DOCUMENT RESUME

ED 365 610 SO 023 654

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TITLE Beyond Gender Differences: Traditional and Alternative Cognitive Strategies.
PUB DATE Apr 93
NOTE 54p.; Paper presented at the Annual Meeting of the American Educational Research Association (Atlanta, GA, April 12-16, 1993).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Behavioral Science Research; *Cognitive Processes; *Cognitive Style; Cultural Differences; Elementary Education; *Epistemology; Feminism; Grade 3; *Learning Strategies

ABSTRACT

This document reports on a study that attempts to move beyond the polarization of labels and move toward a unity that transcends distinctions of gender and gender's embeddedness in the larger culture. While the traditional male model in studies of cognitive approaches has been challenged by feminist scholars, there is still some question of the efficacy of current methodology and terminology in addressing and understanding differences in cognitive styles not necessarily attributable to gender differences. This study extends feminist terminology and perspective to the more inclusive "alternative." "Alternative" is intended to include all non-traditional cognitive strategies and to better define them within the limits of language. This exploratory study proposes a more holistic conceptual paradigm that encompasses a variety of learning approaches. These approaches are measured by a dialectic instrument that strives for a more authentic equity in method as well as in interpretation. The instrument is designed to move beyond the polarity and structural observational format of traditional discourse coding categories. The dimensions measured are: (1) process and goal oriented; (2) discovery and didactism; (3) rational and intuitive; (4) separate and related; (5) exclusion or inclusion; (6) breadth and concentration; (7) support and challenge; (8) personal and impersonal; (9) self-concern and other concern; (10) inner-directed and outer directed; and (11) listening and speaking. Through these conceptual lenses, both the content and intent of student discourse in third grade science classes is examined and interpreted. The instrument used for the research and charts and graphs illustrating study results are included in appendixes. (Author/DK)

Beyond gender differences: Traditional and alternative cognitive strategies

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Paper pr sented at American Educational Research Association
Annual Meeting, April, 1993, Atlanta, Georgia

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ABSTRACT:

The purpose of this investigation is to move beyond the polarization of labels and move towards a unity that transcends distinctions of gender and gender's embeddedness in the larger culture. While the traditional "male" model in studies of cognitive approaches has been challenged by feminist scholars, there is still some question regarding the efficacy of current methodology and terminology in addressing and understanding differences in cognitive styles not necessarily attributable to gender differences. This study extends "feminist" terminology and perspective to the more inclusive "alternative." "Alternative" is intended to include all non-traditional cognitive strategies and to better define them within the limits of language. This exploratory study proposes a more holistic conceptual paradigm that encompasses a variety of learning approaches. Furthermore, this research maintains that recently designed collaborative models of instruction, such as the cognitive apprenticeship model (Brown, Collins & Newman, 1989), have been successful because they validate the continuum of learning approaches addressed in this study.

These approaches are measured by a dialectic instrument that strives for a more authentic equity in method as well as in interpretation. This instrument, based on theoretical rationale which overlaps with the work of Peirce, Habermas and Jakobson, is designed to move beyond the polarity and structural observational format of traditional discourse coding categories and to capture the wider and more inclusive context heretofore reserved for thick description alone. The basis for the categories addressed is Belenky, Clinchy, Goldberger & Tarule's list of bimodal learning approaches that they identified with "women's ways of knowing" (1986). These dimensions have been developed, through a more encompassing "alternative" lens, into eleven conceptual continua. The dimensions included are: process and goal oriented; discovery and didactism; rational and intuitive; separate and related; exclusion or inclusion; breadth and concentration; support and challenge; personal and impersonal; self-concern and other concern; inner-directed and outer directed; listening and speaking. Through these conceptual lenses, both the content and intent of student discourse in third grade science classes is examined and interpreted.

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INTRODUCTION

The issue of equity in the classroom is an enduring concern. Researchers have long examined differences in school-age children's attitudes, behavior and achievement. However, this work is typically gender-related, comparing attributes of male and female students within a male framework (Hart, 1992). Traditionally, in education as in psychology, the disparity between a male dominated culture and women's experience has been ignored, with male values being treated as "normal" and "natural" for both sexes (Gilligan, 1982; Noddings, 1991).

Therefore, not only the results, but the research methods themselves reflect a gender bias, perpetuating these distinctions by unintentionally reinforcing subliminal barriers to equal access to education. "Equal access" goes beyond equal opportunity to "the recognition of the female point of view toward experience" (Gilligan, Lyons, & Hanmer, 1989). Carol Gilligan (1982) described two styles of reasoning which, although varying in the degree to which they are adopted by individuals, she identified as gender-related. The traditional style is objective, logical, and justice-based, reflecting a "male" approach based on separation and competition (Lesko, 1988). The other — "the different voice" that Gilligan identified with women — is subjective, intuitive, and relationship-based.

This research recognizes that there are differences in cognitive strategies that have been viewed as gender-related and that these differences are embodied in classroom discourse and reflected in achievement levels. However, since inequality is multi-dimensional with numerous critical differences including race, class, ability, motivation, and others, in addition to gender (Cookson, 1991), the meaning of male/female terminology throughout this literature is not so much tied to gender as to theme, as

Gilligan (1982) pointed out, and they are not mutually exclusive. It represents a linguistic distinction between two modes of thought, allowing room for gender to interact with race, culture and social class.

Several decades ago, Wittgenstein (1965) argued that language in and of itself creates opposition. Foucault (1977) continued this critique of linguistic categorization, writing that the subjection of difference is a construction projected onto "the other" which suppresses differences, delimits rights, and establishes this projection as a legitimacy. While recognizing, as Habermas did (1973), that an ideal speech situation in which there is no salient bias, may, in fact, be unattainable, the very searching for one cannot help but create a more equitable discourse. Thus, this investigator would expand the "feminist" terminology and perspective to the more inclusive "alternative."

"Alternative" is intended to include all non-traditional cognitive strategies and to better define them within the limits of language. Derrida (1981) argued that western thought has been always structured in terms of polarities, and that these polarities are not independent and equal. The second term is considered the negative, corrupt version of the first: good vs. evil; presence vs. absence; being vs. nothingness; male vs. female. Therefore, the terminology is not simply oppositional but is inherently hierarchical.

Recent theoretical views of gender differences have also argued that oppositions are more linguistically based than biologically based (Chodorow, 1978). Additionally, the research literature shows that gender-related differences in science, for example, are present in some countries but not in others (Jones & Wheatley, 1990; Walberg, 1991). This also suggests that the differences are sociocultural and not biological. While relevant research on the topic has not been conclusive (Hall & Hoff, 1988), mean differences in performance between sexes on science tasks are often found (Walberg, 1991).

With this in mind, science was chosen for the focus of this study. Science is one of the most emphasized academic subjects in schools because, in our technological society, economic development is linked to the potential contribution of improved science education (Walberg, 1991). Yet, achievement in science and access to related disciplines is historically higher for traditional, mainstream, "male" students.

Most studies examining differences in science achievement have dealt with high school or junior high populations (e.g.; Walberg, 1991; Carlsen, 1990; Morse & Handley in Wilkinson & Marrett, 1985). However, because science is hierarchical, in that basic concepts need to be mastered before advanced topics can be learned, students without a thorough knowledge base in the earlier grades are likely to fall behind. (What Walberg, 1991, terms the Matthew Effect.) Thus it is critical to study earlier years of schooling. Because of this and because, developmentally, the "age of reason" is not reached until 8 years of age (Case, 1986), third grade was selected.

Although disparities between gender-related cognitive strategies exist before school age (Chodorow 1978; Eccles & Blumenfeld in Wilkinson & Marrett, 1985) and so are not primarily caused by classroom interaction, the interactions do contribute to maintaining the disparities (Cazden, 1988). If adults (consciously or not) do not value a particular child's learning or way of learning of some skill, the interchanges involving that skill "will be unlikely to provide the finely tuned directives necessary to encourage the child's inferences." (Stone, in press). Goodnow (1989) also emphasizes the need to consider the culturally and socially determined explicit or implicit value of a skill in interpersonal dynamics.

This study thus explores a more holistic conceptual paradigm that encompasses a variety of learning approaches evidenced, hopefully with both fewer and less covert

biases, in an instrument that strives for a more authentic equity in method as well as in interpretation.

Furthermore, this research maintains that recently designed collaborative models of instruction, such as the cognitive apprenticeship model (Collins, Brown & Newman, 1989), have been successful because they validate this continuum of learning approaches. With the current shift toward cognitive and metacognitive models of instruction, there has been an increasing interest in understanding active knowledge construction rather than passive knowledge acquisition (Woolfolk, 1991; Phye & Andre, 1986).

This research has focused on higher-order thinking processes and their development through social interaction (Bereiter, 1990; Cole, 1989; Stone, 1991), based on the Vygotskiian (1978) notion that all higher cognitive functions are derived from interactions with others. If differences in school performance are related to differences in the use of higher order cognitive strategies such as problem solving and reasoning (Bjorklund, 1989), then perhaps each student uses different cognitive strategies to construct knowledge. This would imply that the poorer classroom performance of a student involves a potential "mismatch" between the cognitive strategies acquired and used in learning contexts outside of school and those demanded in the classroom (Thornburg, 1991; Garner,1990).

Through the incorporation of "traditional" taxonomy such as complexity sequencing, repetition, and skill practice, and by assuming connectedness, group orientation, cooperation and mutual responsibilities, the cognitive apprenticeship model promotes the development of higher-order thinking within a context of human relationships. This approach fosters an optimal learning environment accessible through a wide range of cognitive strategies. The argument Collins, Brown and Newman (1989)

make, verified by recent research (Reid & Stone, 1991; Thornburg, 1991), is that the cognitive apprenticeship model allows equal access to disciplines to groups traditionally lower in their achievement, as well as to higher achievers (Manning & Lucking, 1991). This would suggest that lower-achieving students (including learning disabled, ESL, and students from other than mainstream upper-middle class sociocultural backgrounds) may have alternate "ways of knowing" that are facilitated in the social milieu.

SAMPLE AND METHODOLOGY

The dialectic instrument for this study has been developed as a result of extensive preliminary classroom observations and consultations with colleagues and experts in field research. Because the observational data is organized using this new format, its use was piloted by the researcher and two assistants with four randomly chosen students from each of two randomly chosen classrooms other than, but similar in population to, the ones selected for the exploratory study.

Piloting included the researcher's recording of discourse. Transcriptions of the recorded discourse were independently evaluated by the researcher and two assistants according to the dialectic format. There were three pairs of assistants during the course of the study. Each member of a class was scored by the same pair of individuals. Teachers were also asked to evaluate the participating students in a similar fashion, and were interviewed in follow-up conversations by the researcher. Adjustments were made in the wording of the instrument until 85% of the answers were in agreement at $p < .05$. For example, the original explanation for the category of "Breadth" read "Generalist; dilettante." This was perceived by the assistants as having a negative connotation, so the description was changed to "Generalist; wide ranging; broadly connected."

Upon completion of the pilot study in early November, 1992, thirty randomly selected children (15 boys and 15 girls) in eight third grade science classes in seven suburban New York area public schools were studied. The schools are part of an ongoing state-funded research program involving teacher training in mathematics and science. The teachers have expressed their willingness to allow classroom observations for this independent endeavor by requests made through workshops held as part of the funded program. The participating schools were contacted and appointments were made for on-site observations of third grade science classes.

There were two male and six female teachers involved in this study. All were middle class to upper middle class. One was Hispanic. The rest were of European extraction. One was a first-year teacher; two had approximately eight years teaching experience; five averaged 21 years experience (with a range of 17 to 25) in the classroom. The average age was 47, with a range of 32 through 63.

The population of the schools involved in this study mirrors the population of urban schools, with a multi-racial student body from lower to lower middle class socioeconomic backgrounds, so the cohort is comparable to an urban setting. Of the thirty participating students, seven were of European heritage; five were African American; eight were Hispanic; and ten were Asian. Thirteen students were in supplementary English as a second language (ESL) programs.

The researcher conducted ethnographic research within the classrooms, observing each student on two separate occasions, about one week apart, for approximately twenty minutes each time during the course of the study. No more than two class periods were observed in a single day to prevent fatigue. The subjects were not aware that they were being individually observed. Detailed observation and discreet audio recording were

supplemented by semi-structured interviews with the teachers. Detailed descriptions of the teachers' individual pedagogical practices and teaching styles were also made.

Since content interacts powerfully with teaching method (Joyce, 1978), it is of great importance. Content components receive varying emphasis through the teaching model being used to convey it (Joyce, 1978). More recent research of aptitude treatment interactions (ATI) tends to verify Joyce's position (Woolfolk, 1991). Particular attention focused on the content of discourse to explore the development of higher order scaffolding by the teacher with "traditional" and "alternative" learners, and on the variables which make learning experiences different for each student. Explicit strategy instruction as well as the behavior of the teacher towards students, as manifested in discourse, was taken into consideration.

All observed classes were regularly scheduled hands-on science lessons with students working in pairs or groups. This type of lesson was chosen because it provided the opportunity to observe a wider range of behavior and to better assess a more varied range of interactions than more traditional instructional methods such as lecturing or board work would allow. Also, because students were actively involved in projects, the researcher was able to remain, relatively speaking, invisible, except for an occasional request for assistance from a student.

All teachers provided some level modeling prior to the lesson, demonstrating the steps needed to accomplish the task that the students would perform in their own separate but parallel activities. All teachers entertained questions and walked around the room during the activity answering questions, refocusing students not on-task, and, with one exception, prompting and scaffolding further learning.

Scaffolding is a discursive facilitator of learning whereby a task is broken down into smaller sequential steps and modeled by the teacher who then observes student attempts to solve it, withdrawing from the activity (fading) as the student develops mastery. Students' mastery of the task is evaluated as part of the learning process itself through, for example, encouraging students to articulate the strategies they used. Scaffolding may also be what Cazden (1988) has termed a "reformulation" of statements or questions. When a teacher asks a question and receives no response after several seconds, he reformulates it on a simpler level.

One teacher, as noted, was considerably more directive than the others, and did not support the students' "discovery" or discussion of an answer or solution. Instead of scaffolding, this teacher provided the "correct" answer. (This will be discussed later.) Otherwise, teaching styles, possibly due to the nature of hands-on lessons, were very similar.

The researcher transcribed recorded classroom discourse and ethnographic notes within 24 hours. Identifying factors, including gender, were removed from the transcripts which were then blind-coded by two assistants. The teacher and researcher also completed coding instruments on each student. The answers on the 120 completed coding instruments were correlated to determine level of agreement.

Frequency distributions of the dialectic codes were tabulated and treated verbally and visually. A correlational study of science achievement scores, as reported by the teachers, and dialectic codes of the subjects was made. The scores were also examined in view of the variables of gender, ethnicity, and academic achievement to examine the potential relationships among differences in the tendencies of dialectic codes, discourse, and cognitive strategies.

Since one cannot assume normalcy of the frequency data, the data was treated as ordinal. Non-parametric analysis was used for this reason and because the numbers in each individual classroom violate standards for sample size. Spearman rank order correlations were deemed the appropriate measurement in order to compare and contrast the magnitude of differences between each pair of measures (Siegel, 1956).

INSTRUMENTATION

This exploratory effort attempts to examine the content and intent of each student's discourse, and interpret the findings through an instrument designed to move beyond the polarity and structural observational format of traditional discourse coding categories and to capture the more inclusive context heretofore reserved for thick description alone.

Discourse analysis is the study of verbal and nonverbal language interactions in a given context and the examination and evaluation of patterns in and functions of that interaction. Although the relationship between thought and language is still cause for debate in cognitive research, analysis of classroom discourse has become an accepted context for examining thought processes. (Cazden, 1988; Forman & McPhail, 1989; Stone, 1989). Discourse analysis "captures the multiple influences that go into creating the context in which classroom lessons occur" (Lindsay,1990).

However, Brophy (in Wilkinson & Marrett, 1985) writes that research using quantitative, structural analysis of discourse does not allow for capturing the "subtleties and qualitative aspects of classroom events." Structural analysis tends to concentrate on patterns and structure and to ignore experience (Lesko, 1988). These studies have, for example, focused on enumerating teacher questions asked and/or counting frequency of praise and reprimands (Wittrock, 1986, in Carlsen, 1989), or the time length of each verbal

exchange (Carlsen, 1990). Other studies have linked the type of questions asked to the level of difficulty of the materials under discussion (Barr, 1987; Lindsay, 1990). Yet, they have not interpreted it from a wider and more comprehensive standpoint (Morse & Handley in Wilkinson & Marrett, 1985).

This research interprets discourse through an instrument that strives to bridge the objective and subjective in order to offer a more holistic communication. The creation of meaning and the self is an ongoing process from the standpoint of the subject shaped by experience and socially defined identity. This endeavor, while representing context frozen in time, attempts to acknowledge the multi-layered and sometimes contradictory experiences of self.

The basis for the categories addressed in the instrument used in this study is Belenky, Clinchy, Goldberger & Tarule's list of bimodal learning approaches that they identified with "women's ways of knowing" (1986). They interviewed 135 women representative of a diversity of ages, interests, education, circumstances, ethnicity, and social classes. From these interviews and the work of Carol Gilligan and William Perry, among others, Belenky and her colleagues (1986) developed their model of "educational dialectics." These dimensions have been developed, through a more encompassing "alternative" lens, into eleven conceptual continua that each address meaning from different epistemological perspectives.

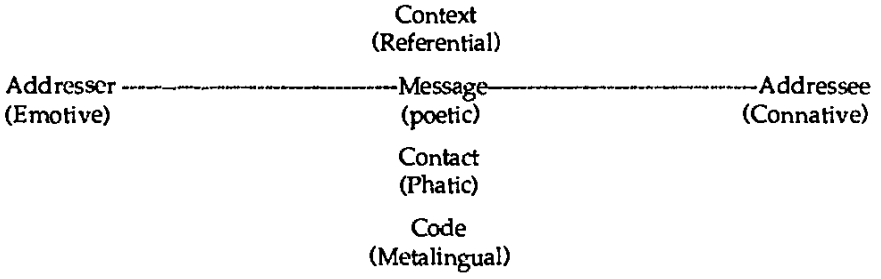
Established philosophical frameworks offer diffuse justifications for these approaches. Habermas (1971), building on the work of Peirce, asserted that we need to recognize that different realms of meaning are "equally valid in all communities" (Aber, 1989). According to Habermas (1979), the success of a speech act to convey the meaning of the utterance can only occur when the hearer enters into the relationship intended by

the speaker. Structural forms of discourse analysis, by their objective nature, do not allow room for this interpretive relationship.

Furthermore, because they may be dependent on context and/or extralinguistic communication, expressive speech acts (such as those that disclose, conceal, and reveal information) cannot be correlated with the expressive use of language as constative speech acts (true/false statements and other representations of fact) are correlated with the cognitive use of language and regulative speech acts (those that function to establish interpersonal relations) with the interactive (Habermas, 1979). Thus, one would have to look beyond, within, or possibly through the linguistic content to establish meaning of expressive speech acts and create a global orientation toward understanding meaning. Because it maintains such an awareness and builds on these Habermasian premises, Jakobson's approach toward communicative interaction provides a useful perspective applicable to the interpretation of discourse.

Jakobson's communication model (Brown, 1982) is grounded in semiotic theory and proposes six functions of language that provide a venue for examining the content and context of language. The emotive function concerns the speaker's attitude about what he says. It can be expressive (intentional and/or indirect/unintentional) or affective (attitudinal, proxemic, and kinesic). Affect has associative potentialities such as propaganda and poetry — the domains of metaphor (Rommetveit 1974). The opposite of emotive is connative, which produces an effect on the receiver inducing him to act (organizational mode) or react (affective mode). Connotative demands a performance. The referential function is denotative and cognitive. It is concerned with objectifiable, scientific and truth statements. The phatic function includes any (verbal or nonverbal) utterance used to establish, prolong or discontinue communication.

The classic of this model is reproduced below:



According to Jakobson: "The ADDRESSER sends a MESSAGE to the ADDRESSEE. To be operative the message requires a CONTEXT . . . seizable by the addressee and either verbal or capable of being verbalized; a CODE fully, or at least partially, common to the addresser and addressee (or in other words to the encoder and decoder of the message); and, finally, a CONTACT, a physical channel and psychological connection between the addresser and the addressee enabling both of them to enter in and stay in communication." (Sebeok, 1960, in Brown, 1982).

Jakobson pointed out that features of a message cannot be considered apart from their functions (Brown, 1982). The problem with most methodologies, as Brown points out about foreign language instruction, is that they view speech interactions as "object-oriented," treating all speech communication as if they depended only on the referential, denotative, or cognitive function, without making the implicit functions of the speech act explicit. The same can be said of traditional discourse coding categories. Attempts have been made to incorporate the phatic function, most notably by Courtney Cazden's (1988) inclusion of features such as "bounding off" in classroom discourse, but it remains primarily a verbal utterance. The emotive and affective functions have been relegated to descr :n alone and thus outside the realm of quantification. By encompassing

objective and subjective constituent elements of communication acts, the instrument attempts to begin to address a more complete discursive interaction, hopefully creating a more meaningful, equitable assessment.

Given the speculative nature of this research, using a conceptualization fairly new to the discipline, the investigator provides a brief description of relative concepts addressed in the instrument and speculates a discursive sample that could evidence the concepts. (See Appendixes A and B.)

A) Process or goal oriented: What is more important to the student — the means or the outcome? What is the purpose of education to this student? Is the child involved in the project or materials or anxious to get to the end result — or the "right" result?

B) Discovery or didactism: How does the student view knowledge and knowledge acquisition? Is it actively constructed through experience or passively received from an "authority?" Is the student a recipient or a source of knowledge? The student's behavior, questions, and contributions during lessons may provide evidence of this. For example, does the student share ideas [constructivist] or simply repeat back what was said [didactive]?)

C) Rational or intuitive: What method(s) does the student use for analysis? Are logical, analytic, objective methods or subjective, autonomous, "gut feelings" preferred? Does student follow instructions or "jump in" on his own? Why? Can the student give reasons for his conclusions? What type of reasons? Does the student rely on universal principles and deduction or favor context, relativity and induction?

D) Separate or related: What is the relationship between learning and "life?" Is schooling compartmentalized or synthesized? Does the student attempt to connect learning to what is already known? Does the student maintain a formal, impersonal

stance, separating schooling from other areas of life? Or does the child attempt to connect knowledge to their personal schema, perhaps as exemplified in relating an event or asking a question that indicates an effort to integrate the knowledge?

E) Exclusion or inclusion: Does the student prefer being with others or being alone or on her own? Which style(s) of learning has the student experienced and favored? Does the student prefer to work in a collaborative, cooperative way or a solitary, competitive way. Does the student join in group activities or remain an "outsider"? Why? Does s/he join in if encouraged or still resist?

F) Breadth or concentration: What is the range of the student's interest in learning? Is it general and wide-ranging or specific and focused? Is knowledge in-depth or superficial? Is it narrowly or broadly connected?

G) Supportive or challenging: Who and what are experienced as supportive and/or non-supportive? Does the student respond more to direct guidance and assistance or challenges of problem solving? Does the student turn to peers or teacher for help? Does the student resist soliciting or accepting guidance?

H) Personal or impersonal: How does the student view the relationship between self and other? How are the student's relationships structured with peers? Faculty? Staff? Are they formal or informal? Open and receptive or distant? Why?

I) Self-concern or other concern: Is caring for the self and/or others an issue in the student's classroom activities? This may be shown by expressions of concern, nurturing behavior, offers and giving of help, sharing, self-sacrificing behavior, and attitudes towards rights and responsibilities.

J) Inner-directed or outer directed: Is the student intrinsicly or extrinsicly motivated? What factors control goal setting, pacing, decision making, and evaluation

for the student? Who and what does the student experience as validating and/or nonvalidating? Does the student look to others for self-knowledge or within the self? Does the student tend to be judgmental or non-judgmental? Is the student prone to argue or attempt to understand the other viewpoint?

K) Listening or speaking: What are the student's experiences of verbalization? Does the student speak out or maintain silence? Is s/he outspoken or quiet? Is speaking or not speaking a voluntary act, a forced response, or a confrontation or avoidance? Is the student hesitant? Why? (Is it, for example, possibly due to learning style or lack of language ability or domain knowledge?) Is listening active or passive?

Process, Discovery, Intuitive, Related, Inclusion, Breadth, Supportive, Personal, Other-concerned, Outer directed, and Listening represent the "alternative" cognitive strategies. The poles of each continuum are separated by gradations of one through five on a likert-like scale. So, for example, a two rating on continuum A would be closer to a process oriented than a goal oriented perspective, and would translate into a rating of four when converted to traditional and alternative poles for statistical and descriptive purposes. Therefore, the lower the numeric value of the converted score, the more "traditional" the approach to learning. (See Appendixes C and D.)

Inter-rater agreement on 93.18% of answers was significant ($p < .05$ with a range of .40862 to 1.0 correlation), with eight out of the eleven categories reaching complete (100%) correlation at $p < .05$. The high level of agreement may be due to the overlapping of similar categories, which will be addressed later (See table 2). Teacher ratings showed the most disparity with the general consensus, especially in the categories of separate/related (87.5% agreement), concentration/breadth (87.5% agreement), and self-concern/other concern (50% agreement). (See Appendix E.)

One might expect teachers to disagree even more with the other three raters, since they bring more knowledge of each child to their ratings, but, on the whole, this was not the case. The most exteme disagreement was in the area of self-concern/other-concern, where teachers may have considered expressions of concern for others as disruptive or untimely. For example, on a student given a "5" rating on that category, the teacher wrote: "She will help anyone and everyone in the room. Whether she's supposed to or not." Since only two science classes were observed, during which time students were supposed to be helping each other, this may not have been apparent to the researcher and raters. On the other hand, perhaps this perception was based on the teacher's own general and specific biases.

The largest discrepancies in individual ratings were clustered in one class (students 5, 6 and 7.) It appeared to the researcher and two assistants that this teacher favored one student above the others, which may have contributed to the disagreement. This student was frequently complimented ("That's a good question!"), addressed by name more often than the others, and permitted to interrupt (such as asking "When are we having the science fair?" or engaging the teacher in a dialogue about his father's birthday in the middle of a discussion about the weather), while others who did this were ignored, reprimanded, or told to raise their hands.

While the teacher saw this child as highly "other-concerned," the other three raters saw him as highly "self-concerned." One assistant commented: "This student has a tendency to interrupt and seeks to focus attention on herself or himself." The teacher gave him the highest rating in "process oriented," "discovery," and "rational" poles while the other raters all gave him the highest rating in the opposite areas of "goal oriented," "didactic," and "intuitive." Similarly, the teacher rated the other students in

the study as highly "separate" and "exclusion" oriented, although other raters disagreed, commenting, for example, that "this students wants to be part of the group, but is not acknowledged by the teacher." Perhaps the teacher's judgement was colored by what she viewed as the "better" of each pair, even though it was clearly explained that each pole represented a different approach and one was not "better" than the other.

The other exception among the teachers was, as mentioned earlier, the more directive style of one teacher. This teacher provided detailed guidance during the entire activity, often telling students how to solve the problems they encountered without scaffolding or leading them to the discovery of a solution on their own, and without entertaining alternate methods or answers contributed by the students.

However, the scores of the students of the more directive teacher (students 22 through 26) were highly correlated ($p < .05$) with the scores of the other raters. One might have expected this more directive approach to result in a more "traditional" rating for this group of students, but this was not the case. The mean scores of these five students ranged from 2.704 through 3.636 and were normally distributed.

Teacher bias, in this case, seems to have made a difference in the consistency of the results obtained with the instrument, while teacher style did not.

Data from this and several other studies (Brophy in Wilkinson & Marret, 1985) comparing male and female teachers does not support the notion that teachers of either sex treat same sex students differently, more appropriately, or more effectively supporting Brophy and Good's (1974) conclusions that "sex differences in students' classroom experiences are not due to the sex of their teachers."

FINDINGS AND DISCUSSION

Since this research uses exploratory methods and is an ongoing endeavor, the findings are tentative. Out of 175 possible correlations, there were 34 significant at $p < .05$. Negative correlations are inversely related. So, for example, in Table 1, a "rational" cognitive strategy is highly correlated with academic achievement, as are "challenging" and "inner-directed." Given the number of statistics, correlations are presented in graphic form and the researcher has chosen to deal with those results found more compelling for this presentation.

INSERT TABLE 1

Only the overall mean score correlated with gender. Although males made up 80% of the "traditional" half of the students (with mean scores of 2.273 to 3.204) and females 80% of the "alternative" half (mean scores of 3.227 to 3.886) this was not significant across instrumental categories, which may be a function of the small N (30).

However, it may be noteworthy that variations in male scores ranged 40% wider than female scores. Because the population for this study was comprised of eight year olds, this wider variation may simply reflect the more uneven developmental or maturational differences among males at that age (Maccoby & Jacklin, 1974). Or, it may reflect cultural factors, such as a wider range of socially acceptable behaviors available to one sex, with a corresponding restriction of similar freedoms for the other.

One could speculate that the differences in the span of the ranges may also be a result of the interaction between gender and ethnicity. Does such an interaction, for

example, pull the male in two directions as he tries to establish an equilibrium between the opposing tendencies of his own inclinations and societal expectations? And is this, in fact, a stronger issue for males than females? Further study is needed to explore this, especially if the unusually high percentage of differences in distribution curves between genders remains in a larger sample.

Both female and male showings were strongest in "traditional" realms. "Inner-Directed/Outer-directed" was the most strongly "male" category (with 10 falling in the "traditional" half and 5 in the "alternative"). "Speaking/Listening" was the most strongly "female" category (with 9 falling in the "traditional" half and 6 in the "althernative"). This latter finding is discrepant with the majority of studies on gender differences and the use of language that generally find that the men "speak" and the women "listen." (See Belenky, et. al, 1986, for further discussion.)

Five instrumental categories were evenly split by gender (8 or 7 "traditional" and 7 or 8 "alternative"): "Goal oriented/Process oriented;" "Self-concern/Other-concern;" "Didactism/Discovery;" "Separate/Related;" "Concentration/Breadth."

"Rational/Intuitive," "Exclusion/Inclusion," "Challenging/Supportive," and "Impersonal/Personal" categories all totalled 9 "traditional" males, 6 "alternative" males and 6 "traditional" females, 9 "alternative" females. Although the aforesaid scores were consistent when grouped by gender, they were not obtained by the same individuals.

INSERT TABLE 2

The high number of correlations in table 2 may, in part, be due to the similarity of categories such as "Speaking/Listening" with "Separate/Related" and others based on behaviors indicative of tendencies in the areas reflected in interpersonal relations.

While the overall mean score correlates with six of the eleven instrumental categories, ("Rational/Intuitive," "Separate/Related," "Exclusion/Inclusion," "Concentration/Breadth,," "Impersonal/Personal," and "Self-concern-Other-concern") only two of these categories ("Rational/Intuitive" and "Separate/Related") also correlate with academic achievement. Three correlate with ethnicity (Rational/Intuitive, "Separate/Related," and "Self-concern/Other-concern"). None correlate with gender.

Further work will be directed toward determining the semantic inclusiveness and overlap of these categories in an effort to ascertain whether they provide sufficient differentiation of discernible characteristics. Individual correlations will be reexamined based on the conclusions of this endeavor and, if warranted, correlations will be determined on aggregate group scores of homogeneous categories to compare significance levels with those described earlier.

The previous descriptions may impact on the reader in a way suggestive of discrete entities, which, this researcher maintains, they are not. In an effort to represent data in a less divisive, hierarchical way, circular "continuum wheels" were constructed. By visually presenting research results as a continuum, it is hoped that gender, ethnicity, and academic achievement may be more easily seen as component parts of a whole. For example, the bipolar peaks of "males" that would appear at each end of a linear continuum of mean scores appear here as a less oppositional "cluster." Through the mediation of visual representation, it is hoped that a more holistic paradigm might be brought closer to realization. (Appendix F)

A comparison of gender and ethnicity reveals that while all European-American males are in the "traditional" span of scores, none of them are in the top 40%, which is 83% Asian and includes two females, only one of whom is of European background. This comparison raises issues about the relation between ethnicity and gender. It might also suggest that perhaps ethnicity is a stronger factor than gender in determining cognitive approaches — or that perhaps they should not be separated. These are issues to be explored at a future time.

Although ESL students were evenly distributed throughout the continuum of learning styles, this may also be a factor for further consideration. The degree of English proficiency, or the perception of such proficiency by the speaker, may have a direct bearing on some of the instrumental categories which may be, at least in part, speech dependent. Other confounding variables may include self-esteem, motivation, and physical contact between students and teachers.

Fourteen students were reported by their teachers as above average to high in academic and science achievement. Of these, eight (1 female and 7 males) may be characterized as "traditional" and six (2 males and 4 females) as "alternative" in cognitive strategies, if we divide the wheel by mean scores. Five (one "alternative" female and four "traditional" males) are ESL students. However, eight of those fourteen also fall in the lower half of the visual representation of the continuum, which may be seen as reflecting a combination of traditional and alternative strategies, or a facility with both types. Yet, here too, males remain in the majority, occupying five of the eight slots. In this half, one female and two males are ESL students. The remaining six students then cluster at the poles — interestingly divided in half and occupying the three most extreme ends of both

traditional (two ESL males and one female) and alternative (one male and two female) poles. The high achievers include almost half of all ESL students.

Six were reported to be average students and ten to be low to below average in achievement. Average students were comprised of two "alternative" females, two "traditional" females, one of whom is also an ESL student, and two "traditional" males. Of the lower achieving students, three scored as "traditional" learners and seven as "alternative." The three low achieving students with traditional scores were all males, two of whom are ESL students. All of the six low achieving females, four of whom are ESL students, had alternative scores.

This may indicate that cognitive strategy may be even more important than gender or ethnicity for lower achieving students. Perhaps alternative cognitive strategies, which predominate among children prior to school age and are acquired outside of the classroom, have not transferred to the school environment, as Garner set forth in her theory of settings (1990).

Or, perhaps, as Gumperz argued, lower achieving students are less adept at "code switching" between "home" language and "school" language — a language, in this case being, according to Bakhtin, "discourse peculiar to a particular stratum of society within a given social system at a given time" (Wertsch, 1991, in Mckeough & Lupert, 1991). Since two-thirds of the low achieving students were ESL students, while only one-third of the higher achieving students were, this may warrant further attention. The ESL literature lends support to this explanation through studies of contextualized and decontextualized language use (Treuba, 1989; Seliger, 1988; Tharp & Gallimore, 1987; Cummins in Hakuta, 1986).

On the other hand, since approximately half of the higher achieving males were ESL students, while only one-fifth of the females were, perhaps we are back to the conundrum this endeavor began with — the multi-dimesionality of inequity and the embeddedness of every critical difference within each of the others. The question to be addressed then becomes "Does addressing the cognitive strategies of students regardless of gender, ethnicity, and class provide a solution to the dilemma of creating more equitable access to education ?"

There is a tradition of functionalist educational research that claims to address this dilemma. However, its "fatal empirical flaw," as discussed by Bereiter (1990) is that this tradition provides a means of predicting or weighing the effects of different variables, but, "if one's goal is understanding and explanation, then it is necessary to take account of interactions — with the possibility that the effect of any one variable depends on the state of the other variables." Furthermore, as Cronbach (1975, in Bereiter, 1990) said, "Once we attend to interactions, we enter a hall of mirrors that extends to infinity. However far we carry our analysis . . . untested interactions of a still higher order can be envisioned."

This endeavor does not escape the "hall-of-mirrors." But it does attempt to lessen the glare and the distraction of the multiplicity of images in order to focus on the more pragmatic issue of what can be done about creating a more equitable learning environment.

Belenky, Clinchy, Goldberger & Tarule (1986) concluded that "connected teaching" (instruction that uses the "midwife" model rather than the typical "banking model" [Freire, 1968]) complemented the learning approaches of women — the basis for the "alternative" cognitive strategies addressed in this study. According to Freire's

views of teaching models, (1968), this practice of problem-solving, cognitive oriented education is dialogic and mediational. The dialogic use of language, as Habermas said (1971), always requires hermeneutic understanding. Rommetveit defines hermeneutics as "the openness of language towards intuitively and experientially shared knowledge," and the embeddedness of the act of speech in social life (1974). This social interaction results in comparisons among multiple perspectives, giving one access to other approaches. The teacher and students become co-creators of knowledge through discourse. This perspective echoes Vygotskiian theory and is incorporated into the cognitive apprenticeship view of instruction (Collins, et al., 1989). This model works because it makes possible the perceiving of wholes while being simultaneously aware of patterns, parts and relationships as constituant features of the whole — an approach this research has struggled to reflect.

CONCLUSION

Durkheim argued that all conceptions have their origins in society. (Lesko, 1988). This study attempts to partially illuminate the issues of equity in schools, and the society of which they are a reflection. The purpose of this paper has been to explore a perspective on research in general and discourse analysis specifically, that might yield a more holistic paradigm. It partially elucidates the difference between traditional and alternative learning styles, and, more generally, adds to the growing knowledge of discourse (Morse & Handley, 1985, in Wilkinson & Marrett, 1985; Carlsen, 1989, 1990) and, specifically, its impact on learning differences in content instruction. Knowing more about the interactional processes of learning and their different relationships to individual students should add to our efforts to define effective teaching and

develop/emphasize instructional strategies which address individual styles of learning and interaction.

This research also sought to examine the potential relationships among differences in the frequency of dialectic scores and instructional strategies in relation to gender, ethnicity, and achievement. It would be premature to offer conclusions about the success or lack of success of this initial effort. However, some consistent observations and trends have been identified and presented in the findings and discussion section of this paper.

This endeavor has raised some of the issues surrounding the possibility of a holistic, equitable educational approach based on cognitive strategies as a "unit" of analysis, rather than the more divisive categories that have dominated equity research. "Units," according to Vygotsky (1988), "designated a product of analysis that contained all the basic characteristics of the whole" (Moll, 1990). Such a cognitive approach does not ignore the forces of gender, ethnicity, class, and achievement, but, building on Vygotskiian perspectives, encompasses them within the paradigm (Wertsch, 1985). Likewise, the resulting situated learning context recognizes that knowledge is densely interwoven with social and physical realms (Brown, Collins, & Duguid, 1989) and does not attempt to artificially separate them.

In a Vygotskiian approach, it is semiotic mediation that links the setting with individual cognitive functioning. One of the advantages to his perspective is the focus on practical activity which is a priori theory. To acknowledge the theoretical embeddedness of these constructs and the paradoxes that this research has illuminated, may be sufficient to move beyond theory and return to the realm of praxis.

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Student Code #_____

Rater Initials_____

APPENDIX A
EDUCATIONAL DIALECTICS INSTRUMENT

RATING SCALE

	1	2	3	4	5	
A) **Process Oriented** Means	O	O	O	O	O	**Goal Oriented** Ends

What is the purpose of education to this student? Connection or mastery? The means or the outcome? Evidence: For example, is the child involved in the project or materials, or anxious to get to the end result — preferably the "right" result?

B) **Discovery** Constructed knowledge	O	O	O	O	O	**Didactism** Received knowledge

How does this student view knowledge and knowledge aquisition? Is it actively constructed or passively received? Is the student a recipient or a source of knowledge? Evidence: content of student's questions and contributions during class. Does the student share ideas (constructivist) or simply "report" (didactive)?

C) **Rational** Logical, analytical, objective	O	O	O	O	O	**Intuitive** Gut feeling, subjective

What method(s) does the student use for analysis? Are logical, analytic, objective methods or subjective, autonomous, "gut feelings" preferred? Evidence: responses and procedures: Does the student wait for/follow instructions or jump in" on their own? Why? Can the student give reasons for conclusions? What type of reasons? Does the student rely on universal principles and deduction or favor context, relativity, and induction?

Student Code #_____

Rater Initials_____

	1	2	3	4	5	
D) **Separate**	O	O	O	O	O	**Related**
Compartmentalization						Synthesis

What is the relationship between learning and "life"? Is schooling compartmentalized or synthesized? Possible evidence: Does the student attempt to connect knowledge to their personal schema, perhaps as exemplified in an episodic narrative or a question that indicates such an effort, or does the student maintain a formal, impersonal stance?

E) **Inclusion** O O O O O **Exclusion**
Co-operative, collaborative Solitary, competitive

Does the student prefer being with others or being alone or on their own? Which style(s) of learning has the student experienced? Favored? Possible evidence: Does the student join in group activities or remain an "outsider?" Why? Does s/he join in if encouraged or still resist?

F) **Breadth** O O O O O **Concentration**
Generalist, wide-ranging Specialist, focused

What is the range of the student's interests in learning? Is knowledge in-depth or superficial? Narrowly focused or broadly connected?

G) **Supportive** O O O O O **Challenging**

Who and what are experienced as supportive/nonsupportive? Does the student respond more to direct assistance or challenges of problem solving? Evidence: Does the student turn to peers or teacher for help? Does the student resist soliciting or accepting guidance?

Student Code #_____

Rater Initials_____

	1	2	3	4	5	
H) **Personal**	O	O	O	O	O	**Impersonal**

How does the student view the relationship between self and the content of learning? How are relationships structured with peers? Faculty? Staff? Are they formal or informal? Open and receptive or distant?

I) **Self-concern** O O O O O **Other-concern**

Is caring for self vs. others an issue in the student's classroom activities? Possible evidence: expressions of concern, nurturing behavior, offers and giving of help, sharing, self-sacrificing, rights vs. responsibilities.

J) **Inner-directed** O O O O O **Outer-directed**

Intrinsic or extrinsic motivation? What factors control goal setting, pacing, decision making and evaluation for the student? Who and what does the student experience as validating/nonvalidating? Does the student look to others for self-knowledge or within the self? Does the student tend to be judgemental or non-judgemental? Prone to argue or understand the other viewpoint?

K) **Listening** O O O O O **Speaking**

What are the student's experiences of verbalization? Does the student speak out or maintain silence? Is s/he outspoken or quiet? Is speaking or not speaking a voluntary act, a forced response, or an avoidance or confrontation? Is the student hesitant? Why? (for example: due to learning style or lack of domain knowledge?) Is listening active or passive?

Please feel free to add any other comments you think would helpful in this assessment. Use the back of this page to do so.

FOR INTERNAL USE ONLY

CODE #_____

APPENDIX B

TEACHER QUESTIONNAIRE

EDUCATIONAL DIALECTICS INSTRUMENT

School _____ Teacher _____

Grade _____ Student _____

Student's Age _____ Sex_____ Ethnic background _____

RATING SCALE

	1	2	3	4	5	
A) **Process Oriented** Means	O	O	O	O	O	**Goal Oriented** Ends

What is the purpose of education to this student? Connection or mastery? The means or the outcome? Is the child involved in the project or materials, or anxious to get to the end result?

_____

_____

_____

_____

_____

B) **Discovery** Constructed knowledge	O	O	O	O	O	**Didactism** Received knowledge

How does this student view knowledge and knowledge aquisition? Is it actively constructed or passively received? Is the student a recipient or a source of knowledge? Does the student share ideas (constructivist) or simply "report" (didactive)?

_____

_____

_____

_____

_____

C) **Rational** Logical, analytical, objective	O	O	O	O	O	**Intuitive** Gut feeling, subjective

What method(s) does the student use for analysis? Are logical, analytic, objective methods or subjective, autonomous, "gut feelings" preferred? Does the student "jump in" on their own? Can the student give reasons for conclusions? What type of reasons?

_____

_____

_____

_____

_____

FOR INTERNAL USE ONLY

CODE #_____

1 2 3 4 5

D) **Separate** O O O O O **Related**

Compartmentalization Synthesis

What is the relationship between learning and "life"? Does the student attempt to connect knowledge to their personal schema, or maintain a formal, impersonal stance?

E) **Inclusion** O O O O O **Exclusion**

Co-operative, collaborative Solitary, competitive

Does the student prefer being with others or being alone or on their own? Does the student join in group activities or remain an "outsider?" Why? Does s/he join in if encouraged or still resist? Which style(s) of learning has the student experienced? Favored?

F) **Breadth** O O O O O **Concentration**

General, wide ranging Specific, focused

What is the range of the student's interests in learning? Is knowledge narrowly or broadly connected?

G) **Supportive** O O O O O **Challenging**

Who and what are experienced as supportive/nonsupportive? Does the student respond more to direct assistance or challenges of problem solving? Does the student resist soliciting or accepting guidance?

FOR INTERNAL USE ONLY

CODE #_____

	1	2	3	4	5	
H) **Personal**	O	O	O	O	O	**Impersonal**

How does the student view the relationship between self and the content of learning? How are relationships structured with peers? Faculty? Staff? Are they formal or informal? Open and receptive or distant?

I) **Self-concern** O O O O O **Other-concern**

Is caring for self vs. others an issue in the student's classroom activities?

J) **Inner-directed** O O O O O **Outer-directed**

Is the student intrinsically or extrinsically motivated? What factors control goal setting, pacing, decision making and evaluation for the student? Who and what does the student experience as validating/nonvalidating? Does the student look to others for self-knowledge or within the self?

K) **Listening** O O O O O **Speaking**

What are the student's experiences of verbalization? Does the student speak out or maintain silence? Is s/he outspoken or quiet?

On the back of this page, please give a brief evaluation of the student's language and academic abilities, including strengths and weaknesses. Please add any other comments you think would be helpful in this assessment.

APPENDIX C

EDUCATIONAL DIALECTICS INSTRUMENT

TALLEY SHEET

SUBJECT_____

Rating Scale

	1	2	3	4	5	
A) Process Oriented						Goal Oriented
B) Discovery						Didactism
C) Rational						Intuitive
D) Separate						Related
E) Inclusion						Exclusion
F) Breadth						Concentration
G) Supportive						Challenging
H) Personal						Impersonal
I) Self-concern						Other-concern
J) Inner-directed						Outer-directed
K) Listening						Speaking

Comments: _____

APPENDIX D

Instrument Conversion
to traditional and alternative poles for statistical purposes

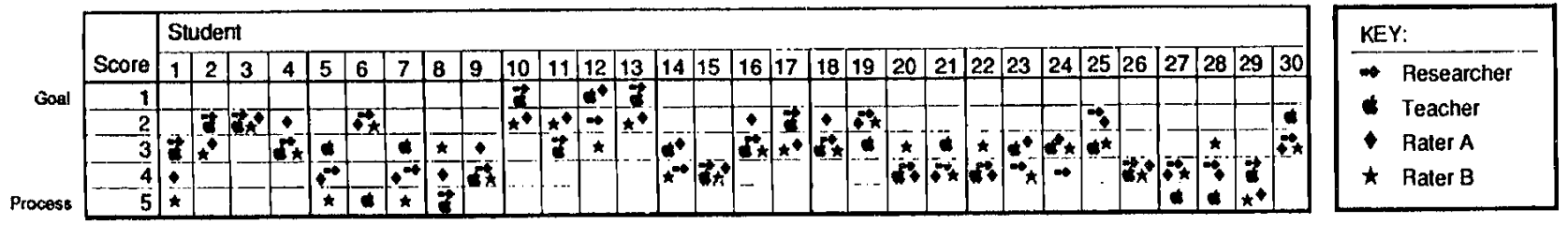
SUBJECT_____

Note: Traditional and alternative poles on the dialectic instrument used in this study were randomly assigned either a first or last position. This chart converts those poles so that all "traditional" categories are on the left and alternative categories are on the right. Ratings for categories that were listed in this order on the instrument will remain the same, while those that were in the opposite order will be converted to conform to the same directional scale. For example, a rating of 1 for the category of "Process Oriented/ Goal Oriented," which was listed with the alternative pole first on the rater's instrument, would become a 5 on this conversion scale, while ratings on the "Rational/Intuitive" category will remain the same, since that category was originally listed in this format.

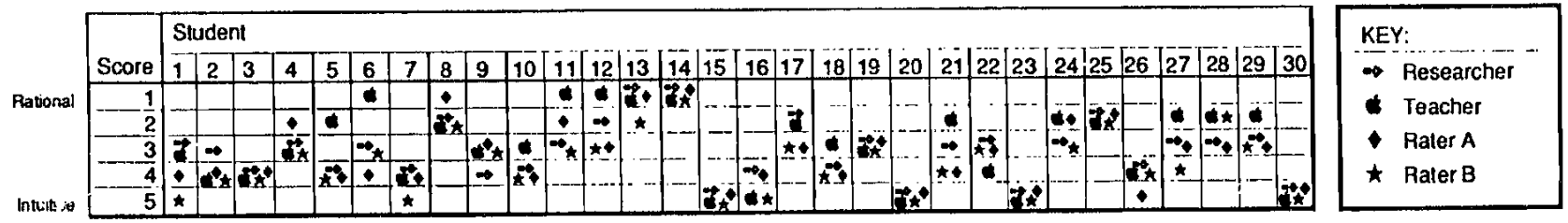
Traditional Poles:	1	2	3	4	5	Alternative Poles:
Goal Oriented	☐	☐	☐	☐	☐	Process Oriented
Didactism	☐	☐	☐	☐	☐	Discovery
Rational	☐	☐	☐	☐	☐	Intuitive
Separate	☐	☐	☐	☐	☐	Related
Exclusion	☐	☐	☐	☐	☐	Inclusion
Concentration	☐	☐	☐	☐	☐	Breadth
Challenging	☐	☐	☐	☐	☐	Supportive
Impersonal	☐	☐	☐	☐	☐	Personal
Self-concern	☐	☐	☐	☐	☐	Other-concern
Inner-directed	☐	☐	☐	☐	☐	Outer-directed
Speaking	☐	☐	☐	☐	☐	Listening

APPENDIX E (1)

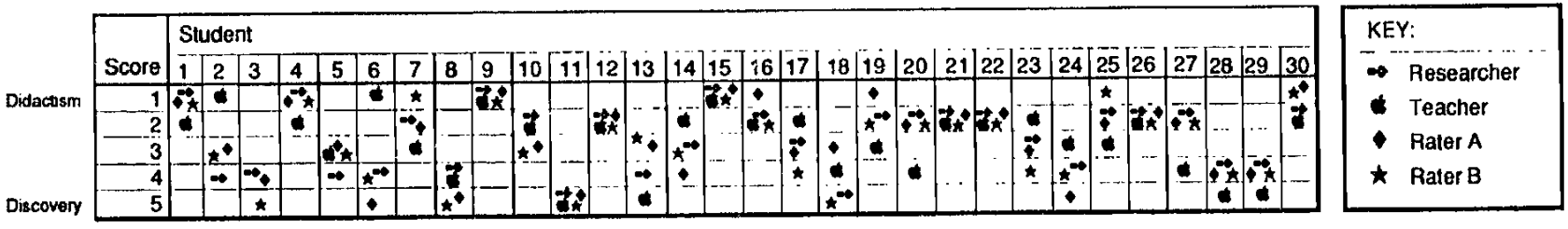
Inter-rater Reliability:
Goal Oriented/Process Oriented



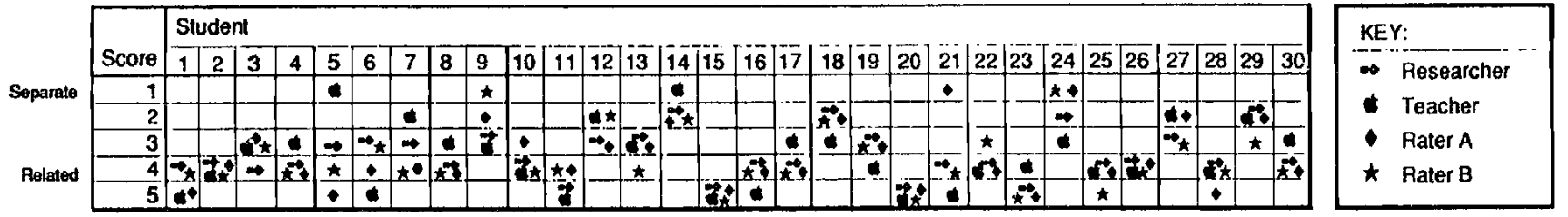
Inter-rater Reliability:
Didactism/Discovery



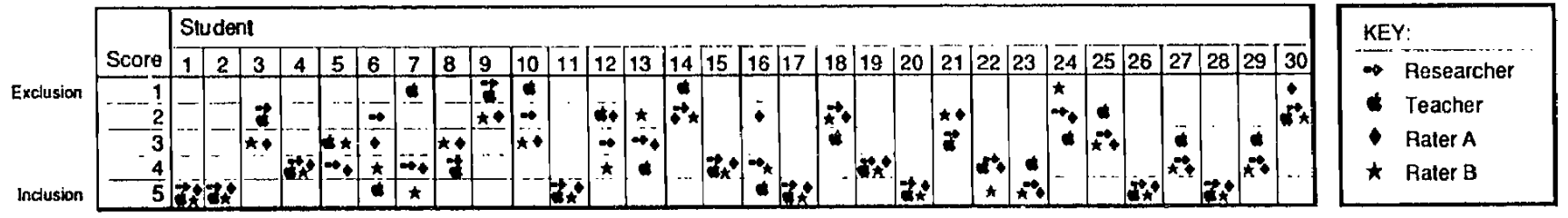
Inter-rater Reliability:
Rational/Intuitive



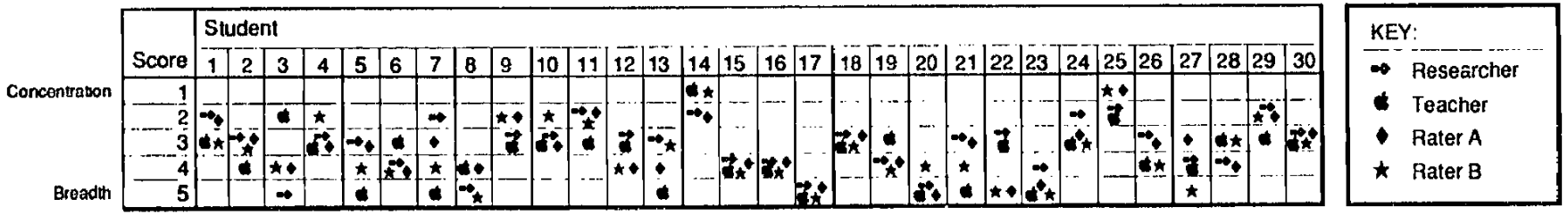
Inter-rater Reliability:
Separate/Related



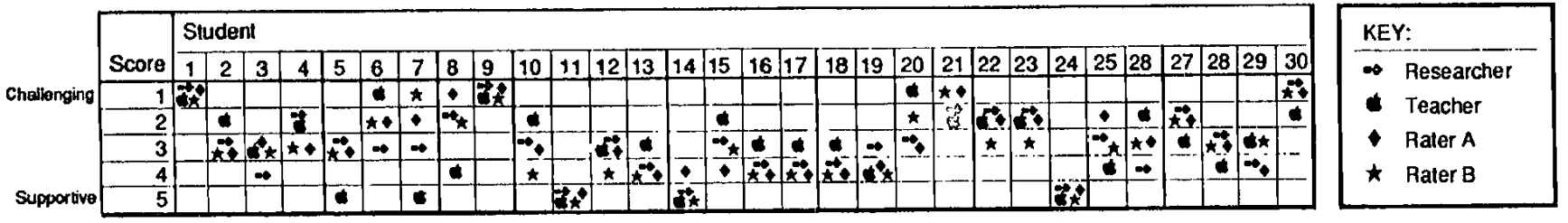
Inter-rater Reliability:
Exclusion/Inclusion



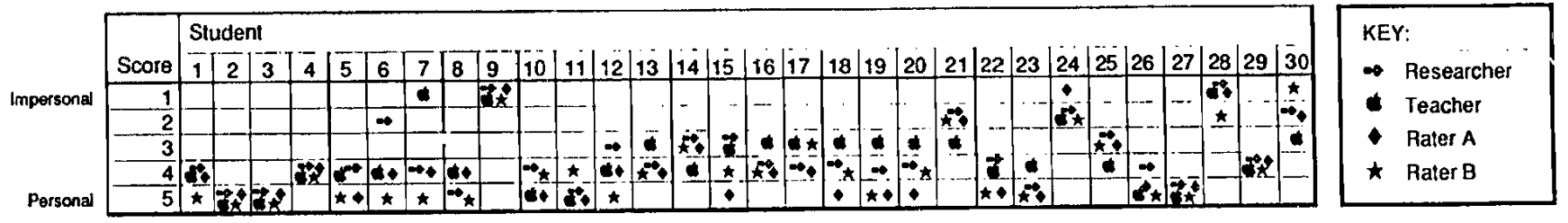
Inter-rater Reliability:
Concentration/Breadth



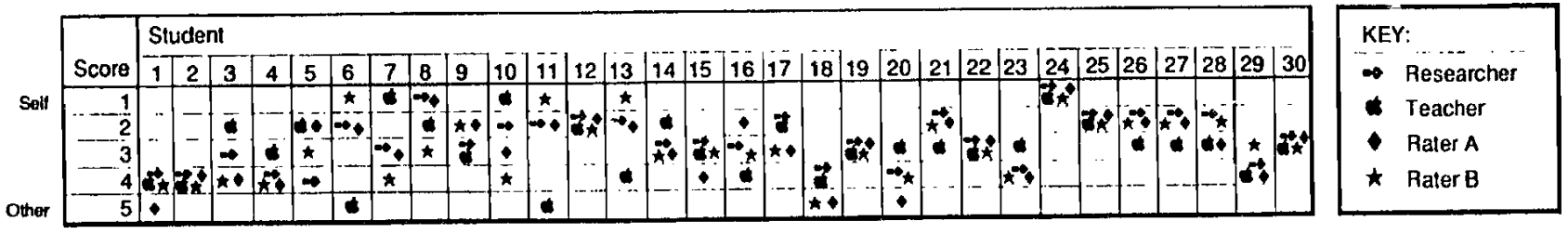
Inter-rater Reliability:
Challenging/Supportive



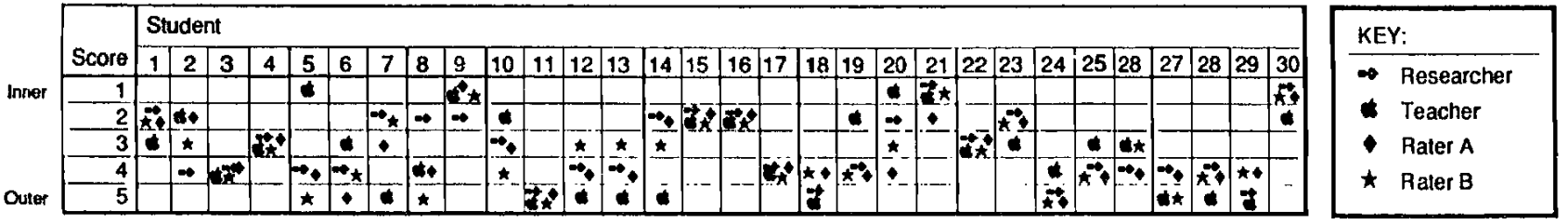
Inter-rater Reliability:
Impersonal/Personal



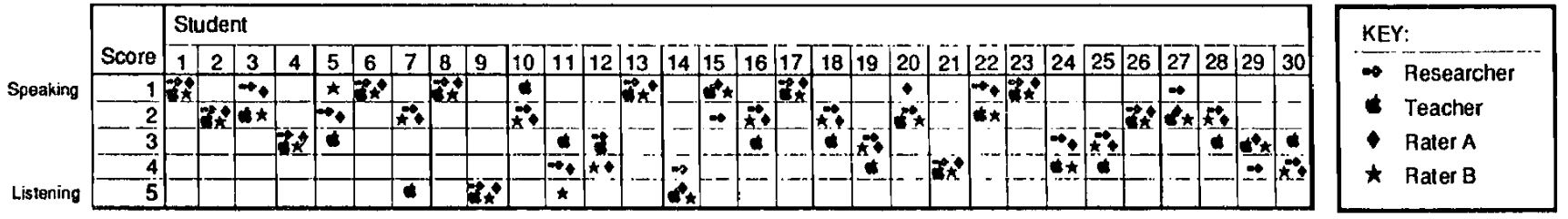
Inter-rater Reliability:
Self-concern/Other-concern



Inter-rater Reliability:
Inner-directed/Outer-directed

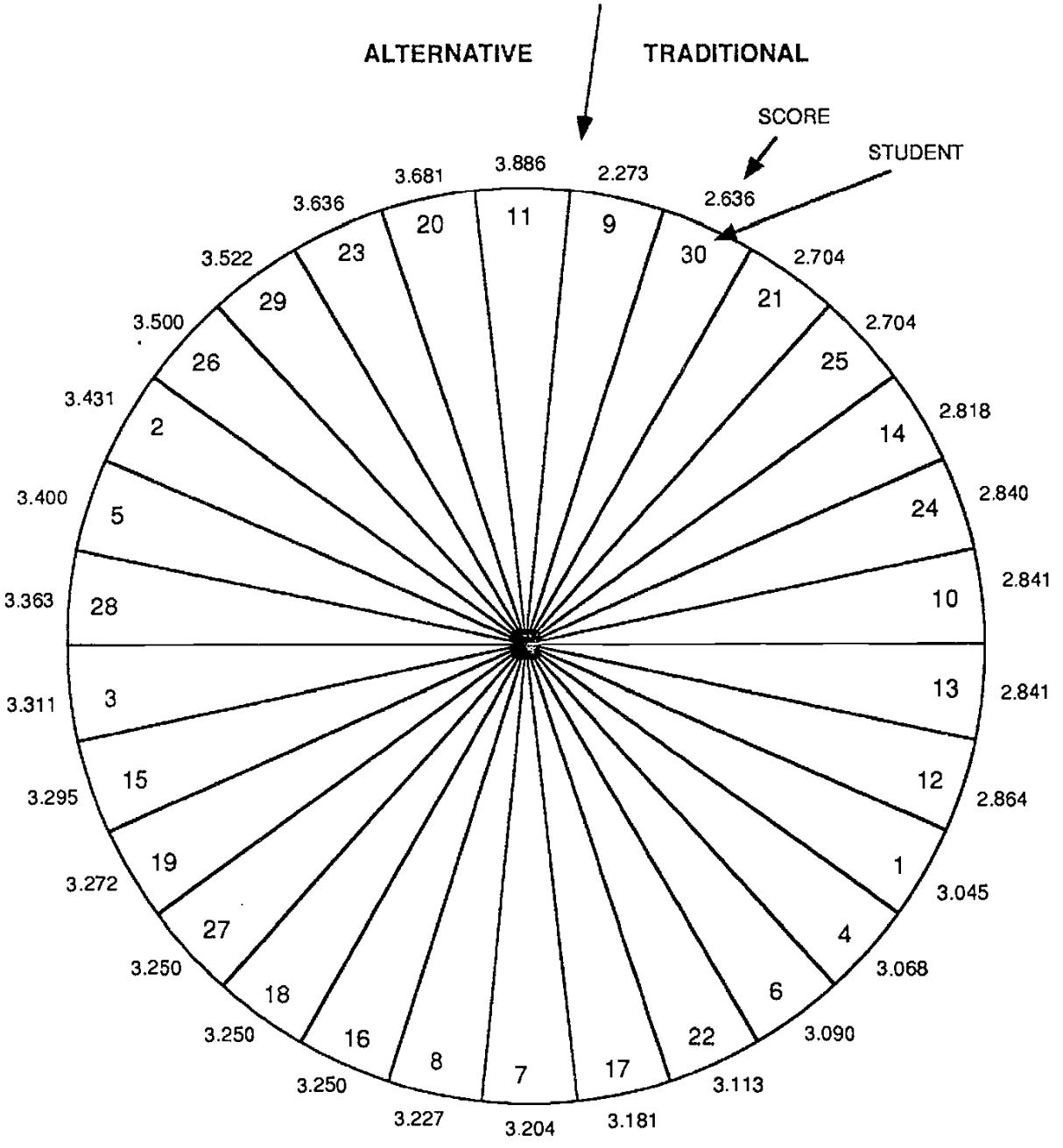


Inter-rater Reliability:
Speaking/Listening

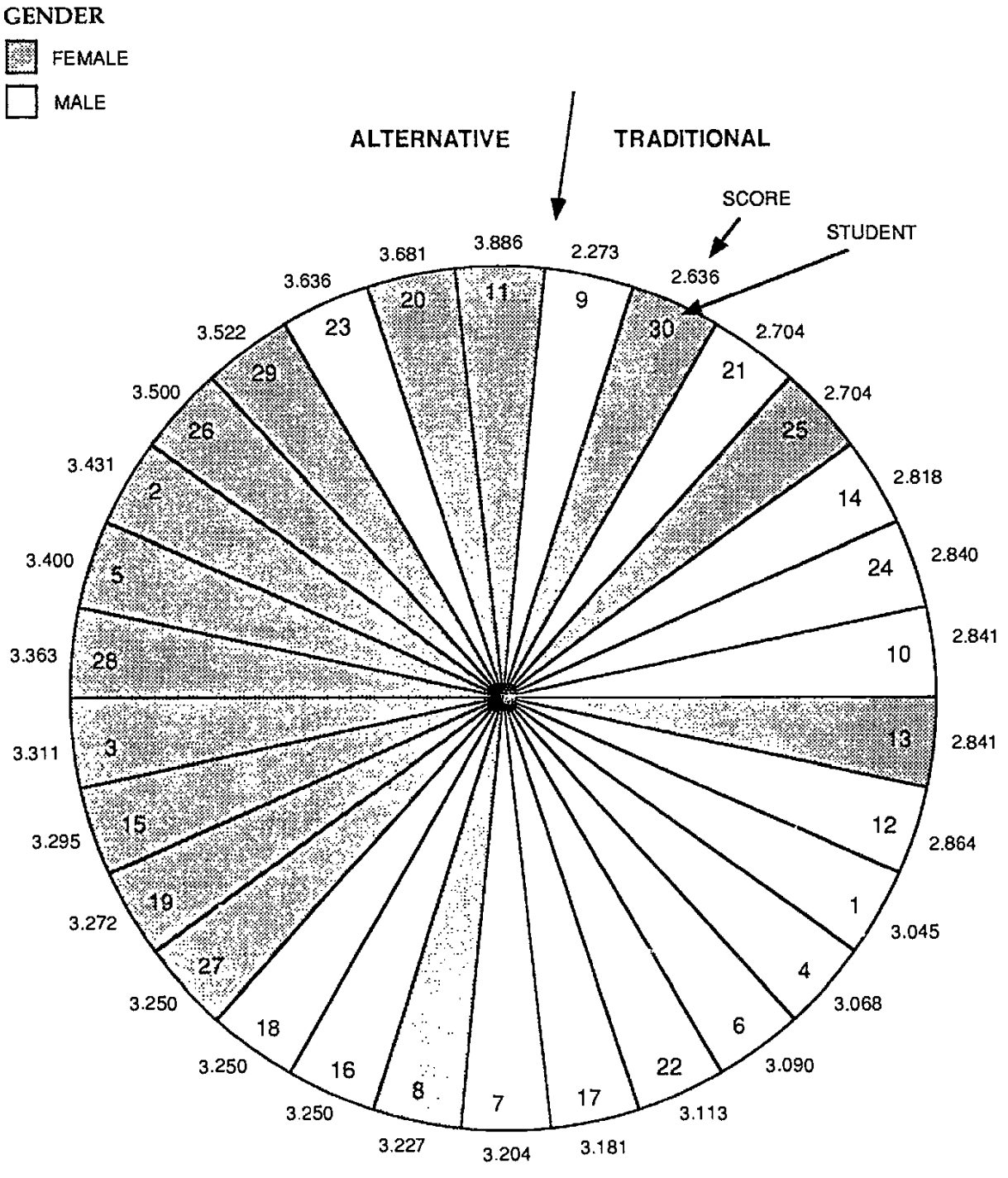


APPENDIX F (1)

MEAN SCORE CONTINUUM



APPENDIX F (2)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FEMALE
MALE
ALTERNATIVE
TRADITIONAL
SCORE
STUDENT
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2.636
2.704
2.704
2.818
2.840
2.841
2.841
2.864
3.045
3.068
3.090
3.113
3.181
3.204
3.227
3.250
3.250
3.272
3.295
3.311
3.363
3.400
3.431
3.500
3.522
3.636
3.681
11
9
30
21
25
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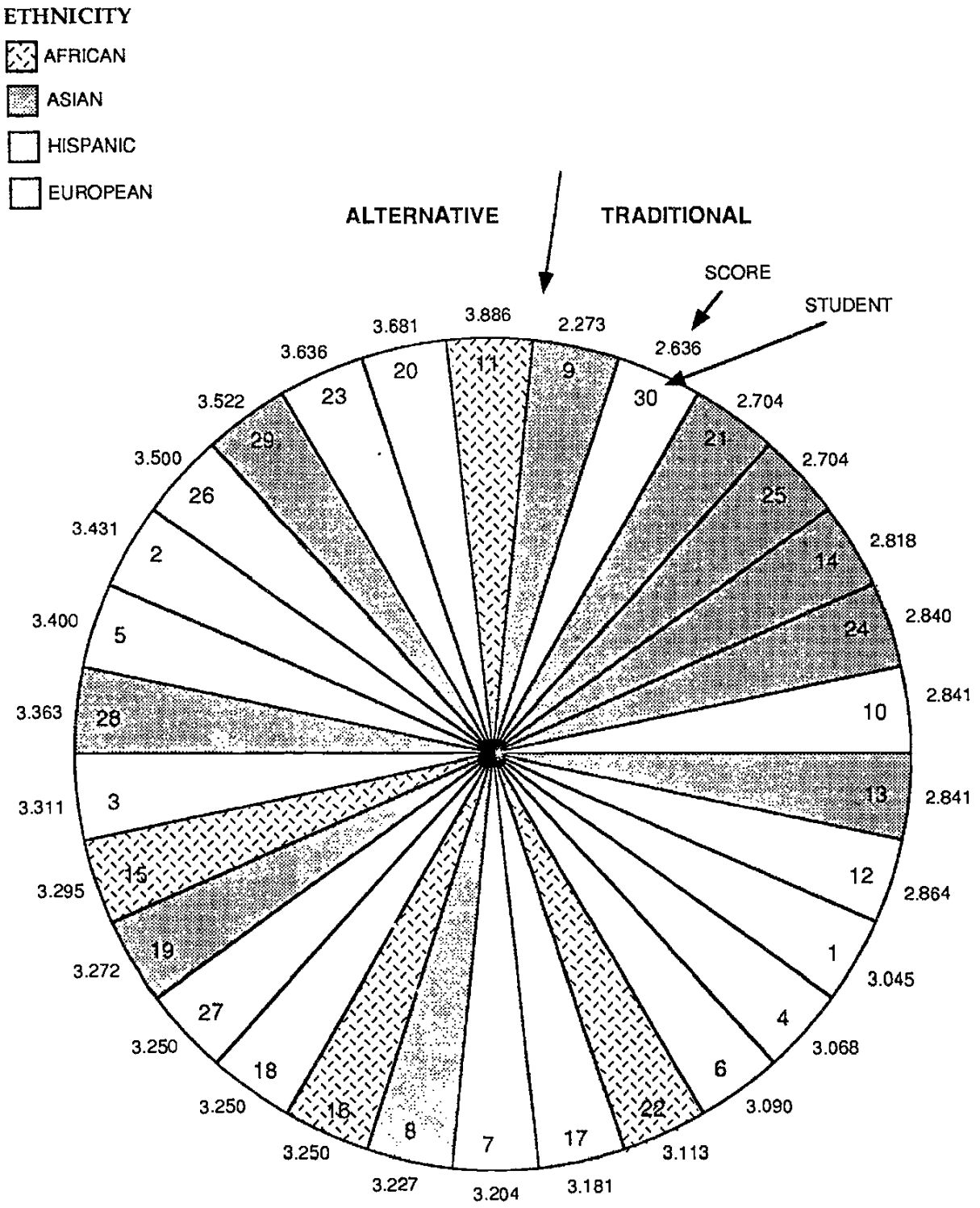
13
12
1
4
6
22
17
7
8
16
18
27
19
15
3
28
5
2
26
29
23
20

APPENDIX F (3)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ASIAN
HISPANIC
EUROPEAN
ALTERNATIVE
TRADITIONAL
SCORE
STUDENT
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2.636
2.704
2.704
2.818
2.840
2.841
2.841
2.864
3.045
3.068
3.090
3.113
3.181
3.204
3.227
3.250
3.250
3.272
3.295
3.311
3.363
3.400
3.431
3.500
3.522
3.636
3.681
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30
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25
14
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4
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22
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27
19
15
3
28
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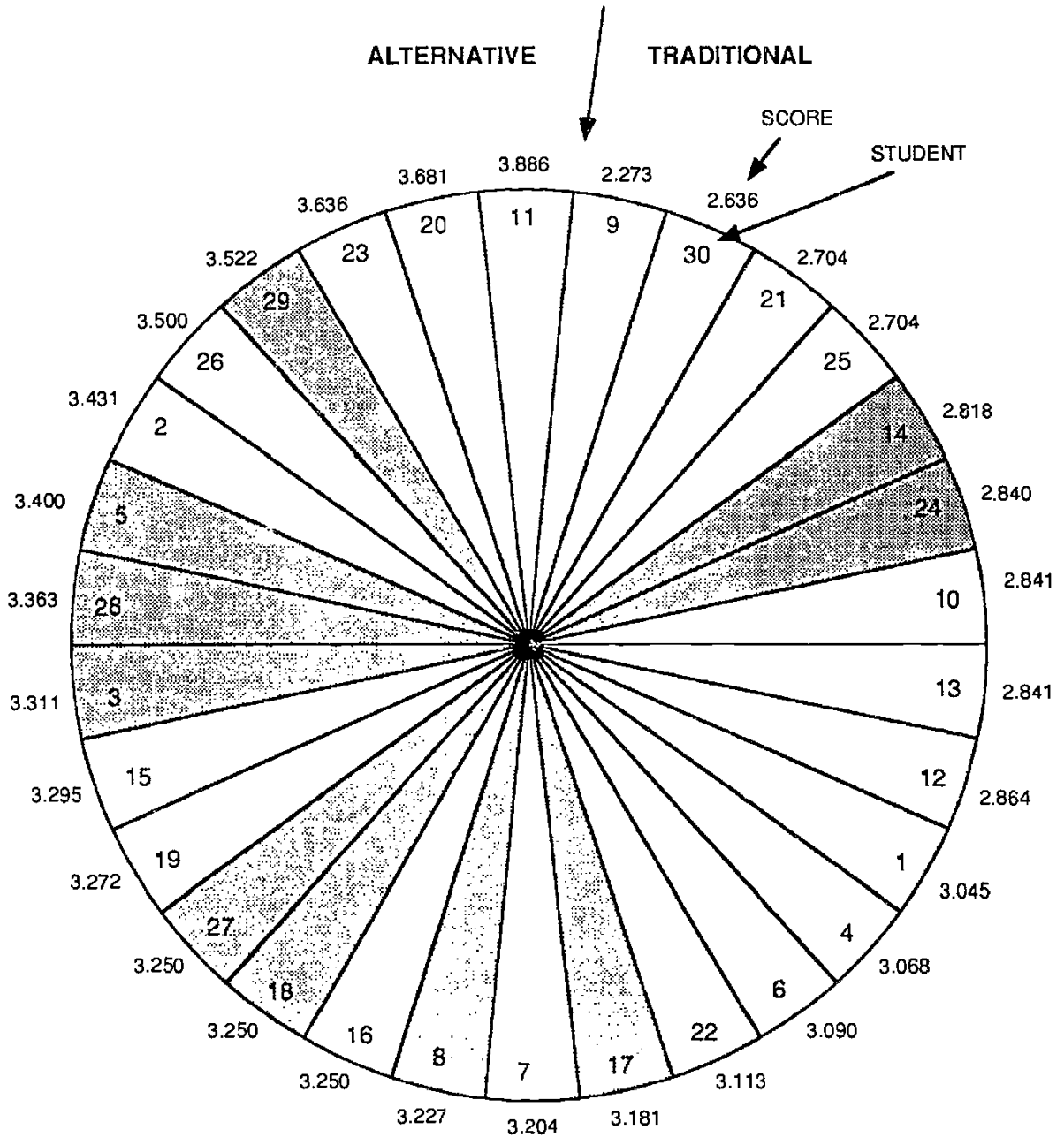
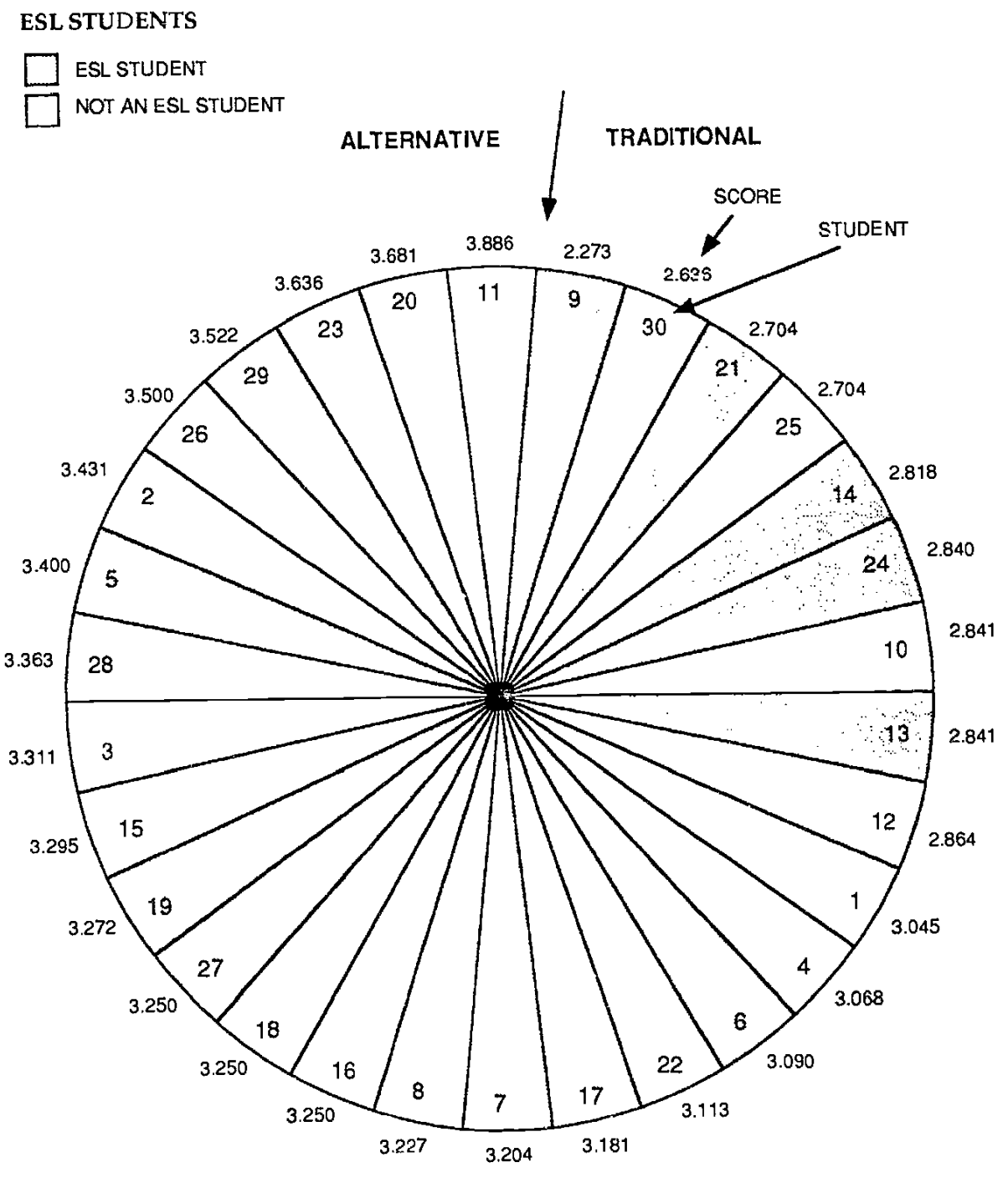
2
26
29
23
20

APPENDIX F (4)


ACHIEVEMENT
ABOVE AVERAGE TO HIGH
AVERAGE
LOW TO BELOW AVERAGE
ALTERNATIVE
TRADITIONAL
SCORE
STUDENT
3.886
2.273
2.636
11
9
30
3.681
20
2.704
3.636
23
21
3.522
29
25
2.704
3.500
26
2.818
14
3.431
2
24
2.840
3.400
5
10
2.841
3.363
28
13
2.841
3.311
3
12
2.864
3.295
15
1
3.045
3.272
19
4
3.068
27
6
3.250
18
3.090
3.250
16
22
8
3.113
3.250
7
17
3.227
3.204
3.181

APPENDIX F (5)


ESL STUDENTS
ESL STUDENT
NOT AN ESL STUDENT
ALTERNATIVE
TRADITIONAL
SCORE
STUDENT
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11
2.273
9
3.681
20
2.636
30
3.636
23
2.704
21
3.522
29
2.704
25
3.500
26
2.818
14
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2
2.840
24
3.400
5
2.841
10
3.363
28
2.841
13
3.311
3
2.864
12
3.295
15
3.045
1
3.272
19
3.068
4
3.250
27
3.090
6
3.250
18
3.113
22
3.250
16
3.181
17
3.227
8
3.204
7

TABLE 1

Correlations (Spearman rho) between dependent and independent variables

significant at $p < .01$ level significant at $p < .05$ level

Category	Gender	Ethnicity	Academic Achievement
Overall mean score	.4740		
Goal oriented/Process oriented			
Didactism/ Discovery		—.4829	.4085
Rational/Intuitive		.3784	—.6069
Separate/Related		—.5225	.4674
Exclusion/Inclusion			
Concentration/Breadth			
Challenging/Supportive			—.5273
Impersonal/Personal			
Self-concern/Other-concern		—.4425	
Inner-directed/Outer-directed			—.6660
Speaking/Listening			

TABLE 2

Correlations (Spearman rho) among dependent variables

significant at $p < .01$ level significant at $p < .05$ level

Category	Goal or Process Oriented	Didactism or Discovery	Rational or Intuitive	Separate or Related	Exclusion or Inclusion	Concentration or Breadth	Challenging or Supportive	Impersonal or Personal	Self or Other Concern	Inner or Outer Directed	Speaking or Listening
Overall mean score			.3843	.4820	.7057	.3745		.6153	.4073		
Goal oriented or Process oriented											
Didactism or Discovery			-.4075	.5135		.3752	-.4075			-.5793	
Rational/ Intuitive							.4891		-.1669	.7430	
Separate/ Related					.7300	.3896				-.4160	-.4686
Exclusion/ Inclusion								.4356			-.4425
Concentration/ Breadth											-.5901
Challenging/ Supportive										.5544	
Impersonal/ Personal											-.4294
Self-concern/ Other-concern										-.3645	
Inner-directed/ Outer-directed											
Speaking/ Listening											