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Relationship Between Degree of Infant Handicap and Clarity of Infant Cues

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Dunst (1983) suggested that severely handicapped infants' intentional and unintentional communicative behaviors may be less interpretable or less easily "read" than are those of less handicapped infants. This hypothesis was tested in a sample of 15 pairs of mothers and their handicapped 11-month-old infants. As expected, the results indicated that coders agreed on the occurrence of an infant cue a lower percentage of the time when coding severely handicapped infants than when coding less handicapped infants.

Many clinicians and researchers assume that severely handicapped infants exhibit behaviors that are more difficult to interpret, or less "readable," than are the cues of less handicapped infants (i.e., the readability hypothesis, Dunst, 1983). Previous research, however, has only shown that severity of handicap covaries with qualitative differences in selected discrete behaviors (see Dunst, 1983, for review). Previous findings are inadequate to support the readability hypothesis because (a) focusing on a small set of discrete behaviors excludes many behaviors that mothers and researchers consider to be communicative, and (b) infant cues may be qualitatively atypical and still be easily interpretable.

The present study was designed to test the relation between degree of infant handicap and readability of infant cues using a measure of readability that addresses these two shortcomings. Readability was measured here as the extent to which two trained observers agreed on the occurrence of a communicative cue. The occurrence of an infant cue was measured using a coding system that allows many forms of infant behavior to be judged as communicative.

Subjects were 15 volunteer mothers and their handicapped infants (9 males, 6 females). The infants were mostly white (n = 14), approximately 11 months old (mean = 11.6 months, standard deviation [*SD*] = .78), and mostly first or second born (8 and 6, respectively). No sex effects were found on either variable of interest. Informal assessments indicated that all infants had hearing and vision within normal limits. The type and severity of the handicaps were severe physical and mental handicap (n = 5); moderate physical handicap, but mild mental handicap (n = 3); mild physical handicap, but moderate cognitive handicap (n = 1); mild overall delay (n = 5); and developmentally at risk (n = 1). The severity of cognitive (mean Bayley Scales of Infant Development [Bayley, 1959] Mental Development Index = 65.5, *SD* = 28.93) and physical (Movement Assessment of Infants [Chandler, Andrews, & Swanson, 1980] mean = 32.5, *SD* = 15.87) handicaps varied greatly.

The mothers' average age was 31.6 years (*SD* = 5.01). All mothers had at least some college education and all but one lived in families making over $15,000 annually.

Although the mothers completed other procedures, a trained examiner (Kasari, 1985) measured the infants' neuromotor development using the Movement Assessment of Infants, a 65-item instrument that measures four aspects of infant movement status: (a) muscle tone, (b) autonomic reaction, (c) primitive reflexes, and

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(d) volitional movement. The presence or absence of an item risk point was assigned according to the manual. A total risk score was calculated by summing the item risk points (range = 0 to 65). Higher scores indicate more risk or indication of a physical handicap. The average risk score for a nonhandicapped sample of 16, 11-month-olds was 8 (SD = 5) (Yoder & Feagans, 1986).

Interobserver reliability was estimated via a generalizability coefficient (Cronbach, Rajartnam, & Glaser, 1972) to be .98 (n = 10) (Kasari, 1985). Test–retest reliability of the instrument has been estimated to be .72 (Harris & Swanson, 1984).

The Movement Assessment of Infants was selected over the Bayley Mental Development Index to measure degree of infant handicap because (a) the Movement Assessment of Infants indexes skills that directly affect the clarity and frequency of communicative signals (e.g., muscle tone) (Gallagher, Jens, & O'Donnell, 1983) and (b) unlike the extrapolated form of the Bayley (Naglieri, 1981), it allows continuous measurement of the severity of handicap represented in the present sample. Although the Movement Assessment of Infants directly indexes neuromotor status, cognitive (Bayley Mental Development Index) and neuromotor status (Movement Assessment of Infants risk score) covaried strongly in this sample, r = −.80, p<.001.

Data relevant to this report were collected from the first 10 minutes of videotaped mother–infant free-play sessions. The setting for the session simulated a play room in which developmentally appropriate toys were available. Mothers were instructed to play with their infant as they would at home.

Training on the coding system prior to coding the actual data lasted approximately 20 hours. Subsequently, the two coders practiced separate coding on pilot tapes with mildly retarded and nonretarded infants until they achieved an average of 80% agreement on the occurrence of infant cues.

Each observer then separately recorded the time of occurrence of infant cues during the first 10 minutes of each free-play session in the sample. Coders repeatedly viewed the videotape until they were satisfied with the accuracy of their coding.

Infant cue was conceptually defined as any infant behavior that (a) resembles conventional communicative signals (e.g., nonfuss vocalizations or gestures), (b) allows a coder to identify the object of the infant's interest or disinterest, and/or (c) indicates sudden change in emotional state. Type of infant cue was not discriminated for the purposes of this study; however, the following examples are offered to help define infant cue: sustained shift of attention to a new toy (e.g., baby was playing with rattle, but now stops and begins playing with blocks for at least 3 seconds), sustained shift in manner of play with toy (e.g., baby was mouthing stack rings, but now stops and starts shaking the stacking pole for at least 3 seconds), sudden shift in emotional state (e.g., baby suddenly begins to cry), strained or frustrated directed action (e.g., baby maintains a strained reach for a toy that is out of reach), nonfuss or noncry vocalization (e.g., baby says "ah" while separating connecting beads), conventional gesture (e.g., baby points to object), word approximation (e.g., baby says "baba" while playing with doll), and coordinated attention to object and mother (e.g., baby gives object to mother). (More detail on the coding system is given in Yoder and Feagans, 1986).

The index of the clarity of infant cue was the coders' percentage agreement on the occurrence of an infant cue. Percentage agreement was calculated as number of agreements / number of disagreements plus number of agreements. Agreement was determined by one-to-one correspondence of time of occurrence of cues within 10 seconds of each other.

Although the reliability of the percentage agreement scores was not assessed, the consequence of unreliable scores in the analysis used in this study, simple regression, is an attenuated relation (Pedhazur, 1982). Therefore, if the relation between degree of handicap and the percentage agreement scores is statistically significant, then it is reasonable to assume that the relation did not occur by chance.

These results support the readability hypothesis. A simple regression was carried out using Movement Assessment of Infants risk score (mean = 32.5, SD = 15.87, range = 6 to 55) to predict the percentage of agreement between coders on the occurrence of infant cues (mean = 59.93%, SD = 12.18). Coders tended to

agree on the occurrence of mildly handicapped infants' cues more than those of severely handicapped infants, $r = -.65$, $p < .01$, one-tailed. Although there are probably other variables that influence the clarity of the handicapped infant's cues (e.g., type of handicap, type of cue), severity of handicap accounted for almost 43% of the variance in the clarity of infant cues in this sample. The regression equation ($y = -.50(x) + 75.30$) predicted within plus or minus 1.50 *SD*s of all but one of the subject's actual readability scores, standardized residual = −1.97.

There is no evidence that this result is an artifact of the absolute number of agreements plus disagreements. There is almost no relation between degree of handicap and the number of agreements plus disagreements, $r = -.04$. The number of agreements plus disagreements was sufficient to prevent inflated percentages due to small denominators (mean = 27.75, *SD* = 6.3, *R* = 18 to 37).

In summary, the present results complement previous findings in supporting the notion that severely cognitively and physically handicapped infants tend to present qualitatively different cues than do less handicapped infants (see Dunst, 1983, for review) and that these behaviors are frequently more difficult for even trained observers to interpret.

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