or female's second rating was more extreme in the direction of the individual's first rating. Frequency tallies indicated negligible differences between the experimental conditions in the proportion of second ratings that polarized. The percentage of polarization was 26% for the Alone condition, 22% for the Coactive condition,

and 24.5% for the Joint condition. Therefore, the presence of another person does not seem to be a factor in the tendency for second judgements to be more extreme than initial judgements. Perhaps the Coactive and Joint subjects may be trying to take the perspective of the opposite gender member, which might cause a tendency conflicting with that of being more extreme in their initial attributions. Also, a dominant response is described as the response which takes precedence in a subject's response repertoire in a given stimulus situation; therefore, in the Coactive and Joint conditions, it may be that perspective-taking beliefs are what constitutes the subjects' dominant response; this would not necessarily result in extreme ratings. Also, it might be argued that the subjects in the Alone condition are becoming more extreme 26% of the time due to the mere presence of another person, the experimenter.

Influence

The analyses using absolute difference scores bear on the hypothesis of whether males have more influence than females in the joint rating task. Here influence is defined as "the ability of one partner in the dyad to persuade the other into accepting their attributional rating, and move away from their own". In computing the absolute value of the difference between the joint and the individual scores for each subject, smaller values in this index reflect smaller change in the joint ratings from the individual's

own rating. This may be interpreted to suggest that a given subject is being less influenced (or is more influential). Since there are no significant differences between males' and females' change scores in the Joint condition, one might conclude that they exhibited an equal amount of influence. Also, the fact that the amount of absolute change in the Coactive condition is not significantly different than that in the Joint condition suggests that there is something other than influence that contributes to rating change in the joint condition (i.e., perhaps perspective-taking). The absolute difference between joint and first ratings reflects more than influence and is not the most reliable indicator of influence attempts. First of all, the effect for gender is computed by averaging across all males and females; the analysis of variance does not consider each dyad separately. Secondly, a change from an individual's initial rating does not necessarily mean that the person was influenced. Consider the example of an initial rating for a male of 6, female of 5, and the joint rating of 7. Here, the male's rating changed by one unit, but he was not influenced by the female since his initial rating was on the same side of the rating scale and higher than the female's. For the male, this example is better interpreted in terms of polarization and not influence. For the female, we can talk of both polarization, (her second rating is more extreme 5-7), and influence (her score moved closer to the male's).

In order to better test the hypothesis that males are more influential in that they have their attributional ratings accepted more, and thus change less than females in the joint ratings, influence was operationally defined as "movement towards the partner's rating". If the dyad members' initial ratings were the same the dyad was ignored. In the remaining cases, the following decision rules were adopted: if the joint score (J) was between the individual male (M) and female (F) score, the absolute difference score for J-M and J-F was obtained; if $M > J$ and $F > J$ or if $M < J$ and $F < J$ the absolute difference score between the male and female initial ratings was computed ($M - F$, $F - M$) by taking the most extreme score minus the partner's. The absolute difference scores were tallied for males and for females for each such dyad. For each dyad, the proportion of the total amount of movement toward the partner to the total amount of cases where influence was possible was calculated. These average scores became the dependent measure. A t-test (1-tail) was conducted to compare the amount of movement toward the partner for males and females. There were no significant differences between males ($M = 1.04$) and females ($M = 1.13$) in the average amount of movement towards the partner's attributional ratings, $t(58) = -.88$, $p > .05$. Males and females seem to therefore exhibit an equal amount of influence (or no influence) over their partner in the joint rating task.

This finding should not be surprising given the nature of the task. First of all, this experiment involved a cooperative task facilitated by positive social activity, which may affect the level of influence men and women have (Eagly, 1991; Eagly & Carli, 1981; Mabry, 1985) in that women's greater social activity should result in their participating more in such tasks. Secondly, males and females did not differ significantly in their initial attributional ratings; hence, influence attempts were not as necessary or as likely to occur as with some other tasks used in influence studies which tend to establish communications between mixed-dyads on topics on which members disagree. In addition, Eagly & Carli (1981) found that when the experimenter is a female (as with this study) there are no differences between males and females in the amount of influence.

Questionnaire

Task, Socio-Emotional Behaviours & Influence

There have been numerous studies adopting Bales' (1950, 1970) theory of leadership which makes a distinction between task behaviours (giving ideas, suggestions) and socio-emotional behaviours (agreeing, encouraging others opinions). In these studies, the amount of task and socio-emotional behaviours occurring have been found to predict the emergence of leader in a group (Bales, 1950) and to be related to the amount of influence a person has (Bales,

1950, 1970; Carli, 1989). Females have been found to exhibit significantly more socio-emotional behaviours than males, and have less influence, and males have been found to engage in mostly task related behaviours, and to be more influential (Meeker & Weitzel-O'Neil, 1977). However, some studies have found larger gender differences in same-sex groups than in mixed-sex groups where both men and women behave more like members of the opposite sex (Carli, 1989; Piliavin & Martin, 1978).

In order to test whether males engage in more task behaviours than females and have more influence, and whether females exhibit more socio-emotional behaviours, and have less influence, subjects in the joint condition of the study were asked to rate themselves and their partner on 3 task items (talkativeness, ideas, contribution) and 3 socio-emotional items (agreeability, friendliness, concern with feelings), and on amount of influence, see Appendix A. Separate 2 (gender) x 2 (self/other) mixed-design ANOVA's were conducted for each of the task and socio-emotional items and for perceived influence in order to discover whether males and females perceive one another as behaving in the stereotypic task and socio-emotional modes, and to discern who is perceived as being the most influential⁴. In using the self/other variable, it could be determined whether males and females perceived themselves differently than their opposite sex partner perceived them.

A significant interaction between gender and self/other emerged for "how friendly" subjects perceived themselves and their partner to be $F(1,58) = 4.148, p < .05$. Males rate females as more friendly ($M = 6.37$) than themselves ($M = 6.1$), whereas females' ratings of self ($M = 6.17$) vs other ($M = 6.13$) are not significantly different. A significant interaction between gender and self/other ratings emerged for "the concern with dyad feelings" subjects perceived themselves and their partner to have, $F(1,58) = 5.78, p < .05$. Males rate females as more concerned with feelings ($M = 5.36$) than themselves ($M = 4.73$), whereas females' self- ($M = 5.01$) vs other- ($M = 4.93$) ratings are not significantly different. There were no significant differences between males and females for the analysis of variance on the other socio-emotional item concerning "agreeability" (overall $M = 5.98$), and the 3 task items measuring perceptions of "talkativeness" (overall $M = 5.33$) "contribution" (overall $M = 5.59$), and "ideas" (overall $M = 5.35$). With respect to the question of "who had the most influence", there was a significant effect for self- vs other- ratings, $F(1,58) = 5.45, p < .05$. Both males and females rate themselves higher in influence ($M = 5.67$) than the other person ($M = 5.3$).

To summarize, contrary to research indicating that males engage in greater task related behaviours than females, males and females did not differ in the amount of task behaviours they perceived themselves and their partner

to make. In partial support of research indicating that females engage in more socio-emotional behaviours than males, males perceived females to be more friendly and concerned with feelings than themselves; however, females did not perceive any differences between themselves and their partner on friendliness or concern for feelings. This may simply reflect that males are responding to the questionnaire in terms of gender-stereotypic expectations that women are more social and expressive than men, and suggests that males may be retaining gender stereotypes, whereas females are not. Or maybe males are right, and females were more socio-emotional than males were, but this was not as apparent to the females as it was to the males. That there were no overall mean gender differences in perceived task and socio-emotional behaviours supports research (Bayer, 1989; Carli, 1989; Piliavin & Martin, 1978) indicating that gender-stereotypic task and socio-emotional behaviours are not as strong in mixed-sex groups.

Intercorrelations were performed on subjects' ratings on the 7 questions for both self and other ratings and are presented in Tables 2 and 3 respectively. For self ratings, "talkativeness", "ideas", "contribution", and "influence" were all significantly intercorrelated. "Friendliness" was significantly correlated with "influence", and with "concern for feelings".

Table 2

Correlations Amongst Task, Socio-Emotional & Influence-Self

	Talk	Ideas	Contribute	Feel	Agree	Friendly	Influence
Talk	1						
Ideas	.51**	1					
Contribute	.57**	.79**	1				
Feel	.12	.15	.23	1			
Agree	-.18	-.06	-.09	.11	1		
Friendly	.31*	.04	.06	.31*	.24	1	
Influence	.44**	.42**	.32*	.09	-.15	.34*	1

* $p < .05$, ** $p < .01$; $df = 58$

Ratings of one's partner are perhaps of more interest, since studies using Bale's ratings of task and socio-emotional behaviours employ ratings of others and not subjects' ratings of their own contributions. For subjects' ratings of their partner, as anticipated, "talkativeness", "ideas", "contribution" and "influence" were positively intercorrelated. However, none of the socio-emotional items were significantly correlated with influence. "Friendliness" was significantly correlated with "agreeability" and the 3 task behaviours.

Table 3

Correlations Amongst Task, Socio-Emotional & Influence-Other

	Talk	Ideas	Contribute	Feel	Agree	Friendly	Influence
Talk	1						
Ideas	.58**	1					
Contribute	.6**	.74**	1				
Feel	.18	.13	.28*	1			
Agree	-.07	.19	.24	.01	1		
Friend	.27*	.39**	.36**	.12	.36**	1	
Influence	.47**	.44**	.56**	.23	.03	.11	1

* $p < .05$, ** $p < .01$; $df = 58$

As anticipated, perceived task behaviours were highly associated with attributed influence, but perceived socio-emotional behaviours less so; this is consistent with much of the research on influence based on Bales and colleagues' (1950, 1970) elaboration of the dimensions of leadership. Although task behaviours have been found to be more associated with influence than socio-emotional behaviours (Bales, 1950, 1970; Carli, 1989), we might expect tasks in which socio-emotional behaviours are important, such as with this study in which agreement is essential, to show a greater relationship between socio-emotional behaviours and influence (Eagly, 1991; Mabry, 1985). Also Bales (1950)

found that the "best liked" person who was second or third in talkativeness had the second most influence.

Subjects' Perceptions vs Measured Influence

It is interesting to note whether perceptions of influence in the Joint condition, as measured by the subjective evaluations of influence, is related to measured influence, as indicated by shifts in joint ratings of the Heider-Simmel stimuli from the individual ratings. There were no significant differences between males and females in rating change in the Joint condition, and in terms of the amount of movement toward the partner's rating. However, on the post-session questionnaire, both males and females considered themselves to be more influential than their partner. This may reflect the self-centered bias (Ross & Sicoly, 1979), which consists of taking more than one's share of responsibility for a jointly produced outcome. In terms of the overall mean ratings on influence, though, males ($M = 5.43$) and females ($M = 5.53$) did not differ in the amount of influence they were perceived to have. The fact that perceived influence was found to be highly associated with attributed task behaviours, and that males and females did not differ in their ratings of self and other in the amount of attributed task behaviours, fits with the finding that males and females do not differ in the amount of influence they had over their partner in the joint rating task.

Task Difficulty

Subjects in the joint condition were also asked to rate "how difficult you found the task of writing a story about the figures in the film" on a scale of 1 (task was difficult) to 7 (task was easy). A t-test (2-tail) comparing mean male and female ratings of ease to difficulty indicated that there were no differences between males ($M = 4.83$) and females ($M = 4.9$), $t(58) = -2.61$, $p > .05$ and that the task was generally seen as fairly easy.

Subjects' Identification with the Figures

It was expected that males and females would identify with or relate to the three geometric figures differently, and subjects were asked to "rate how much you could relate to the figures in the film". They rated each figure on a scale of 1 (I could relate) to 7 (I could not relate). To determine whether males and females related to the three figures differently, a 2 (gender) x 3 (figure) repeated measures ANOVA was performed on these scores. There was a significant main effect for the figures, $F(2,116) = 3.88$, $p < .05$ as well as an interaction between gender and the figures, $F(2,116) = 2.91$, $p < .05$. The simple effects analysis showed significant mean differences for gender with respect to the circle, $F(1,58) = 5.94$, $p < .05$, in that females related to the circle more than males did ($M = 3.07$ vs. $M = 4.23$). There were also significant mean differences between the three figures in how males related to them.

$F(2,116) = 3.85, p < .05$, in that males related to the small triangle the most ($M = 3.70$), then the circle ($M = 4.23$) and the large triangle the least ($M = 4.77$). The effect for females' relation to the figures was also significant, $F(2,116) = 2.95, p < .05$, in that females related to the circle ($M = 3.06$) more than the little triangle ($M = 3.80$) and large triangle ($M = 3.93$). This supports Allinsmith's (1949) prediction that males would identify with the small triangle and females would identify with the circle.

Story Construction

Dyad Member Roles

One question of interest is, when subjects in the joint condition were asked to work together to re-write the stories, who becomes the "secretary", i.e., the person volunteering or delegated by the partner to do the writing? The secretary was female 21 times and male 9 times. A chi-square goodness of fit test (with $E = 15$ for each cell) was significant $\chi^2(1, N = 30) = 4.8, p < .05$.

Story Length

The number of words in the stories were compared, in a 2 (gender) x 3 (condition) between subjects x 2 (story) repeated measures, mixed ANOVA. Although it is not statistically significant, $p = .12$, there was a tendency overall for females to write longer stories than males ($M = 171.98$ vs $M = 156.67$). There was a significant interaction between condition and story, $F(2,94) = 6.56, p < .01$.

Analysis of the simple effects revealed a significant effect for stories in the Joint condition; the joint story ($M = 150.80$) is significantly shorter than the individual stories in the dyad ($M = 171.58$), $F(1,94) = 8.72$, $p < .01$. The effect for condition and story 2 approximated conventional levels of significance, $F(2,94) = 2.90$, $p = .06$; Joint stories ($M = 150.80$) were shorter than the re-write stories of subjects in the Coactive ($M = 176$) and Alone condition ($M = 185.25$). Lastly, the effect for stories in the Alone condition is significant, $F(1,94) = 14.10$, $p < .01$; the second stories ($M = 185.25$) subjects in the Alone condition wrote were significantly longer than their first stories ($M = 151.45$).

In summary, when individuals simply re-write their stories, they tend to write longer stories, elaborating on themes, characters and details. When subjects "re-write" their stories jointly, they tend to write shorter stories, getting rid of irrelevant or redundant information, and being more concise. This fits with research that found joint accounts to have more omissions of irrelevant detail, continuity and coherence (Edwards & Middleton, 1986), and to be more complete and concise (Stephenson et al., 1986; Clark et al., 1990) than individual accounts.

Gender Assignment of Individual Stories

The analyses of initial attributional ratings on the Semantic Differential indicated no significant gender differences. This is not to deny that there might yet be

gender differences in attributions to the figures in the actual stories that subjects write (e.g story plot, gender-related themes, word usage, adjectives describing the figures, etc.). If there are easily perceived gender differences in attributions that author-subjects make to the figures, evidenced in the stories that they write, then judges should be able to identify the gender of author of the story beyond the level of chance. Twelve subjects made judgements on 30 sets of stories from the Joint condition (male, female, joint) such that each story was judged four times. Judges were asked to guess what the gender of the author of individual stories in the joint condition was. A chi-square goodness of fit test was conducted for judges' assignment of gender to the individual male and female stories in the joint condition. As shown in Table 4, judges were able to determine the gender of the author beyond the level of chance, $\chi^2(1, N = 120) = 4.42, p < .05$. This suggests that there are some perceptible gender differences in the stories subjects wrote.

Influence: Gender Assignment of Joint Story

One hypothesis to be tested in this study is whether men will have more influence than women in the joint task. If men are more influential than women in terms of getting their story accepted, the joint stories should be seen as more similar to the male stories than the female stories. If this holds, then judges guessing at gender of authorship

of the joint stories should designate a male author more often than a female author. Judges (12) were asked to guess what the gender of the author of the joint stories was. A separate chi-square goodness of fit test was employed to examine how judges identify the gender of the author of the joint stories. As shown in Table 5, judges assigned male authorship to the joint stories significantly more often than female authorship, $\chi^2(1, N = 120) = 4.8, p < .05$. This lends some support for the hypothesis that males have more influence than females in the construction of the joint story. It should be noted here, that females wrote out the joint stories more often than males did, which might have affected how much they were able to put forth their ideas.

Table 4

Gender Assignment to Individual Stories

		Observed	
		Male	Female
Actual	Male	71 (59%)	48 (40%)
	Female	49 (41%)	72 (60%)

$$\chi^2(1, N = 120) = 4.41, p < .05$$

Table 5

Gender Assignment to Joint Stories

	Male	Female
Expected	60 (50%)	60 (50%)
Observed	72 (60%)	48 (40%)

$$\chi^2(1, N = 120) = 4.81, p < .05$$

Influence: Judges' Similarity Ratings

If males have more influence in the joint story-writing task, then the joint story should resemble the individual males' story more than the females' story. In order to determine which gender had the most influence in the joint story construction, naive judges were asked to rate (blind) how similar the two individual stories in a dyad were to the joint story on scale of 1 (very similar) to 7 (not at all similar). The judges' similarity scores were compared in a 2 (gender of judge) x 10 (repeated judgments) x 2 (male vs female story) mixed ANOVA. Although the results are not significant at conventional levels, $F(1,90) = 4.16, p = .07$, there is a tendency for the male stories ($M = 3.39$) to be judged as more similar to the joint story than the female stories ($M = 3.98$). This lends tentative support for the hypothesis that males have more influence during the joint story writing task.

Judged Quality of stories

It was hypothesized that joint communication may produce a qualitatively superior story than that produced individually. In order to test this hypothesis, naive judges were asked to rate the quality of stories on 8 indexes of quality. It should be recalled that this study involved a creative task that also had a memory component to it. The subjects were told to be as creative as possible in writing the stories, and also to be accurate, which entailed recalling the movement configurations of the figures in the film. Therefore, the indexes of quality selected reflect creativity and accuracy; they are how "good, well written, creative, innovative, interesting, concise, complete, and accurate" the stories were judged to be (Appendix B- 5, 7).

Intercorrelations between the 8 quality items were conducted and are presented in Table 6. All the items were significantly intercorrelated, $p < .01$. Items "good", "well written", "creative", "innovative", and "interesting" were all highly intercorrelated with another. "Good" and "well written" were moderately correlated with all of the items and "creative", "innovative" and "interesting" were mildly associated with "complete", "concise" and "accurate" which were moderately interrelated.

Table 6

Intercorrelations Amongst Indexes of Quality of Stories

	Good	WW	Cr	Inn	Int	Con	Com	Acc
Good	1							
WW	.78	1						
Cr	.72	.67	1					
Inn	.73	.68	.85	1				
Int	.73	.66	.78	.78	1			
Con	.53	.54	.37	.41	.46	1		
Com	.55	.58	.39	.42	.44	.64	1	
Acc	.58	.62	.39	.44	.44	.57	.73	1

all significant $p < .01$, $df = 679$

(Good= Good; WW=Well Written; Cr=Creative; Inn=Innovative;
Int=Interesting; Con=Concise; Com=Complete; Acc=Accurate)

A principal factor analysis using varimax rotation was performed on the correlation matrix of quality indexes to see if they did factor into separate factors of creativity and accuracy (see Table 7). The oblique solution showed that the quality indexes factor analyzed into two clearly identifiable factors that can be said to represent creativity and accuracy. The indexes "good", "well written", "creative", "innovative" and "interesting"

comprised the first factor which seems to be tapping creativity. The three indexes "accurate" "complete" and "concise" had high loadings on the second factor which seems to be tapping accuracy. The two factors themselves were moderately related ($r = .53$).

Table 7

Factor Analysis Indexes of Quality

Quality Indexes	Factor 1	Factor 2
	Creativity	Accuracy
Good	.58	.26
Well Written	.49	.35
Creative	.83	-.08
Innovative	.79	-.02
Interesting	.74	.04
Concise	.01	.70
Complete	-.04	.78
Accurate	.00	.74

Since the 8 indexes of quality may be grouped into the 2 separate factors of creativity and accuracy, judges' ratings of the stories on the indexes comprising each factor were averaged to become the judges' rating for Creativity and Accuracy, and this served as the dependent measure.

In order to test the hypothesis that joint communication produces a story qualitatively superior to that produced individually, judges' mean Creativity and Accuracy ratings for stories in the Joint condition, (individual male and female and joint stories) were analyzed in two separate 2 (gender of judge) x 3 (story) x 10 (repeated judgements) mixed ANOVA's. It is of no interest to interpret the main effect for repeated ratings or any interactions with them, since this only indicates that the different dyad stories are judged differently. Therefore only the main effects for story and gender of judge, story, and the interaction between the two will be discussed.

In both the analyses there was no effect for gender of judge. In the ANOVA for Creativity there was a main effect for how creative the stories are judged to be, $F(2,20) = 4.58$, $p < .05$. Tukey's HSD test indicated that joint stories ($M = 3.38$) are judged to be significantly more creative than male stories ($M = 3.93$), $p < .05$; female stories ($M = 3.72$) were not significantly different from male or joint stories. In the ANOVA for the judged Accuracy of the stories there were no significant differences between male, female and joint stories (overall $M = 3.26$).

As an additional measure of the quality of male, female, and joint stories, judges were instructed to rank the three stories in each triadic set. The judges' rank ordering of the stories were analyzed in a separate ANOVA.

There was a significant effect for the 3 stories, $F(2,20) = 12.63$, $p < .01$. Duncan mean comparisons indicated that the quality rank order for joint ($M = 1.59$) stories was significantly higher than those for individual males ($M = 2.25$) and females ($M = 2.1$), $p < .01$.

Consistent with the hypothesis raised by Aboud (in response to Lomov, 1979), (see p.10 above) it is possible that high ratings on quality for the joint stories are not so much due to properties inherent in joint activity as to the effects of having the opportunity to write the story a second time. Fourteen judges rated the quality of first and second stories from the control groups. In order to test for possible practice effects, separate 2 (condition) $\times$ 2 (gender of judge) $\times$ 2 (story) $\times$ 10 (repeated judgements) ANOVA's for averaged scores on factors of Creativity and Accuracy were conducted for the Coactive and Alone conditions and the first and second stories of these individuals were compared.

In both the analyses for Creativity and Accuracy, there were no effects for gender of judge, and no differences between the Coactive and Alone control conditions. In the ANOVA for Creativity, there was a significant effect for stories, $F(1,12) = 7.62$, $p < .05$. The second stories that individuals in the Coactive and Alone conditions wrote were judged to be significantly more creative ($M = 3.36$) than their first stories ($M = 2.84$). In the ANOVA for Accuracy,

there were no differences in the judged accuracy between the first and second stories of subjects in the Alone and Coactive conditions (Overall $\bar{M}$ = 3.0).

As with the stories from the Joint condition, judges were asked to rank the first and second stories of subjects in the Coactive and Alone conditions in terms of which was best (1) and worse (2) overall. Judges' rank order of the stories' overall quality were analyzed in a separate ANOVA which indicated a significant main effect for the two stories, $F(1,12) = 5.10$, $p < .05$, in that the second story is ranked higher ($\bar{M}$ = 1.34) than the first story ($\bar{M}$ = 1.64).

So far, the results indicate that the Joint stories of dyads and the second, re-write stories of control subjects are both judged higher on Creativity than the first stories individual write. We still don't know if joint communication produces stories qualitatively superior to those just simply re-written. Although some judges compared the quality of the 3 stories belonging to a dyad (male, female, joint), and different judges compared the quality of the first and second stories of control subjects, the quality ratings for joint stories and second draft stories were compared. Average scores for the factors Creativity and Accuracy were again used and separate 3 (joint story vs Coactive vs Alone 2nd stories) x 10 (repeated judgments) repeated measures ANOVA's were conducted. Neither of the analyses of variance for Creativity (overall $\bar{M}$ = 3.02), or

Accuracy (overall $M = 2.97$) indicated significant differences between the second stories of Joint, Coactive and Alone conditions. As an additional comparison between joint stories and those just re-written, judges' rank orderings of second stories of Coactive and Alone subjects were compared to judges' rank orderings of joint stories in a 3 (condition) x 10 (repeated judgements) ANOVA. The results did not indicate a difference between the three conditions (overall $M = 1.42$).

Summary. For the Joint condition, joint stories were judged to be more creative than the stories of the individual male but not female dyad members. However, there were no differences in how accurate male, female, and joint stories were judged to be, contrary to research showing that group and dyadic recall is more complete, concise, and accurate than individual recall (Lomov, 1979; Stephenson et al., 1986). Overall, the quality of joint stories was ranked higher than the individual male or female stories. Taken as a whole, the results of the analyses of stories in the Joint condition indicate that joint stories are judged to be more creative than the individual stories from the dyad. This supported research indicating that joint activity produces qualitatively superior task performance to that produced individually, (Bekhterev, 1923; Clark & Stephenson, 1989; Hinsz, 1990; Lomov, 1979; Lomov & Kol'tsova, 1984; Stephenson et al., 1986). However, this

conclusion was premature.

The present study controlled for possible practice effects by having control conditions where subjects worked only as individuals. For stories in the control conditions, the second stories of individuals in the Coactive and Alone conditions were judged to be significantly more creative than their first stories, but there were no judged differences in accuracy between the first and second stories of these subjects. Overall, the second stories were ranked higher on quality than the first stories. Although joint stories were judged to be higher in overall quality than the individual dyad members' first stories, there were no significant differences in creativity or accuracy between joint stories and second draft stories of subjects in the Alone and Coactive conditions. This is not consistent with Street (1974) who found that independent and coactive (3 person) conditions produced significantly more responses to creative problem solving tasks than did interacting (3 person) subjects, and generally doesn't fit with the majority of brainstorming research which has found individual performance to exceed that of groups (Diehl & Stroebe, 1987). That there were no significant differences in creativity between joint stories and individual second stories is consistent with the research in brainstorming involving two-person groups that found no difference between individuals and dyads in the number of ideas produced

(Cohen, Whitmyre & Funk, 1960; Pape & Bolle, 1984; Torrance, 1970, Experiments 1, 2; as cited by Diehl & Stroebe, 1987). It would appear that the social factors of evaluation apprehension, social loafing and production blocking that have been attributed to group productivity loss in creative tasks are related to group size and are not as operative in dyads.

The present results suggest that it is the opportunity to re-write the story that leads to a more creative story; therefore, the hypothesis that joint activity produces a more creative and/or accurate story cannot be supported. Clark & Stephenson (1989) have noted that models of group memory performance based on individual performance are most predictive when the recall material is simplistic, and that when more complex material is used (e.g. a story), the models overpredict group performance.

Issues and Conclusions

It was hypothesized that communication may produce joint task performance qualitatively superior to that of individuals. Although joint stories were judged overall to be more creative than the individual stories from the dyads, there were no differences between joint stories and second draft stories of Coactive and Alone condition subjects. This suggests that it is the effects of writing the story a second time and perhaps having subjects think as if they

were working jointly (Aboud, in Lomov, 1979) that produces a qualitatively superior story as opposed to "shared processes" in joint activity.

This has implications for future research in the area of joint activity, and particularly with creative tasks. First of all, future research comparing individual performance and joint activity (or group performance) should control for practice effects and other possible effects of working with another person (e.g., perspective taking) before concluding that joint (or group) performance is superior to that of individuals, and is the result of something inherent in shared processes. Secondly, although many researchers have found that memory tasks are enhanced through joint and group collaboration, there is some doubt as to whether such findings are applicable to creative tasks. The different processes occurring in joint performance for creative tasks and other tasks such as in memory needs to be clarified. Thirdly, although research on brainstorming has found individual performance to exceed group performance, this is not as apparent with dyads. Some middle ground between the two diverging opinions of productivity gain and productivity loss in joint creativity is preferable. Caution should be used when generalizing results from dyadic and group research. Future research comparing individual, joint, and increasing group numbers, would help identify properties of each that contribute to

the disparity in research findings. At which point is creativity hindered; as little as 3 group members or more?

Generally, there were no gender differences in attributions to the figures in the film as evidenced in the Semantic Differential ratings. However, females changed their ratings significantly more than males, especially in the Joint and Coactive conditions, indicating that they were more affected by the presence of an opposite sex subject than males were; this was also interpreted as involving females' greater perspective taking. Although males and females did not differ in their attributions of the figures in their ratings, there was some indication that there were gender differences in attributions as evidenced in the stories they wrote. Judges' accurate assignment of gender of authorship of stories indicated that there were some perceptible gender differences in the stories. Further analysis of the stories would be a worthwhile enterprise. Stories could be analyzed in terms of gender differences in care vs justice themes, language, and story plot.

Males and females did not differ in the amount of task behaviours they were perceived to have contributed; however, males perceived females to exhibit more socio-emotional behaviours than females perceived themselves to make, suggesting that males may be retaining gender-stereotypic expectations more than females. As anticipated, perceived task behaviours were highly associated with attributed

influence and perceived socio-emotional behaviours less so. Males and females did not differ in the amount of influence they had over their partner in the joint rating task, but there was some evidence that males were more influential in the joint story construction task. One would expect influence attempts to be more evident in the story writing task as opposed to the rating task. Males and females were in general initial agreement in their attributional ratings of the figures; therefore, influence attempts were not as necessary, or as likely as in the story writing task, where creativity came into play, increasing variability and scope for discussion. Although there was little difference between males and females in influence, both males and females perceived themselves to have more influence than their partners, which may reflect a self-centered bias. The present study's finding of little differences between males and females in interaction style and in influence re-asserts the need for future researchers to consider the type of task involved in a study. The present findings are not surprising if one considers that the task involved the co-operative activity of two people.

One might question whether the research of male and female interaction styles and influence are applicable to both dyads and groups. Future research should clarify this issue, and make distinctions between dyads and varying sized groups. The number of interacting people may have an effect

on whether mixed-sex groups behave in less gender-stereotypical ways than same-sex groups. It seems plausible to suppose that mixed-sex dyads are more likely to converge in task and socio-emotional behaviours and in influence than larger mix-sex groups. In neutral tasks gender norms are not an integral part of the subjects' task. As opposed to dyads, in larger groups, group membership is more salient, categorization processes based on gender are perhaps more likely, and both genders may identify with members of their sex; hence, gender norms may be exaggerated.

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Endnotes

1. One may question whether subjects writing stories first might effect their attributional ratings; therefore, control for order effects by having half of the subjects write stories and then do ratings and half do ratings first and then write stories. However ratings should naturally follow from story interpretations; in this study, the story construction is a vehicle to elicit subjects' ratings. Also, the subjects should write the story immediately following the tape, since this is not a memory test but explicitly a "joint construction".

2. An alternative way of analyzing the effects of subjects' rating the figures a second time is to conduct an analysis of covariance (ANCOVA). Analysis of covariance is designed to allow a more powerful look at the relationship between the independent variable(s) (experimental groups, gender) and the dependent variable (attributional ratings) by minimizing error variance. This analysis essentially covaries out the effects of rating 1, making the three experimental groups statistically comparable. This leaves rating 2 as the dependent measure in which to test for differences between the three experimental groups and between males and females. In partialling out the effects of rating 1, there are actually 9 covariates, the 9 figure-dimension clusters that are repeated measures. This brings

up the issue of how the number of covariates chosen may affect the power of the test. Tabachnick & Fidell (1983) explain this issue well. "Calculation of the slope of the regression of the DV on the covariate(s) results in the loss of degrees of freedom for error (1 df per covariate). This means that the gain in power from decreased sum of squares for error may be offset by the loss in the degrees of freedom. In cases (such as the present study) where there is a statistically significant relationship between the DV and the covariate(s), the gain in reduced error variance should offset the loss of a degree of freedom. With multiple covariates, however, a point of diminishing returns can quickly be reached, especially if the covariates are highly correlated with one another." p. 179. Therefore in the present study the use ANCOVA as a means of increasing the power of the test of the IV's is questionable. The outcome of the ANCOVA shows a significant interaction between figures and dimensions for subjects' second ratings $F(4,375) = 10.41, p < .001$. There were no significant differences between males and females or between the three experimental conditions.

3. Algebraic difference scores provide the same outcome as using rating 1 and rating 2 as a within-subjects variable, and since change could be positive or negative, thereby cancelling out any overall effect, absolute difference

scores were used.

4. Using scores on each task and socio-emotional item in separate ANOVA's increases the probability of a Type I error (incorrectly rejecting the null hypothesis). Conducting a multivariate analysis of variance (MANOVA) is one way to deal with this issue.

Appendix A**Subjects' Handbook****Recruiting Announcement to Subjects**

We are recruiting participants for a study dealing with social inference and communication processes. Subjects will be required to view a short 2 1/2 minute film and write a story about it as well as rate the figures presented on a number of adjectives. The session will take approximately 60 minutes and you will receive one credit toward the requirement of experimental participation for 49.100 Introductory Psychology.

Students who are interested are asked to leave their initials and telephone number on the available form below. Thank-you.

INITIALS	GENDER	PHONE NO.	TIME AVAILABLE
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Instructions to Participants

Welcome to this Social Psychology experiment. The study you are participating in is concerned with social inference and communication. You will be viewing a short, 2 1/2 minute film in which there are three characters: a large triangle (T), a small triangle (t), and a circle (c). You will be asked to write a short story about what happened in the film and to rate the three figures on a number of adjective pairs. This is not a test of intelligence or personality; rather, I am interested in what types of ideas you communicate through your stories and ratings.

Informed Consent Form

I agree to participate in a study about social inference that is being conducted by K.J. Hicks under the supervision of Dr. L.H. Strickland. The procedure of the experiment has been explained to me, and I understand that I may withdraw from the experiment at any time without academic penalty. It is also understood that my identity and the information I contribute to the study will remain confidential, to be used solely for the purpose of the study.

Name (Print): _____

Signature: _____

Date: _____

Story Instructions

On the next page, try to compose a short story about the events in the film that you just saw. You may wish to consider such thoughts as: "What is happening?" "Why did they act in this way?" "What has led up to the situation?" and "What is going to happen?". Try to be as complete and creative as possible. Other subjects in a later experiment will be judging the creative and qualitative aspects of such stories, you will not be identified. You have five minutes to write this story.

Rating Instruction

Each one of the next 3 pages contain 15 bipolar adjective pairs on which we would like you to rate the big triangle (T), the little triangle (t), and the circle (c). Check the position on the scale that best represents the direction and intensity of your judgement as to the characteristics of each figure as it is represented in your story. You have up to 10 minutes to do this.

Semantic Differential Rating Scales

FEMININE : __ : __ : __ : __ : __ : __ : __ : **MASCULINE**
FAST : __ : __ : __ : __ : __ : __ : __ : **SLOW**
FOOLISH : __ : __ : __ : __ : __ : __ : __ : **WISE**
TOUGH : __ : __ : __ : __ : __ : __ : __ : **FRAGILE**
WEAK : __ : __ : __ : __ : __ : __ : __ : **STRONG**
VIRTUOUS : __ : __ : __ : __ : __ : __ : __ : **SINFUL**
CRUEL : __ : __ : __ : __ : __ : __ : __ : **KIND**
SEVERE : __ : __ : __ : __ : __ : __ : __ : **LENIENT**
COWARDLY : __ : __ : __ : __ : __ : __ : __ : **BRAVE**
LABORIOUS : __ : __ : __ : __ : __ : __ : __ : **EFFORTLESS**
AIMLESS : __ : __ : __ : __ : __ : __ : __ : **MOTIVATED**
BAD : __ : __ : __ : __ : __ : __ : __ : **GOOD**
REPUTABLE : __ : __ : __ : __ : __ : __ : __ : **DISREPUTABLE**
PASSIVE : __ : __ : __ : __ : __ : __ : __ : **ACTIVE**
VIOLENT : __ : __ : __ : __ : __ : __ : __ : **MODERATE**

Joint Story Instructions

Now we will ask you work together to compose a joint story about the events that occurred in the film. In referring to the individual stories you wrote, you may combine the two stories together, or use elements from just one of the stories, or if necessary, use neither of them and compose a new story altogether if you think that using a different plot would improve it. Whatever you do, again please try to make your story as complete and creative as possible. Other subjects in a later experiment will be trying to identify the creative and qualitative aspects of such stories, you will not be identified. Please take up to fifteen minutes to discuss and compose this joint story.

Joint Rating Instructions

As a pair, that is, working jointly, re-rate the figures T, t, and c on the same previous 15 adjective pairs on the paper provided to you by the experimenter. You may refer to your original ratings. You must come to an agreement as to which position on the scale best describes each figure. Check the position on the scale that best represents the direction and intensity of your joint judgement.

Questionnaire

We are interested to know how you evaluate yourself and your partner during the communication that took place while you worked on the joint story and ratings. Please answer the following questions appearing on the next pages by checking the appropriate number you feel represents the amount of effort by you and your partner.

Circle the number on the scale to indicate "the amount of talking" you would say there was by each member in your dyad.

SELF

I
talked
little

1 2 3 4 5 6 7

I
talked
a lot

OTHER

He/She
talked
little

1 2 3 4 5 6 7

He/She
talked
a lot

Circle the number on the scale to indicate "the quality of ideas" you would say was presented by the members in your dyad.

SELF

I had
low quality
ideas

1 2 3 4 5 6 7

I had
high quality
ideas

OTHER

He/She had
low quality
ideas

1 2 3 4 5 6 7

He/She had
high quality
ideas

Circle the number on the scale to indicate "the contribution to task solution" you would say was given by the dyad members.

SELF

I								I
contributed	1	2	3	4	5	6	7	contributed
little								a lot

OTHER

He/She								He/She
contributed	1	2	3	4	5	6	7	contributed
little								a lot

Circle the number on the scale to indicate "the concern with dyad feelings" you would say each member of your dyad had.

SELF

I was
unconcerned
about
feelings

1 2 3 4 5 6 7

I was
highly
concerned
about feelings

OTHER

He/She was
unconcerned
about
feelings

1 2 3 4 5 6 7

He/She was
highly
concerned
about feelings

Circle the number on the scale to indicate "how agreeable" you would say the members of your dyad were.

SELF

I was
highly
disagreeable

1 2 3 4 5 6 7

I was
highly
agreeable

OTHER

He/She was
highly
disagreeable

1 2 3 4 5 6 7

He/She was
highly
agreeable

Circle the number on the scale to indicate overall,
"how friendly" you would say the members of your dyad were.

SELF

I was
not very
friendly

1 2 3 4 5 6 7

I was
very
friendly

OTHER

He/She was
not very
friendly

1 2 3 4 5 6 7

He/She was
very
friendly

Circle the number on the scale to indicate the "amount of influence" you would say the members of your dyad had.

SELF

I had
little
influence

1 2 3 4 5 6 7

I had
a lot of
influence

OTHER

He/She had
little
influence

1 2 3 4 5 6 7

He/She had
a lot of
influence

We are also interested to know how much you could relate to the figures in the film and secondly, how difficult you found the task of writing a story about the figures in the film. Please indicate on the scales below how much you related to the figures and how difficult the story writing task was for you.

To the big triangle:

I could relate 1 2 3 4 5 6 7 I could not relate

To the little triangle:

I could relate 1 2 3 4 5 6 7 I could not relate

To the circle:

I could relate 1 2 3 4 5 6 7 I could not relate

Task was difficult 1 2 3 4 5 6 7 Task was easy

Lastly, in the space below, we would like you to try to explain how you and your partner accomplished the task of writing a joint story and making joint ratings for the three figures. Briefly, what was the procedure you went through to accomplish the joint tasks? Anything you might like to write down would be helpful in my attempt to understand the data.

2nd Story Instructions (Control Groups)

Now we will ask you to rewrite the story you wrote about the events that occurred in the film. In referring to your first story, you may want to just edit and polish it, use only some of the elements from it, or use none of them and compose a new story altogether. Whatever you do, again please try to make your story as complete and creative as possible. Other subjects in a later experiment will be judging the creative and qualitative aspects of the stories, you will not be identified. Please take up to 15 minutes to think about and make any revisions in your story.

Re-rating Instructions

Now we will ask you to re-rate the three geometric figures, T, t, and c on the same 15 bipolar adjectives. You may refer to your original ratings if you wish. Check the position on the scale that best represents the direction and intensity of your judgement as to the characteristics of each figure. In rethinking how you judge the characters, you may feel that no changes are necessary, or that many changes are needed. You have up to 10 minutes to do this.

Debriefing

The study in which you have just taken part is concerned with gender differences in social perception and social influence, and with the effects of communication on task performance. The brief film you saw is one of the oldest stimuli in social psychological research, and we are looking to see whether or not male and female students write, in the first instance, different kinds of stories in response to this stimulus. Some previous studies have hinted that there are gender differences, others have not found them. We have no confidently held expectations about the kind of differences we will find, if any, but if we do find them we could content-analyze the stories to see if there are characteristic gender-related themes. Because we are interested also in communication and influence, some of our subjects write and then rewrite their stories alone, while others, working in pairs, rewrite their first stories to produce a joint story. Here we are interested in observing the relationship between communication and influence, that is, if there is a difference in the kind of stories that males and females write, whose individual story will the final joint story most closely resemble? Again we have no strong hypothesis because previous research indicates that influence could go either way. In looking at the effects of communication, we will also be comparing the

individual stories to those done under joint communication, to see if joint activity produces qualitatively different stories than those done individually. The ratings of the stimulus objects which you completed are simply more "objective" measures of the kinds of attributes you make to objects in the film - objective in the sense that we can perform statistical analyses on them.

Do you have any questions concerning the study? If so, contact me, Karen Hicks or Dr. L.H. Strickland (788-2600 ext. 1840). Thank-you for your participation.

Also, if you have any ethical concerns with this study, please contact Dr. C. Herdman, the Chair of Ethics Committee (788-2689), or Dr. W. Jones, the Chair of the Psychology Department (788-2648).

Thank-you,

The Principle Experimenter, Karen Hicks

Appendix B**Judges' Handbook****Recruiting Announcement for Judges**

We are recruiting participants for a study dealing with social inference and story construction. You will be viewing a short, 2 1/2 minute animated film. You will then be asked to make judgments concerning stories written by fellow students about this film. The session will take approximately 60 minutes and you will receive one credit toward the requirement of experimental participation for 49.100 Introductory Psychology.

Students who are interested are asked to leave their initials, student ID#, telephone number, and time available on the form below.

Thank-you.

INITIALS	GENDER	ID#	PHONE #	TIME AVAILABLE
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Instructions to Judges

The study you are participating in is concerned with social inference and story construction. You will be viewing a short, 2 1/2 minute film in which there are three characters: a large triangle (T), a small triangle (t), and a circle (c). The same film was previously shown to other first year psychology students, after which they wrote a short story about the events in the film. These students were told to be as creative and complete as possible in writing their stories. After viewing the film, you will be asked to make judgments on these short stories. You may be asked to compare the similarity of stories, rate their quality and guess the gender of the author.

Informed Consent Form

I agree to participate in a study about social inference that is being conducted by K.J. Hicks under the supervision of Dr. L.H. Strickland. The procedure of the experiment has been explained to me, and I understand that I may withdraw from the experiment at any time without academic penalty. It is also understood that my identity and the information I contribute to the study will remain confidential, to be used solely for the purpose of the study.

Name (Print): _____

Signature: _____

Date: _____

Instructions (Judges 1)

You have been given 30 stories to read that were about the film. As you can see, these have been given to you as 10 sets of 3 stories. You are to make all judgments on one set before moving on to the next set of stories. All judgments are to be recorded on the separate page at the back of each set. Turn to this page now. After you have read a set of stories, you have three judgement tasks to perform.

First, in reading the story labelled "Comparison", rate how similar the stories labelled "A" and "B" are to the "Comparison". You are to place both "A" and "B" on the 7-point scale according to whether you think each is very similar or not at all similar to the "Comparison".

Secondly, you are to rate the quality of the stories on the 6 item questionnaire. Please put "A", "B", and "C" (for Comparison) on the 7-point scale according to how good, well written, creative, interesting, concise, complete, and accurate you think they each are. And rank order the stories overall.

Lastly, you are to guess what the gender of the author is.

In making your judgments, please keep in mind that the students writing the stories were instructed to be as complete and creative as possible.

Ratings (Judges 1)

1. Rate stories "A" and "B" on how similar they are to the "Comparison" by locating them on the 7-point scale provided.

Very similar : : : : : : : : Not at all
similar
 1 2 3 4 5 6 7

2. Quality Questionnaire. For each 7-point scale, rate stories "A", "B", and "C" by placing them on the appropriate space.

GOOD : : : : : : : : BAD
 1 2 3 4 5 6 7

WELL WRITTEN : : : : : : : : BADLY WRITTEN
 1 2 3 4 5 6 7

CREATIVE : : : : : : : : NOT CREATIVE
 1 2 3 4 5 6 7

INNOVATIVE : : : : : : : : NOT INNOVATIVE
 1 2 3 4 5 6 7

INTERESTING : : : : : : : : NOT INTERESTING
 1 2 3 4 5 6 7

CONCISE : : : : : : : : NOT CONCISE
 1 2 3 4 5 6 7

COMPLETE : : : : : : : : INCOMPLETE
 1 2 3 4 5 6 7

ACCURATE : : : : : : : : INACCURATE
 1 2 3 4 5 6 7

In summary, which story do you think was better?

Rank them: 1 2 3

3. Circle what the gender of the author of each story is.

A male female

B male female

C male female

Instructions (Judges 2)

You have been given 20 stories to read that were about the film. These have been presented to you as 10 pairs. You are to read and make judgments on one pair of stories before moving on to the next set. At the back of each pair of stories is a separate sheet on which you are to record your judgments. Turn to this page now. After you have read a set of stories, you have three judgment tasks to perform.

First, rate how similar the stories labelled "1" and "2" are. You are to place both "1" and "2" on the 7-point scale according to whether you think they are very similar or not at all similar to each other.

Second, you are to rate the quality of the stories on the 6 item questionnaire. You are to put both stories "1" and "2" on 7-point scales according to how good, well written, creative, interesting, concise, complete, and accurate you think they each are. And overall rank order the stories' quality overall.

Third, you are to guess what the gender of the author is.

In making your judgments, please keep in mind that the students writing the stories were instructed to be as complete and creative as possible.

Ratings (Judges 2)

1. Rate stories "1" and "2" on how similar they are by locating them on the 7-point scale provided.

Very similar : : : : : : : : Not at all
similar 1 2 3 4 5 6 7

2. Quality Questionnaire. For each 7-point scale, rate stories "1" and "2", by placing them on the appropriate space.

GOOD : : : : : : : : BAD
 1 2 3 4 5 6 7

WELL WRITTEN : : : : : : : : BADLY WRITTEN
 1 2 3 4 5 6 7

CREATIVE : : : : : : : : NOT CREATIVE
 1 2 3 4 5 6 7

INNOVATIVE : : : : : : : : NOT INNOVATIVE
 1 2 3 4 5 6 7

INTERESTING : : : : : : : : NOT INTERESTING
 1 2 3 4 5 6 7

CONCISE : : : : : : : : NOT CONCISE
 1 2 3 4 5 6 7

COMPLETE : : : : : : : : INCOMPLETE
 1 2 3 4 5 6 7

ACCURATE : : : : : : : : INACCURATE
 1 2 3 4 5 6 7

In summary, which story do you think was better?

Rank them: Best ____ Worse ____

2. Circle what the gender of the author of each story is

1. male female

2. male female

Debriefing

The study in which you have just taken part is concerned with gender differences in social inference and social influence, and with the effects of communication on task performance. The stories you read and made judgements on were written either by individual males or females or by a mixed-sex pair working together. The brief film you saw is one of the oldest stimuli in social psychological research, and we are looking to see whether or not male and female students write, in the first instance, different kinds of stories in response to this stimulus. Some previous studies have hinted that there are gender differences, others have not found them. We have no confidently held expectations about the kind of differences we will find, if any, but if we do find them we could content-analyze the stories to see if there are characteristic gender-related themes. We had judges guess at the gender of the author. If they are able to do this beyond the level of chance, it suggests that there are some perceptible gender differences in the stories. Because we are interested also in communication and influence, some of our subjects wrote and then rewrote their stories alone, while others, working in pairs, rewrote their first stories to produce a joint story. Here we are interested in observing the relationship between communication and

influence, that is, if there is a difference in the kind of stories that males and females write, whose individual story will the final joint story most closely resemble? To determine this, we asked judges to judge the similarity of A (male) and B (female) stories to the comparison (joint) story. Again we have no strong hypothesis because previous research indicates that influence could go either way. In looking at the effects of communication, we will also be comparing the individual stories to those done under joint communication, to see if joint activity produces qualitatively different stories than those done individually. For this purpose we asked judges to rate the stories on a number of indices of quality.

Do you have any questions concerning the study? If so, contact me, Karen Hicks or Dr. L.H. Strickland (788-2600 ext. 1840). Thank-you for your participation.

Also, if you have any ethical concerns with this study, please contact Dr. C. Herdman, the Chair of Ethics Committee (788-2689), or Dr. W. Jones, the Chair of the Psychology Department (788-2648).

Thank-you,

The Principle Experimenter, Karen Hicks

END

2|5| 0|5| 9|3|

FIN