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The Effect of Peer and Adult-Child Transactive Discussions on Moral Reasoning

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Piaget (1932) hypothesized that children's interactions with peers during middle childhood are essential to their moral reasoning development. To test this hypothesis, 48 female focal subjects (M age = 8.6 years) were paired with either a female age-mate or their mother. All focal subjects were pretested and posttested for moral reasoning abilities. In the intervention, the adult-child and peer dyads engaged in consensus-seeking discussions of two moral dilemmas. Focal subjects' moral reasoning at pretest and posttest and their use of reasoning (transacts) in the intervention discussions were measured. As predicted, focal subjects paired with peers showed significantly more sophisticated moral reasoning subsequent to their discussions than did focals paired with adults. In addition, focals paired with peers used more active transacts in their discussions than did focals paired with adults. Styles of dyadic discussion that featured active transacts by focal subjects were positively correlated with the focals' moral reasoning at posttest, whether the focal subject was paired with a peer or an adult. The more sophisticated posttest reasoning by focals paired with peers was attributed to the greater use of active discussion styles in peer dyads.

Piaget (1932) hypothesized that peers are uniquely important in children's moral development because, during middle childhood, children's interactions with peers are egalitarian, marked by a symmetry of competence and influence. When peer interaction results in the conflict of ego-centric, but equally valid points of view, the child is prompted to take another perspective into account and to use reasoning to integrate the perspectives. Piaget asserted that this process of conflict and resolution is crucial to development (1970), and he contended that opportunities to resolve sociomoral differences are a more frequent and more typical feature of peer interaction (1932).

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Interactions with adults during this time are not as likely to foster this type of developmental process. Adults' greater authority and interpersonal power contribute to their social dominance in interactions with children. Piaget observed that when children and adults experience conflict, the children, acknowledging the asymmetry of the relationship, yield to the adult solution, which removes the child's motivation to use reasoning and to abstract new sociomoral rules. Thus, for Piaget (1932), it is the independent negotiation that children conduct with peers that is vital to moral development.

This hypothesis is untested, although one part of Piaget's idea has been supported by training studies, most involving adult subjects. These studies suggest that interpersonal conflict resolved by consensus-seeking discussions results in change in moral reasoning. Neither personal consideration of moral dilemmas nor open-ended group discussion of them is as successful in promoting the developmental change in moral reasoning as is group discussion with the goal of resolution and consensus (Maitland & Goldman, 1974). Dyads who actively debate moral dilemmas to consensus change more than do those who passively listen to moral arguments (Arbuthnot, 1975), and the more conflict that dyads experience in their discussions, the more likely they are to change as a result (Berkowitz, Gibbs, & Broughton, 1980).

A fine-grained analysis of this developmental process of conflict and resolution was conducted by Berkowitz and Gibbs (1983). They compared moral discussions by adult dyads who showed subsequent developmental change to discussions by dyads who showed no change. Their results indicated that changing dyads, as opposed to unchanging dyads, are distinguished by the presence of transaction in their discussions. Berkowitz and Gibbs defined *transaction* as reasoning about reasoning: one individual uses reasoning that operates on the reasoning of the partner or that significantly clarifies his or her own ideas. Damon and Killen (1982) conducted a similar investigation of triads that were composed of children age 5 to 9 years. Like Berkowitz and Gibbs, they found that the children who advanced as a result of a moral discussion were those who both directed transforming (transacting) statements to their partners and received transactive statements from their partners.

Kruger and Tomasello (1986) applied this process analysis to investigate differences in the dialogues that children have with adults and with peers. To reflect the developmental level of the subjects and the process differences in adult-child and peer dialogues, they examined two aspects of transacts: the activity required for production (spontaneous transactive statements and questions vs. passive transactive responses) and the personal orientation of the transaction (reasoning about the listener's ideas

vs. reasoning about the speaker's ideas). They showed that children who were paired with peers used transactive reasoning more often than did children paired with adults. Furthermore, the transacts between peers were more likely to be critiques of the listener's ideas, rather than clarifications of the speaker's ideas, and were produced more spontaneously. Children who were paired with adults were more passive and self-oriented in their use of reasoning because adult partners dominated the discussions by asking many questions.

It has been demonstrated, thus, that sociomoral conflict and its resolution lead to developmental change and that a key element in this process is transactive reasoning. It also has been demonstrated that discussions between peers feature more and qualitatively different transacts than do discussions between adults and children. However, the crucial assertions in Piaget's hypothesis remain untested. It is not known if indeed peer discussions produce greater changes in moral reasoning than do adult-child discussions. Nor is it known if the different use of reasoning in the process of adult-child and peer discussions is responsible for such changes. The purpose of the present study, therefore, was to test these hypotheses by comparing the moral reasoning of children before and after their moral discussions with either a peer or an adult. It was hypothesized that: (a) At posttest, focal subjects in peer dyads show greater moral reasoning as a result of their discussions than do focal subjects in adult-child dyads. (b) In their discussions, focal subjects in peer dyads, as compared to focals in adult-child dyads, use more transacts, use them more spontaneously, and focus their transacts on their partner's ideas, rather than their own. And (c) the use of spontaneous transacts in discussions, no matter the partner, is positively related to moral reasoning level at posttest.

METHOD

Subjects

Focal subjects were 48 middle-class females (45 white, 3 black) recruited from Girl Scout troops in metropolitan Atlanta. The mean age of the subjects was 8.6 years (range = 7.3 to 10.2 years). The sample was restricted to a single sex because of the preference for same-sex dyads and because of the greater availability of female adults as participants. All subjects were selected from a small set of comparable neighborhoods.

Subjects were recruited by mail. For a subject to be considered for participation, it was required that she receive parental permission and that her mother volunteer to participate in the study. It was further required that

the subject nominate a friend (same-sex agemate) to participate with her. The parents of the nominated friends were contacted by mail and requested to allow their children to participate. From this pool of focal subjects, each with two potential partners (a parent volunteer and a peer volunteer), focal subjects were randomly assigned to participate with either their parent or their peer as a partner; the other partner was dropped from the study. This procedure yielded 24 adult-child dyads and 24 peer dyads.

Procedure

Each dyad met on one occasion in the focal child's home. This choice of setting has ecological validity because children's personal dilemmas are likely to be discussed with important others in comfortable environments. The outline of the procedure was: The pretest consisted of two private interviews, one between the experimenter and the focal subject and one between the experimenter and the partner subject (counterbalanced for order across conditions). This interview was followed by dyadic discussion (intervention) of two dilemmas between focal subject and partner. The procedure ended with a posttest interview between the experimenter and the focal subject.

Pretest. The subjects were interviewed privately by the experimenter, a white adult female, using Damon's standard positive justice interview (1975, 1977, 1980). The interviews and all other components of the experiment were tape-recorded. In this pretest interview, the subjects were presented with a dilemma about fairness, sharing, and distributive justice. The dilemma was presented, illustrative drawings were provided, and a set of probing questions followed. The questions were designed to learn the subjects' solution to the problem and, more importantly, the reasoning process used to arrive at the solution. These were nondirective interviews. Although all subjects, including adult partners, were given the pretest, only the focal subjects' pretests were transcribed and scored.

A total of four positive justice dilemmas was used in the present study. All four addressed similar issues and were similar in structure. Dilemma 1 and Dilemma 4 were used as the pretest and posttest. Previous research has shown that the scores derived from interviews using Dilemma 1 and interviews using Dilemma 4 are highly correlated ($r = .86$; Damon, 1980). The order of the pretest interviews (focal subject or partner going first) and the dilemma used (1 or 4) were fully crossed and counterbalanced across conditions.

Intervention. Following the pretest, the focal girl and partner subjects were reunited, and two dilemmas were presented. Dilemmas 2 and 3 were used in the intervention, always in the same order (2 followed by 3). The

dilemmas were illustrated with line drawings. The experimenter read Dilemma 2 and the probe questions, but did not allow immediate discussion. Instead, the subjects were instructed to discuss competing solutions to the dilemma until they agreed on the best one. The possibility of a disagreement and the meaning of consensus were discussed. Subjects were encouraged to take their time and to consider all solutions to avoid a superficial discussion. The experimenter left the room immediately after providing instructions and was not present during the discussion. Following the discussion of Dilemma 2, Dilemma 3 was read and the same procedure was followed.

Posttest. Following the intervention, the subjects were instructed that there was time left for one more story and that, for this final interview, the focal girl's name had been selected in advance by drawing straws. This mild deception appeared to satisfy the children's sense of fairness. The procedure for the posttest was identical to that of the pretest.

Scoring Procedure: Pretest and Posttest

Transcripts of the focals' pretests and posttests were scored according to Gerson and Damon's criteria (1975). The scoring procedure focused on the reasoning process used by the subjects, specifically, the nature of the considerations articulated by the subjects in arriving at solutions and how the considerations related to one another.

Damon's (1980) index of moral reasoning is an ordered, six-step sequence that has been validated for several populations of North America, Europe, Asia, and the Middle East in both longitudinal and cross-sectional studies. In scoring the interviews, each subject's responses were divided into "chunks" of reasoning. A *chunk* was a sentence, statement, or group of statements that corresponded to a characteristic of one of Damon's stages. For example, when asked, "Why do you share with Sally?" one child may respond, "Because she's a girl. I'm a girl, and I share with girls." This response corresponds to one characteristic of stage 0-B: an assertion of size, sex, or other physical characteristic as justification for a choice. Each chunk was scored as corresponding to a stage level.

All posttest interviews were scored prior to the scoring of the pretest interviews. A random sample of 20% of the pretests and posttests was independently rescored to assess scorer reliability. The random selection was constrained so that a representative number of focal pretests and focal posttests were rescored. The obtained agreement was excellent, Cohen's kappa = .84.

For purposes of statistical analysis, subjects were assigned a weighted mean reasoning score for each interview. Assigned weights were: 10

points to each chunk scored as 0-B, 20 points to each chunk scored as 1-A, 30 for 1-B, 40 for 2-A, and 50 for 2-B. The assigned values were summed and averaged. Thus, the subject's score reflected the mean level of reasoning expressed in each interview. Similar weighting schemes have been used in previous training studies (Berkowitz et al., 1980).

Coding Procedure: Intervention Discussions

The 48 tape recordings of the intervention discussions were transcribed for coding. The unit of analysis was the conversational turn. Each time a subject spoke (uninterrupted) was considered one conversational turn. Turns ranged in length from one word to several sentences. Conversational turns were identified as either *nontransactive* (no code) or *transactive*, as defined by Berkowitz and Gibbs (1983) and adapted for younger subjects by Kruger and Tomasello (1986). Three specific types of transacts were coded, each with two orientations: transactive statements (self-oriented and other-oriented), transactive questions (self-oriented and other-oriented), and transactive responses (self-oriented and other-oriented).

Transactive statements were defined as spontaneously produced critiques, refinements, extensions, or significant paraphrases of ideas. Operations on the partner's ideas were labeled as *other-oriented*. (Example: "Your idea might get the little girl in trouble.") Spontaneously produced clarifications of one's own ideas were coded as *self-oriented*. (Example: "No, you see, my solution is only about the teacher.")

Transactive questions were defined as spontaneously produced requests for clarification, justification, or elaboration. Requests for such elaboration of the partner's ideas were coded as *other-oriented*. (Example: "Why do you think the class should use your solution?") Requests for evaluative feedback regarding one's own ideas were coded as *self-oriented*. (Example: "Do you think my idea is fair or unfair?")

Transactive responses were defined as clarifications, justifications, or elaborations of ideas given in answer to a transactive question. Responses that elaborated on the partner's ideas were coded as *other-oriented*, whereas those that elaborated on one's own ideas were coded as *self-oriented*. Response transacts were given only in response to and immediately following transactive questions. It should be noted that transactive statements and transactive questions were defined as actively self-generated by the subject. However, transactive responses were passive replies to requests and were not spontaneously produced.

A random sample of 20% of the transcripts, equally distributed between the groups, was independently recoded to assess coder reliability. Coders scored copies of the same unmarked transcripts, and the obtained agreement was excellent, Cohen's kappa = .87.

For purposes of statistical analysis, scores were assigned to subjects as follows: Each conversational turn in the intervention discussions was assessed independently. If a turn contained no transactive content, it received no code. If a turn was transactive, it was coded with one of the six mutually exclusive and exhaustive transact codes described earlier. Each turn received only one code. In no transcripts did a subject generate two or more of the six transacts in one turn.

Discussions varied in length, that is, in their total frequency of conversational turns (for the 48 dyads, $M = 47.25$, range = 15 to 94 turns). Consequently, the frequency of total transacts varied (for the 48 dyads, $M = 10.06$, range = 0 to 18 transacts). Because discussions varied, subjects' transactive reasoning in the intervention session was quantified as proportions. Each subject received a score for each of the six codes, computed as that code's frequency divided by that subject's total frequency of conversational turns. In addition to these six measures, each subject also received four summary scores: total transactive statements (self-orientation and other-orientation combined), total transactive questions (self-orientation and other-orientation combined), total transactive responses (self-orientation and other-orientation combined), and total transacts (all transacts combined). Each summary score was calculated as a proportion, using total frequency of conversational turns as the divisor.

By definition, transacts reflect the context of the discussion. Coding transacts requires taking into consideration the content of the preceding turns. However, for statistical purposes, the transacts by the focal subjects and the transacts by the partner subjects were summarized separately. Therefore, for each dyad the coding procedure yielded 20 proportions, 10 proportional transacts (six individual measures and four summary measures) for each member of the dyad (focal subject and partner).

RESULTS

Group Differences in Reasoning at Posttest

Focals who were paired with peers and focals who were paired with adults were equal in their level of pretest reasoning, with means of 32.77

(focals with peers) and 31.97 (focals with adults), $t = n.s.$ As predicted, focals who were paired with peers produced significantly higher levels of reasoning at posttest ($M = 35.34$, $SD = 4.44$) than did focals paired with adults ($M = 32.46$, $SD = 5.32$), $t(46) = 2.03$, $p = .025$ (one-tailed).¹

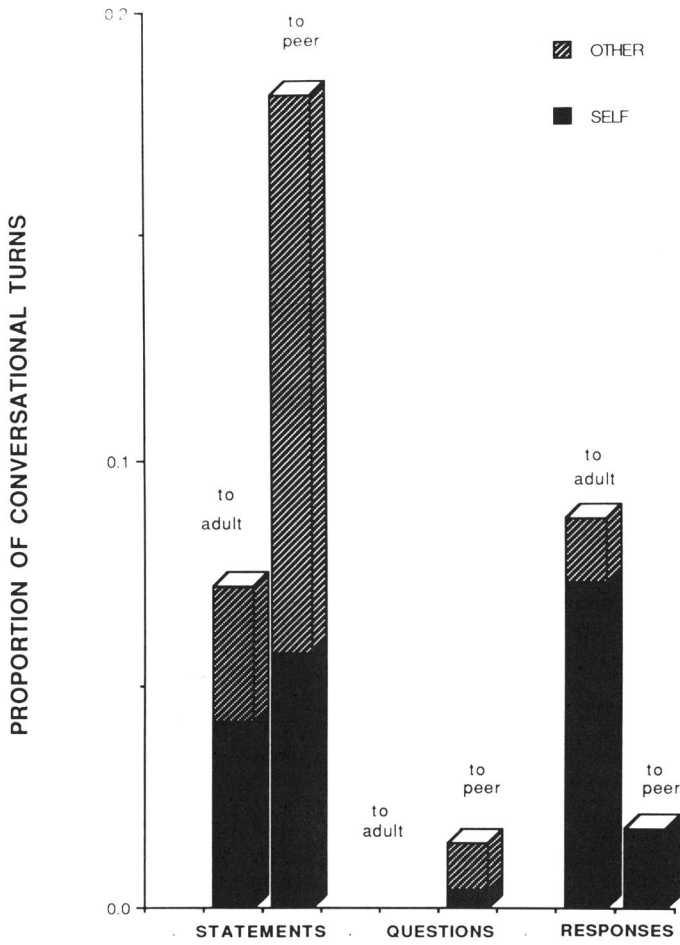
Group Differences in Transacts

A 2 (Group: adult, peer) \times 3 (Transact Type: statements, questions, responses) \times 2 (Transact Orientation: self-orientation, other-orientation) mixed model analysis of variance (ANOVA) for repeated measures was calculated. This first analysis was based on data generated by focal subjects only. No significant main effect for group was found, $F(1, 46) = 2.94$, $p = .09$. There was no group difference in the proportions of focal girls' conversational turns that were coded as transactive across types and orientations (for focals with peers, $M = 0.214$, $SD = 0.122$; for focals with adults, $M = 0.158$, $SD = 0.103$). As expected, group differences in the type and orientation of the transacts generated by focal girls were found.

As predicted, a significant three-way interaction was found (Group \times Transact Type \times Transact Orientation), $F(2, 92) = 5.40$, $p = .01$. Analyses of the six simple, simple main effects contained in this interaction (that is, analyses of the variability due to group alone for the six transacts) revealed that, as predicted, focal girls who were paired with adults produced proportionally more self-oriented responses ($M = 0.073$, $SD = 0.062$) than did focal girls who were paired with peers ($M = 0.018$, $SD = 0.037$), $F(1, 92) = 20.00$, $p < .001$. Also consistent with predictions, focals paired with peers produced proportionally more other-oriented statements ($M = 0.124$, $SD = 0.081$) than did focals paired with adults ($M = 0.030$, $SD = 0.045$), $F(1, 92) = 70.96$, $p < .001$. None of the remaining simple, simple main effects reached significance.

Thus, focals in the two groups generated the same proportional number of transacts, but those generated by focals with peers were more spontaneous (i.e., statements) and other-oriented, and those generated by focals with adults were more passive (i.e., responses) and self-oriented. Figure 1

¹Given the absence of pretest differences and the random assignment of subjects to experimental groups, posttest scores are the preferred outcome variable for the measurement of change in the present study (Achenbach, 1978; Cronbach & Furby, 1970; Linn & Slinde, 1977). Change scores as outcome variables are highly problematic, one of the often-noted problems being the regression to the mean. A negative correlation between pretest scores and change scores indicates that there has been such an effect (Borg & Gall, 1983). In the present study, the correlation between pretest and change was negative and significant, $r = -.373$, $p < .01$. Thus, change scores are unreliable and posttest scores are the preferred measure of change.



TRANSACTS BY FOCAL SUBJECTS

Figure 1. Group differences in focals' types and orientations of transacts.

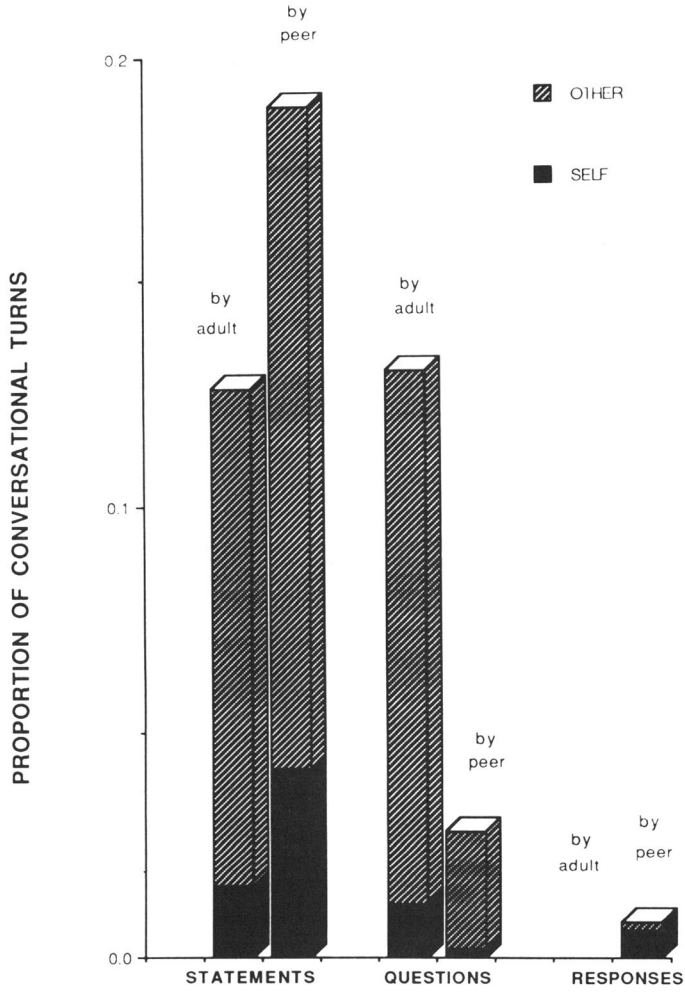
is a graphic representation of the differences between the groups in the types and orientations of transacts generated by the focals.²

Also of interest were the transacts generated by the adult and peer partner subjects. A second ANOVA was calculated, based on the transact data generated by the partner subjects only. A 2 (Group) \times 3 (Transact Type) \times 2 (Transact Orientation) mixed model ANOVA for repeated measures was calculated. No significant main effect for group was found, $F(1, 46) = 0.96, p = .33$, indicating no difference between peer and adult partners in the proportions of their conversational turns that were identified as transactive across types and orientations (for peer partners, $M = 0.225, SD = 0.113$; for adult partners, $M = 0.257, SD = 0.115$). As predicted, a significant three-way interaction effect was found (Group \times Transact Type \times Transact Orientation), $F(2, 92) = 8.98, p < .0001$. Analyses of the six simple, simple main effects contained in this interaction indicated that, as predicted, adult partners produced proportionally more other-oriented questions ($M = 0.117, SD = 0.089$) than did peer partners ($M = 0.025, SD = 0.039$), $F(1, 92) = 62.71, p < .0001$. Also consistent with predictions, peer partners produced proportionally more other-oriented statements ($M = 0.146, SD = 0.072$) than did adult partners ($M = 0.109, SD = 0.068$), $F(1, 92) = 9.87, p < .01$. In addition, peer partners generated proportionally more self-oriented statements ($M = 0.043, SD = 0.050$) than did adult partners ($M = 0.017, SD = 0.032$), $F(1, 92) = 5.02, p < .05$. None of the remaining simple, simple main effects reached significance. Figure 2 is a graphic representation of group differences in the type of transacts produced by the partners.³

To summarize the foregoing analyses of the intervention discussions: All subjects, focals and partners, children and adults, generated the same proportional numbers of transacts in their conversations. However, consistent with predictions, group differences appeared in the nature of the transacts generated, that is, in the types and orientations used. Focals paired

²Other results from this analysis, not directly addressed by the present hypotheses, were: no main effect for transact orientation was found, $F(1, 46) = 0.32, p = .57$. A significant main effect for transact type was found, $F(2, 92) = 35.79, p < .001$. A significant Group \times Transact Type interaction effect occurred, $F(2, 92) = 19.58, p < .001$. A significant Group \times Transact Orientation interaction effect was found, $F(1, 46) = 22.06, p < .001$. A significant Transact Type \times Transact Orientation interaction effect was found, $F(2, 92) = 17.01, p < .001$.

³Other significant effects from this analysis, not directly addressed by the present hypotheses, occurred: a main effect for transact type, $F(2, 92) = 57.74, p < .001$; a main effect for transact orientation, $F(1, 46) = 100.57, p < .001$; a Group \times Transact Type interaction effect, $F(2, 92) = 17.21, p < .001$; a Group \times Transact Orientation interaction effect, $F(1, 46) = 5.65, p < .05$; a Transact Type \times Transact Orientation interaction effect, $F(2, 92) = 38.89, p < .001$.



TRANSACTS BY PARTNER SUBJECTS

Figure 2. Group differences in partners' types and orientations of transacts.

with peers produced more other-oriented statements than did focals paired with adults, and peer partners produced more other-oriented statements than did adult partners. Thus, peer dyads were characterized by their mutual use of other-oriented transactive statements. In contrast, focals paired with adults produced more self-oriented responses than did focals paired with peers. Adult partners produced more other-oriented questions than did peer partners. Therefore, adult-child dyads were characterized by a pattern of adult questions and child responses. These patterns are consistent with expectations and with previous findings (Kruger & Tomasello, 1986).

Relationships Among Partner, Transacts, and Reasoning at Posttest

The differential use of transacts by subjects in the two conditions was predicted to be related to the differential posttest reasoning by those subjects. To assess this possibility, multiple regression analyses were made after a complete correlation matrix had been constructed. This correlation matrix (presented in Table 1) served as the basis for the selection of variables to be included in the multiple regressions, and it described the relationships between 20 transact measures (10 proportional scores for the 48 focal subjects and 10 proportional scores for the 48 partner subjects, both children and adults, as previously described) and focal posttest scores. Thus, for both the correlations and the multiple regressions, the focal posttest score was the outcome variable.⁴

Analysis of styles. The correlation matrix was calculated for the two experiment groups separately and for the total sample, and the results showed that specific types and orientations of transacts by focals in the intervention discussions correlated with reasoning at posttest. However, in addition to the focals' use of transacts, specific patterns in the partners' transacts influenced focals' reasoning as well. These results suggested an influence of dyadic style on focal reasoning at posttest. A dyadic influence on reasoning is logical, given the interactional nature of the transact measures. Furthermore, dyadic style differences were found in the analyses of transacts previously reported and were suggested by patterns in the correlations. Therefore, four types of dyadic discussion style were described post

⁴Due to the lack of reliability of change scores, their use can attenuate correlations between predictors and outcome, particularly when the correlation between pretest and posttest is high (Linn & Slinde, 1977). In the present study, the correlation between pretest and posttest is positive and highly significant, $r = .545$, $p < .001$. In this experiment, the null hypothesis states that the two treatments have the same effect; therefore, the crucial question is whether the posttest scores vary between the groups. Thus, the posttest score is the preferred criterion variable (Achenbach, 1978).

Table 1. Pearson Product Moment Correlations: Transacts and Posttest Scores

	<i>Adult-Child</i>	<i>Peer</i>	<i>Total Sample</i>
Focals			
Self-oriented statements	.230	.006	.144
Other-oriented statements	.445* ^a	-.050	.279*
Total statements	.436*	-.032	.281*
Self-oriented questions	.000	.322+	.253*
Other-oriented questions	.000	.298+	.268*
Total questions	.000	.346*	.293*
Self-oriented responses	-.070	.043	-.163
Other-oriented responses	-.028	.000	-.094
Total responses	-.064	.043	-.163
Total transacts	.263	.072	.244+
Partners			
Self-oriented statements	.167	-.537**	-.114
Other-oriented statements	.459*	-.181	.219+
Total statements	.561**	-.382*	.118
Self-oriented questions	-.022	.223	-.029
Other-oriented questions	.085	.177	-.078
Total questions	.065	.243	-.076
Self-oriented responses	.000	.270	.233+
Other-oriented responses	.000	.223	.178
Total responses	.000	.297+	.250*
Total transacts	.378*	-.211	.067
Dyadic styles			
Egocentric	.268	-.306+	.045
Socratic	.023	.116	-.117
Egalitarian	.597***	-.139	.307*
Leadership	—	.337*	.284*

^aAll probability values are one-tailed.
 * $p < .05$. ** $p < .01$. *** $p < .001$. + $p < .10$.

hoc. The styles, conceptualized by combining the focal and partner transact measures that independently predicted focal posttest, represent four distinct interactional patterns observed and reflect transaction at the level of the dyad. However, for the purpose of hypothesis-testing, the four dyadic styles may be ranked hierarchically to reflect four degrees of transactive engagement with the partner from the focal subject’s point of view.

Egocentric style is defined as the combination of self-oriented statements by the focal subject and self-oriented statements by the partner. It represents an absence of engagement with the partner and a focus on the self. Egocentric style was suggested by a pattern of negative correlations in the peer group.

Socratic style is defined as other-oriented questions by the partner

combined with self-oriented responses by the focal subject. It represents the focal's passive engagement in the transactive dialogue and features the focal's compliance with the partner's requests for transacts. Socratic style was suggested by the question-and-response pattern typical of discussions by adult-child dyads reported earlier.

Egalitarian style, defined as the combination of other-oriented statements by the focal subject and other-oriented statements by the partner, represents the focal's active and spontaneous collaboration with the partner in the transactive dialogue. It features the focal's and partner's equal status, and was suggested by the pattern of transacts typical of discussions by peer dyads previously reported and by a pattern of significant positive correlations in the adult-child group.

Leadership style is defined as the total questions by the focal subject combined with total responses by the partner. It represents the focal's most active level of engagement in the transactive dialogue. Leadership style features the focal's spontaneous control of the interaction by way of questioning and passive compliance by the partner, and was suggested by a pattern of significant positive correlations in the peer group.

For these four specific discussion styles, scores were assigned to dyads by simply adding the individual proportional transact scores involved. Each dyad, then, received four style scores, one score for each of the four discussion styles. Thus, the dyads were not characterized as using one style as opposed to the other three. Instead, the proportional use of the four styles in each dyad's discussions was measured. There was no difference between the groups in the use of egocentric style (for the adult-child group, $M = 0.06$, $SD = 0.06$; for the peer group, $M = 0.10$, $SD = 0.09$; $t = n.s.$). However, as suggested by the previously reported results, adult-child dyads featured more socratic style interaction ($M = 0.19$, $SD = 0.14$) than did peer dyads ($M = 0.04$, $SD = 0.07$), $t(46) = 4.44$, $p < .001$. Peer dyads featured more egalitarian style interaction ($M = 0.27$, $SD = 0.12$) than did adult-child dyads ($M = 0.14$, $SD = 0.09$), $t(46) = 4.27$, $p < .001$. In addition, peer dyads featured more leadership style interaction ($M = 0.02$, $SD = 0.05$) than adult-child dyads ($M = 0.00$, $SD = 0.00$), $p = .02$ (Fisher's Exact Test). A Fisher's Exact Test was employed to compare the groups' use of leadership style due to a lack of variability in the adult-child group. The four discussion styles were correlated with focal posttest scores for the two groups separately and for the total sample (see Table 1), with one exception. The absence of variability in the use of leadership style in the adult-child group (zero evidence of its use) made a correlation coefficient inappropriate for that group. These correlations between the dyadic styles and focal posttest scores also served the selection of variables for the multiple regressions.

Multiple regressions. All measures significantly correlated with post-test reasoning were selected to enter the multiple regression equations with one exception: When two correlating measures were not mutually exclusive, such as other-oriented statements and total statements, the measure with the highest correlation coefficient was selected to enter the equation. This was done to eliminate the collinearity of the two predictors, protecting that assumption of multiple regression analysis.

For the total sample, the adult-child group, and the peer group, equations were calculated two ways, utilizing as predictors (a) the individual transact measures and (b) the discussion style transact measures. All variables competed to enter the equations. Results of the multiple regression analyses are presented in Table 2.

Two equations were written to describe the total sample. For the first equation, the following predictors were entered: focals' total statements, focals' total questions, partners' other-oriented statements, and partners' total responses. The equation created by the four individual transact variables was not successful in describing the entire sample, $F(4, 43) = 1.88, p$

Table 2. Multiple Regression Analyses

Model				Predictors	Predictors' Contributions	
F	df	p	R ²		t	p
Total Sample						
1.88	4,43	.13	.15	Partner—other oriented statements	0.90	.37
				Focal—total statements	1.05	.30
				Focal—total questions	1.07	.29
				Partner—total responses	-0.30	.77
4.05	2,45	.02	.15	Egalitarian	1.95	.06
				Leadership	1.76	.09
Adult-Child Group						
5.55	2,21	.01	.35	Focal—other oriented statements	1.00	.33
				Partner—total statements	2.18	.04
12.15	1,22	.002	.36	Egalitarian	3.49	.00
Peer Group						
3.91	3,20	.02	.37	Focal—total questions	0.62	.54
				Partner—self oriented statements	-2.82	.01
				Partner—total responses	0.20	.85
3.71	2,21	.04	.26	Egocentric	-2.05	.05
				Leadership	2.18	.04

= .13, multiple $r^2 = .15$. The variables did not independently make significant contributions to the model.

In the second equation, egalitarian style and leadership style were selected for entry by the aforementioned criteria. The equation created by the two discussion styles accounted for 15% of the variance and the contribution was significant, $F(2, 45) = 4.05, p = .02$. The two variables contributed to the model at a marginally significant level (.06 and .09 for egalitarian and leadership, respectively), which was superior to the level of contribution of individual transact measures and suggests that the discussion style variables may be more powerful predictors than individual transact measures.

Two equations were written to describe the adult-child group. The first equation utilized individual transact measures. Focals' other-oriented statements and partners' total statements were entered. The equation successfully described the adult-child group, $F(2, 21) = 5.55, p = .01$, multiple $r^2 = .35$. Focals' other-oriented statements did not contribute significantly to the model ($p = .33$), but partners' total statements did ($p = .04$). The second equation utilized egalitarian style as a predictor and was highly successful, $F(1, 22) = 12.15, p = .002$, multiple $r^2 = .36$. Egalitarian style contributed significantly to the model ($p < .0001$).

Two equations were written to describe the peer group. The first equation utilized individual transact measures: focals' total questions, partners' self-oriented statements, and partners' total responses. This equation successfully described the peer group, $F(3, 20) = 3.91, p = .02$, multiple $r^2 = .37$. However, only one variable, partners' self-oriented statements, contributed significantly to the model ($p = .01$), having a negative relationship with reasoning.

The second equation utilized discussion style variables, egocentric style and leadership style. This equation was significant, $F(2, 21) = 3.71, p = .04$, multiple $r^2 = .26$. Both variables contributed significantly to the model. Egocentric style made a significant contribution ($p = .01$), with a negative relationship with reasoning; leadership style contributed significantly ($p = .04$) with a positive relationship with reasoning.

The discussion styles that predicted outcome varied between the groups: Egalitarian style was predictive in the adult-child group; leadership style was positively predictive in the peer group; and egocentric style was negatively predictive in the peer group. This difference in predictors was tested for significance: First, the correlation between egalitarian style and focal posttest scores was calculated for the adult-child group and for the peer group (as reported in Table 1). The correlations for the two groups are significantly different, $z = 2.68, p < .01$. Second, the correlation between egocentric style and focal posttest scores was calculated for the two groups

(Table 1); the correlations are significantly different, $z = 2.00, p < .05$. Third, the correlation between leadership style and focal posttest scores was calculated for the peer group (Table 1). It was inappropriate to calculate a correlation in the adult-child group because of zero evidence of leadership style use. Therefore, it was impossible to compare correlations between the adult-child and peer groups. However, given the absence of leadership style in the adult-child group, and given the significant correlation between leadership style and posttest scores in the peer group, it appears that the two groups varied meaningfully in the presence of a relationship between leadership style and outcome.⁵

To summarize the multiple regressions: For the sample as a whole, leadership style and egalitarian style were the best positive predictors of posttest reasoning. That is, those dyadic styles consisting of greater spontaneity and activity by focal subjects were most predictive of growth. For adult-child dyads considered alone, egalitarian style was predictive, and for peers considered alone, leadership style predicted reasoning.

DISCUSSION

These results support Piaget's hypothesis (1932) that interaction with peers during middle childhood is important to the development of moral reasoning. The findings of the present study indicated that children paired with peers for a discussion of sociomoral dilemmas produced more sophisticated moral reasoning, subsequent to the discussion, than did children paired with adults.

Other results of the present study confirmed another part of Piaget's hypothesis. As Piaget predicted, children who were paired with peers used reasoning (transacts) in their intervention discussions in a qualitatively different way than did children who were paired with adults. A pattern of activity in peer transaction and passivity in adult-child transaction was found in Kruger and Tomasello (1986) and here as well. Although Kruger and Tomasello also found quantitative differences in transacts, this finding was not replicated here in that form. In the present study, focal girls with adults generated as many transacts as did focal girls with

⁵Because there were trivial differences in pretest scores, partial correlations also were performed, measuring the relationship between discussion styles and posttest scores, controlling for pretest scores. The pattern of results was unchanged, but the degree of some relationships was affected. Egalitarian style: adult-child group, $r = .442, p < .05$; peer group, $r = -.187, n.s.$; $z = 2.14, p < .05$. Egocentric style: adult-child group, $r = .225, n.s.$; peer group, $r = -.305, p < .10$; $z = 1.75, p < .10$. Leadership style: adult-child group, not measured (as before); peer group, $r = .290, p < .10$.

peers overall, but they were of a different nature in the two situations. The transacts generated by focals paired with adults were passive, elicited by the adults and not spontaneously produced. The transacts produced by focals paired with peers were active in nature, spontaneously generated without prompting by the partner. The present finding of differences in the quality of transaction is of more crucial theoretical significance. The active quality of transaction, rather than the amount of transaction, is hypothesized to be related to reasoning development.

A third set of results here supported Piaget's contention of a causal link between the use of reasoning in discussions with peers and the greater reasoning level subsequent to peer interaction. In the present study, the use of spontaneous, self-generated transacts by focal girls was predictive of their subsequent reasoning. Dyadic styles that featured such activity by the focal girl, egalitarian and leadership, were predictive of posttest reasoning for the total sample. Whether a child was paired with a peer or an adult, active reasoning in dyadic discussions led to a more sophisticated reasoning at posttest.

Thus, this third set of results, when viewed in light of group differences in dyadic style, is critical to the Piagetian hypothesis. The differential level of reasoning subsequent to discussions with peers and adults may be attributed to the differential use of reasoning by the groups. Children who were paired with peers engaged in egalitarian- and leadership-style discussions more often than did children who were paired with adults. These two types of discussions were predictive of focal moral reasoning at posttest for the total sample. The interpretation of these findings is that the type, rather than the amount, of transactive discussion generated was important to subsequent reasoning and that the partner in the discussion, whether peer or adult, constrained the type of transacts produced. Peer symmetry of power allowed greater activity of reasoning, from egalitarian co-construction to leadership, and this activity was critical to development.

In both groups, the type of focal transacts that were predictive of reasoning represented control and responsibility. Children paired with adults who engaged in active critiquing subsequently showed greater reasoning skills. Instead of a consistent pattern of compliance, they showed the ability to share control of the conversation and were willing to criticize the adult's thinking, to treat the adult as a peer. Children who were paired with peers generally engaged in shared control of the interaction and showed greater posttest scores than children who were paired with adults. Those focals in peer dyads who assumed an even greater share of responsibility were particularly likely to show improvement. That is, when children paired with peers acted as adults, assumed more control, and questioned the other, they developed in their reasoning.

Two considerations may limit the generality of the current findings. First, these data represent the effect of a single, brief experience by the subjects. Although the present intervention was brief, however, it was designed to enhance thinking in a specific content area, distributive justice, and this is what was measured at pre- and posttest. Furthermore, other training studies with brief interventions (e.g., Nelson & Aboud, 1985) have been effective and have recorded effects beyond the time of the experiment (e.g., Damon & Killen, 1982). Although it remains an empirical question, long-term interventions may promote the effectiveness of Socratic dialogue. At present, the importance of such adult-child interaction is undefined, but it has been demonstrated that, in general, moral discussions between children and adults can be related to changes in reasoning (Azrak, 1978; Grimes, 1974; Hoffman, 1970, 1980; Holstein, 1972; Parikh, 1980; Stanley, 1976). Second, observation may have affected adults and children differentially, but such differences in response to "performance pressure" may reflect similar differences between adults and children in their approaches to interaction in general. Often adults may feel motivated to regulate and guide children (Kaye & Charney, 1981; Martinez, 1987; Rogoff & Wertsch, 1984; Vygotsky, 1978), particularly in discussions of moral dilemmas (Youniss, 1980). Children, by contrast, may view such interactions less seriously, creating a looser, more playful experience.

The present study has demonstrated the importance of peer interaction in the development of the sociocognitive skill of moral reasoning. Other researchers have compared the effect of peer and adult-child interaction on cognitive tasks, such as planning, and have produced results that differ sharply from those presented here. It has been demonstrated that peer dyads and adult-child dyads differ in their problem solving style when engaged in a planning task (Gauvain & Rogoff, 1989), and adult-child interaction is more effective than peer interaction in fostering the development of planning skills (Radziszewska & Rogoff, 1988). Whether these different findings are attributable to different methodologies or whether, in fact, the beneficial social process in problem solving is dependent on the domain of the task involved remains an important empirical question.

It has been demonstrated previously that transacts are important to change in moral reasoning in training studies with adults (Berkowitz & Gibbs, 1983) and with children (Damon & Killen, 1982). It also has been established that children use transacts in qualitatively different ways with peers and adults (Kruger & Tomasello, 1986). In the present study, evidence is presented for the first time that peer discussions of moral dilemmas result in greater improvement in moral reasoning than do discussions between children and adults. In addition, these data indicate that a spontaneous, active use of reasoning is conducive to moral reasoning development.

Mutual engagement in transactive dialogue was predictive of posttest scores when it occurred between children and adults as well as when it occurred between peers. However, here, children in peer dyads had the freedom to use this important, active reasoning more often than did children paired with adults. The peers' equal status allowed a critical reciprocity that was infrequent in adult-child dyads. Thus, Piaget's contention (1932) that symmetry of power leads to greater moral reasoning development is supported, and the current study indicates that active reasoning is the essential element in the process.

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