CHAPTER - II

REVIEW OF LITERATURE
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Hearing impairment had serious impact on personal development. Many deaf authors recounted their feelings of inferiority as children that they felt less than whole because of their language differences. People responsible for the growth and development of deaf had been critical of them without granting full acceptance to them and thus causing serious threat to the development of deaf people.

The review of literature in this chapter covered those dimensions which were identified crucial to the overall understanding of the deaf, their problems and prospects in this investigation. The following review is classified under six broad sections, namely, parental behaviour, perspective taking ability, cognitive development, academic achievement, mainstreaming of the deaf, multiple Vs single deaf, institutionalised Vs non-institutionalised deaf and language of the deaf.

PARENTAL BEHAVIOUR

Discovery of a hearing impairment was known to cause crisis in the affected family. Since most deaf children were born to hearing parents, most of them experienced a profound sense of guilt and tried to hide the handicap. The feelings of frustration on the part of parents often led to a rejecting behaviour towards the child. From the
psychological viewpoint, acceptance of the child was crucial in the development of the child, this made parental counselling an important need for the parents of deaf. On the other hand, the parental acceptance seen among the deaf children of deaf parents was found to give them advantage in their development.

Deaf Children and Hearing Parents:

Bell (1964) reviewed five studies of families having children with various kinds of handicaps. In each of the five studies, the mothers of handicapped children scored higher on intrusiveness than the control mothers as measured by the Parental Attitude Research Inventory. Bell suggested that an intrusive attitude might have been induced in a mother as an effect of a limitation in her child's ability to cope with situations.

Collins (1969) classified 40 percent of the behaviour of mothers of deaf children as "directing".

Goss (1970) found that the mothers of deaf tended to give directions significantly more frequently than mothers of hearing children. Schlesinger and Meadow (1972) found the mothers of deaf preschool children to be significantly less permissive, more intrusive, more didactic, less creative, less flexible and showing less approval of their children in
comparison to the mothers of hearing preschool children. There were no significant differences in mothers of deaf and normal regarding enjoyment with their children, effectiveness in achieving their children's cooperation, and the degree to which they felt relaxed and comfortable in the study situation. The parents of deaf children reported that their children needed far more constant supervision in order to be protected from accidents. Parents of deaf, therefore adopted, greater disciplinary techniques and showed more areas of expressed frustration around child-rearing generally than the parents of hearing children. The parents of the deaf children were constantly concerned about whether they were expecting too much or too little from their deaf children and whether they were being over protective or under protective.

Stinson (1974, 1978) compared the attitudes of 31 mothers of hearing impaired boys to those of 33 mothers of boys with normal hearing. He found that the mothers of the hearing subjects tended to react to the pressures, burdens, and restrictions of child-rearing by increasing their demands on children, while the mothers of the hearing impaired subjects responded by relaxing demands. He also studied maternal and child behaviour in task situations designed to reflect verbal and nonverbal achievement orientation and motivation.
Mothers with moderate demands for the attainment of verbal skills worked more effectively with the hearing impaired subjects. Too early or too late expectations for language appeared to limit acquisition of the achievement motive in the hearing impaired subjects. It was felt that instituting demands of appropriate intensity was difficult especially because different standards were used in judging the progress of deaf and hearing children in the acquisition of verbal skills.

Galkowski (1978) studied 30 (30 - 36 years old) parents of deaf children who were under treatment at the Warsaw Mother and Child Institute. The control group consisted of parents of healthy children from the same social level as the experimental group. The investigator applied the Eysenck Personality Inventory, the Parental Attitude Research Instrument, and an author-constructed inventory for the investigation of deaf children's attitudes of parents. Results revealed an average degree of neuroticism among the deaf subject's parents. Significant correlations were also found between parental attitude and the rehabilitation process and childrearing attitudes. For example, the parents' attitude to rehabilitation correlated with their approval of the child's behaviour. Differences between the experimental and control groups were significant in such parental attitudes as the feeling of anxiety and withdrawal
from social contacts.

Brinich (1980) compared mother-child interactions of 45 deaf-child (5 - 61/2 years of age) and 20 hearing-child dyads which showed an emphasis on regular instructions and commands (control) by mothers of deaf children.

Wedell-Monnig and Lumely (1980) compared the mother child interactions of 6 deaf child-hearing mother pairs and 6 hearing child-hearing mother pairs in free play situations. It was seen that mothers of deaf children were always more dominant in interaction with their children than the mothers of hearing children. None of the mothers of the deaf children was fluent in any form of manual communication. The deaf children were seen to be more passive and less actively involved in the interactions than their hearing counterparts. They discussed the results in terms of learned helplessness theory.

Researchers had also shown different ways of teaching language to deaf children. Nīgam (1981) discussed the significant language differences between deaf and normal children and also presented instructions on how parents could teach spoken English and Hindi to their deaf children. The importance of patience positive reinforcement and emotional support were stressed. Research also indicated that over a period of time there occurred mutual lack of
responsivity between the mother and the deaf child.

Henggelar and Cooper (1983) matched groups of 15 deaf (aged 3.42-6 years) and 15 hearing (3.42 - 5.92 years) preschool children on several demographic variables and observed interactions with their mothers during free play and teaching periods. Although the quantity of mother-child interactions and the use of maternal verbal controls did not differ between groups, there were substantial 'between-group' differences in mother-child responsiveness. The deaf subjects were less compliant and responded less appropriately to maternal directives and questions than the hearing subjects. Similarly, mothers of deaf subjects were less responsive to requests from their children than mothers of hearing subjects. Findings were discussed in the light of longitudinal model of reciprocal mother-child effects.

Mendelson et al. (1983) asserted that the disability of deafness might become the powerful organizing force for the problem areas in the family, especially in the families with high degree of unresolved conflicts, while the deafness itself was denied as a problem. Problems arose from lack of adequate communication between family members, the lack of recognition of this development, and the consequent lack of effort to address it. The poor language created other maladaptive patterns.
Henggeler et al. (1984) showed that mothers of deaf children were more controlling than mothers of hearing children. Excessive maternal control was linked with inoptimal development outcomes such as child dependence, social immaturity and submissiveness. The authors examined the verbal and non-verbal controls employed by mothers of deaf pre-schoolers (aged 3 - 6.42 years). 14 hearing mother-deaf child dyads and 14 hearing mother-hearing child dyads were observed during a 15 minutes free play, and during a 7 minutes teaching period. Dependent measures were subjected to appropriate 2 (hearing status) x 2 (task) ANOVA for repeated measures. Results indicated that the mothers of deaf children used more of non-verbal controls than the mothers of hearing children especially during the free play period but not during the teaching period. The interaction tasks exerted differential effects on the two groups of mother child dyads, indicating a pattern on which mothers of deaf were more controlling during the free play period, when guidance was least required.

Rodda (1984), reviewed some of the behaviour and adjustment problems of parents of hearing impaird adolescents associated with deafness. Poor child rearing was observed. An increase in family problems was also associated with deafness. Nienhuys et al. (1985) examined the dialogic interaction between eight hearing mothers and their hearing
two year olds, and eight hearing mothers and their hearing five year olds, and two groups of five hearing mothers and their age on linguistically matched hearing impaired children using Blank and Franklin's system of analysis. This system judged each participant both as initiator and responder and judged each participant's initiations for cognitive complexity and summoning power, as well as the appropriateness of participants' responses. Childhood deafness was found to be associated with higher levels of maternal conversational deafness when age was held constant. Conversational interactions of dyads with deaf children were more restricted than in dyads with normal children. This seemed to be related to the linguistic inability of the deaf children. Mothers of deaf children also tended to address their deaf children with verbalisations of lower cognitive complexity levels.

Togonu et al. (1985) interviewed 176 mothers of the Yoruba tribe in Nigeria about their patterns of communication and found that mothers perceived expressive linguistic abilities of their deaf children more negatively than their receptive ability. Communicative difficulties affected mother's guidance and discipline, particularly since the culturally preferred modes of discipline weighed very heavily on children's age related language competence.
Christensen (1986) suggested that competence in conceptual sign language communication could be achieved by parents through proper training. Positive changes among parents could be brought by developing communication between them and their children.

Kashyap (1986), talked of emerging patterns and problems of communication between deaf child and parents and related coping mechanisms in a sample of 100 deaf Indian children (5-14 yrs) and their families. Parent's expectations of their deaf children were violated by the hearing impairment. For many parents the child's deafness threatened their sense of invulnerability and triggered mourning and anxiety. Most parents viewed the presence of the deaf child as a negative influence on the family. On the other hand, most parents felt that the overall impact on daily life was neutral, although effects on the marital relationship and on sibling relationship were there. Social work intervention was recommended for parental attitude changes towards deafness and expectations from deaf and their impact on family.

Styles (1986) discussed the bearing of parental relationship on the handicap of deaf in terms of the potential crisis. He advocated sensitive understanding by parents regarding expectations.

Mitchell (1987) noted a cummulative deficit pattern in which
parents with negative expectancies contributed to deficits in social competencies. Interventions for helping parents were recommended.

**Deaf Child and Deaf Parents**: Deaf parents generally did not have any negative expectancies and had a tendency to accept their deaf children better.

Meadow (1967) interviewed deaf parents and hearing parents about various practices that might reflect the encouragement of independence in deaf children. Almost half of the deaf parents and only 15 percent of the hearing parents stated that the deaf child should be allowed to play independently in the immediate neighbourhood. Meadow suggested that the hearing parent, in eagerness to "treat the deaf and hearing child alike", might achieve this goal by scaling down expectations for the hearing child rather than by giving the deaf child the same degree of independence.

Stuckless and Birch (1966) and Meadow (1968b), Vernon and Koh (1970, 1971) concluded that the advantages enjoyed by the deaf children of deaf parents might be attributed to early exposure to manual communication.

Carson (1973) also concluded that deaf parents were more likely to accept deaf children than the hearing parents. Conner (1976) concluded, based in his longitudinal studies of
deaf children that deaf children of deaf parents performed better than deaf children of hearing parents in a variety of tasks. The studies revealed that the deaf parents were warmer, and initial flow of conversation between the deaf mothers and their deaf children was easier. Some of the hearing parents also learned to display warmth and acceptance for their deaf child, and by the time their children were three years old, there was no longer any significant difference between their children and the other deaf parents.

Yachnik, (1986) examined the esteem of two groups of 28 deaf subjects (mean age 20.07 years) whose parents were deaf (dD) and 28 subjects (mean age 19.7 years) whose parents were hearing (dH). Subjects' self esteem was measured on the self description questionnaire III (SDQ III) developed by Marsh and Neill, which tapped both global and component measures of self esteem. Parents of subjects also completed the SDQ III. Results showed that dD subjects had higher self esteem rating than dH subjects on a global measure of self esteem and on two out of seven component areas of self esteem.

CONCLUSION:
Review of studies on parental behaviour indicated that parents of deaf children were more intrusive, less permissive, less approving, gave more constant supervision,
placed heavier reliance on spanking and showed greater expressions of frustrations over child rearing in comparison to parents of hearing children. This might lead to inoptimal development of the deaf. However, literature was also suggestive of the fact that able bodied identity of the deaf was associated with poorer outcome on perceived family acceptance. There was some evidence about the differences between the emotional bonds as claimed by the parents of deaf and as perceived by the deaf himself. Deaf children of deaf parents showed an advantage over deaf children of hearing parents.

**PERSPECTIVE TAKING ABILITY**

It had been observed that the ability to perceive messages through facial expressions was intimately related with social maturity. The following review, therefore, has been divided into two sections. The first section concentrates on perceptions of facial expression and the second on performance of deaf and normal children on social maturity scales.

**Perceptions of Facial Expressions:**

Studies of effects of parent child interactions on perspective taking ability (emotional) had emphasised the importance of parent's face as a stimulus in the infant's environment. Darwin (1872/1965) wrote that "movement of
expression in the face and body serve as the first means of communication between the mother and her infant; she smiles approval and thus encourages her child on the right path, or frowns disapproval".

The face-to-face exchanges of everyday life involved for the child, one key task of interpreting the emotional messages (non-verbal cue) conveyed by the facial expressions of others. Such non-verbal components often tended to enhance or modify the information transferred by the verbal components.

The process changed when listeners’ attention was limited to only one mode of communication. For deaf people the vehicle of language was visual instead of an auditory one. The question often asked was whether it was still possible to convey the same information with one channel as when both channels were operating? To what extent was the emotional content of non verbal messages communicated by speaker or signer (the encoder) to the listener or watcher (the decoder)?

The following review summarised researches showing how deaf children perceived the emotional expressions reflected through non verbal modes. According to Blau (1964) the loss of primary communicative channel led to the development of compensatory sensitivity
in the remaining channels to make up for such a loss. However, such claims were not always found confirmed.

Sugarman (1969) showed films of hearing people expressing six different emotions to both hearing and deaf high school students. He also tested responses to several Thematic Apperception Test (TAT) cards. Although the deaf students' TAT protocols contained more affect than the protocols of the hearing students, the deaf students were less accurate than the hearing children in judging the emotional content of the messages.

Ekman and Friesen (1968) considered non-verbal behaviour "the primary means of expressing or communicating emotions". In communication, non verbal information contributed to the perception of the emotional context of messages more than a verbal score (Mehrabian, 1972). How a speaker said was at least as relevant, as what a speaker said, in determining social and interpersonal knowledge. (Ekman et al. 1972). The listener must attend to both how and what components in order to understand the meaning of the communication transmitted aurally and visually.

Odom et al. (1973) studied seven and eight year old deaf children. They concluded that the deaf were less accurate than the hearing peers in the interpretation of emotions.
reflected in facial expressions. This finding apparently, was not due to some perceptual difficulty in recognizing the facial expression since deaf and hearing subjects performed comparably in the expression sorting task.

The authors suggested that the decreased abilities of the deaf children might well be related to the lessened opportunities to receive interpretations and verbal explanations of the emotions of others. Verbalizations of feelings and attributes of a situation might serve to focus (orient) a child's attention on its salient and relevant aspects.

Schiff (1973) presented slides to deaf and hearing adolescents (12 to 19 yrs old) containing facial caricatures and six social interaction cartoon films. Results indicated few age related differences in perceptual reports. A number of differences between deaf and hearing suggested that these groups often differed in their extraction of social information from the eye region of the face as well as from gross motor activity. These factors were viewed as correlates to deafness rather than the effects of intra-adolescent age or sex differences.

It was also found that when judging only facial expressions, deaf subjects tended to judge them as less hostile than the hearing subjects. Deaf subjects with prelingual onset of
deafness tended to make more errors in judging facial expressions than the hearing subjects.

Pietrzak (1981) administered to deaf school children tests of ability to recognize and name emotional states. They presented subjects with a set of 16 pictures designed to elicit emotions and asked them to describe each picture and answer questions. The deaf were 4th, 7th and 10th graders and hearing were 1st and 4th graders, with 15 subjects in each group. The 4th and 8th graders deaf observed as many emotions and named as many different ones as did the hearing 1st and 4th graders. It was suggested that the deaf children could be taught to identify emotions by explaining to them the causes of their own expressions and by discussing with them pictures, slides and film slips. Schneider (1981) presented pictures of eight facial expressions, (anger, joy, surprise, disgust, sadness, mistrust, fear and admiration) in random order to 72 normal and 72 deaf children having ages between 5-17 years. Subjects were divided into 6 age groups of 12 subjects each. The recognition among deaf was generally poorer than the normal. Progressive improvement (genetic evolution) was observed with age for both normal and deaf subjects. Each emotion showed improvement with age except fear and surprise. The more rapid and complete evolution observed in normal subjects was likely due to the voice intonation cues available.
Weisel (1985) showed to 60 hearing and 45 deaf male college students (aged 18 - 35) films of emotional expressions in sign language. He tried to identify the emotional content of each film by asking the subjects to match contents to 6 different photographs by looking at facial expressions. Responses were analyzed for accuracy in perceiving the emotional content. Hearing subjects were found more accurate in perceiving the display of happiness, whereas the display of disgust was perceived better by the deaf subjects. No support was found for compensatory sensitivity among the deaf subjects.

While deaf children were found to pay greater attention to eyes and gross motor activity, Cunninghaum and Odom, (1986) in a bid to determine the relative salience of specific facial features examined the perceptions of affective facial expressions among 40 kindergartners and 40 5th graders in a problem solving task. In the 1st of the two tasks subjects recalled the array location of facial photographs of an unfamiliar adult expressing anger, disgust, fear, joy and shame. Within each age level, subjects recall was cued by five sets of probe photographs that varied in terms of either the features presented (eye, nose or mouth) or the expresor's identity (same or different). In the second task subjects were probed for their incidental recall of those features that were not isolated in the initial task.
Results on both tasks indicated that both younger and older subjects were likely to evaluate and remember information from mouth region first, the eyes region second and the nose region last.

Performance on Social Maturity

Since social maturity and role taking ability were necessary concomitants of emotional perspective taking ability an understanding of differences between deaf and normal on these variables was expected to supplement the understanding of differences in perception of facial expressions between the two groups. The following review therefore concentrated on social maturity and role taking ability of deaf and normal children.

Streng and Kirk (1938), Burchard and Myklebust (1942) and Avery (1948) used the Vineland and Social maturity scale and found that deaf children received lower scores on this scale than hearing children of comparable ages. In many of the studies reported before 1950, children with varying degrees of hearing impairment were included in the same groups. Changing pictures of etiology, early educational treatment, and audiological advances made these earlier studies less meaningful in terms of predicting the kinds of behavioral responses that could be expected from deaf children today. However, the basic theoretical issues remained much the
Myklebust (1960) reported a study using the Vineland Scale with results that were similar to those of Burchard and Myklebust (1942). He surveyed 150 deaf children from 10 to 21 years of age in a public residential school. The mean social quotient (with a norm of 100) was 85.8. On the basis of that data, plus additional data collected independently from pre-school deaf children, Myklebust concluded that the gap between the social maturity of deaf and hearing children widened with increasing age. The social quotient for the preschool group and for the other age groups up to 15 years were slightly above 90. For the age groups from 15 to 21, there was a gradual decline in social quotient. At 15, it was 82.2; at 17 it was 80.4; and at 19 it was 76.2.

Myklebust’s conclusion could not be generalised and should be considered with caution because of the special nature of the sample.

Language deficit had been viewed as having substantial impact on the psycho-social development of deaf children. The following research showed the importance of language development in social maturity and perspective taking ability of deaf.

Schlesinger and Meadow (1971) used the Vineland Scale in a study of 40 deaf preschoolers. They found a strong positive
relationship between the Vineland scores and an index of communicative competence. (This index included the Mecham Language Development Scale score, teachers' ratings for expressive and receptive communication, speech, lipreading, and two communication ratings derived from videotaped mother-child interaction). The results showed that 65 percent of the children who scored below the median on the Vineland also scored below the median for communicative competence and 75 percent scoring above the Vineland median also scored above the median for communication.

Kusche and Greenburg (1983a) evaluated the growth of social-cognitive knowledge in deaf and hearing children during the early and middle school years and assessed the relative importance of language in two domains of social cognition. This study also separately examined the child's ability to evaluate the concepts of good and bad and to take another person's perspective. Subjects consisted of 30 deaf and 30 hearing children divided into three developmental levels (52 months, 74 months and 119 months old). For the good and bad evaluation test each child was shown 12 sets of multiple choice pictures. Each set had 4 alternatives, which included one good, one bad or all neutral activities. Role taking ability was evaluated in terms of the child's choice of strategy in a binary-choice hiding/guessing game. The results showed that deaf children had evidence of a
developmental delay in the understanding of the concept good and bad with regard to role taking ability. The developmental delay among deaf children was no longer apparent by the age of 6. The results also indicated that language was of varying importance in different domains of social and personality development.

Mackay et al. (1987) studied 30 deaf 6-10 years olds, from oral or bimodal education programme. They tested them on two tasks. In the first task they were required to describe designated picture out of a set of four pictures so that their mothers could identify the intended referent. In the second task, they studied a single picture and were subsequently required to identify it from a set of four related pictures. Despite greater hearing loss, bimodally educated children provided more differentiated messages and better reformulations of initially inadequate messages than did orally educated children. Although mothers of orally educated children received inferior messages, they were as successful at selecting a correct referent as were mothers of bimodally educated children. Both groups of children performed at near perfect levels on the picture recognition task, suggesting that performance differences were attributable to differential message formulation skill as opposed to differential visual processing of the referential array.
CONCLUSION:

On the basis of the above review it might be concluded that the deaf children in general scored lower on a) interpretation of emotions through facial expression and b) on social maturity than the normal children of corresponding age groups. As deaf children have lessened opportunities to receive interpretations and verbal explanations to emotions of others and hearing children have access to voice intonation, deaf children displayed developmental lags in interpretations of facial expressions when young. On classification tasks deaf children showed performance similar to normal because they depended significantly on visual models. However, as they grew older they did not exhibit any significant differences in interpretations of emotions expressed through facial expressions.

COGNITIVE DEVELOPMENT

Despite the fact that cognitive development of the deaf child had been an interesting and fertile area for research, researchers failed to give conclusive evidence about the performance of deaf in perceptual and cognitive domains. Confusion of terms, reliance on research populations with characteristics that can well confound results, and difficulties in design and procedures that distinguish well between linguistic and cognitive variables have continued to add to the problems of researchers working with the deaf.
A brief review of the literature that may provide an understanding of the cognitive functioning of deaf in a developmental perspective may be presented below.

**Performance on Cognitive Measures:**

Although the traditional way of assessing the levels of cognitive functioning of normal children had been to evaluate their performance by using standardised tests of intellectual ability, the appraisal of deaf had been done by using performance tests. An early review of studies over deaf school children between 1900 and 1930 revealed that the deaf children were retarded by three to four years in comparison to the hearing children, and that they had their I.Qs in the 90s (Pinter et al. 1941). Vernon (1969b) reviewed a large number of studies and concluded that deaf and hard of hearing children had essentially the same distribution of intelligence as the general population, the mean score of deaf children being slightly below the hearing children.

Schlesinger and Meadow (1976b) confirmed the above findings. They observed that though the hearing children consistently outperformed the deaf children on intelligence tests, the nature of distribution of performance scores was similar in both the groups. The deaf group also showed continuous cognitive development.
Performance on Different Sub-Tests:

Researchers have also examined how deaf children performed on different sub-tests of intelligence test. Levin (1956) and Goetzinger and Rousey (1957) using WISC performance scale on deaf children ranging in age between 6 years through late adolescence found that the highest scores were earned by them on Object Assembly, a task that required to assemble puzzle pieces into coherent wholes. Their results were in the expected direction as the deaf used visual cues more predominantly than the other cues. Following this it had also been theorised that in order to foster achievement on such tests emphasis should be placed on visual training and perception.

Blair (1957) matched groups of deaf and hearing children for IQ, age, and sex, and administered several visual memory tests to the 53 pairs of children. The deaf children performed significantly better than the hearing children on the Knox Cube Test and on the Memory for Designs Test. The hearing children had consistently higher scores on all four of the Memory Span tests. Blair suggested that the Memory-Span tasks required greater mental abstraction and conceptualization and that these areas were more difficult for deaf children. Hess (1960) using WISC found that like Object Assembly, on the Block Design sub test too the deaf children scored higher relative to other sub-tests. The
differences were ascribed to the greater manual manipulation required on these tests. The sub-tests on which the performance fell farthest below the mean performance score were Picture Arrangement and the Coding sub-tests.

Vonderhaar and Chambers (1975) also used WISC on deaf children. They confirmed the earlier findings that deaf children scored maximum on Object Assembly. Schlesinger and Meadow (1976b) in their studies on deaf and normal children using intelligence tests found that the generalised deficit exhibited by deaf children was not distributed differentially over the range of skills tapped by different sub-tests. Using WISC-R, Anderson and Sisco (1977) collected data on 1228 deaf students that enabled them to establish norms on the Performance Scale for deaf students. Generally speaking, they found that deaf children performed like normal children on all the performance subtests except on Coding and Picture Arrangement. On these two subtests, the deaf children performed significantly below their hearing peers. They also found more variance within the scores of deaf children than the comparable groups of hearing children.

**Factor Analytic Studies:**

Previous research reporting differences in intellectual abilities had been based largely on the comparison of
average performance of deaf and hearing subjects. For better understanding of the similarities and differences in the cognitive structures of the two groups, some later researchers used factor analysis and identified significant dimensions of differences. Bolton (1978) compared the factor structures for deaf and hearing children aged 3 to 10 years based on Hiskey-Nebraska Test of Learning Aptitude (HNTLA). He found different factor structures in these groups of children. The findings were interpreted in the light of sensory deprivation, perceptual and conceptual abilities. Braden (1984) using WISC-R performance scale on deaf (n=1,228) and hearing (n=2,200) found identical scale matrices. Though the samples did show small differences, the identical scale matrices indicated that the same principal factors emerged in the cognition of both deaf and hearing population. In a second study, using the same sample, Braden (1985a) compared factors extracted from the performance scale of the WISC with non verbal tests (WISC N = 300; WISC-R N = 1,228). All data sets yielded that g (general) + P (performance) factors comprising the first principal factor was virtually identical for the deaf and hearing samples. The similarity of the principal factor supported arguments that deaf and hearing children did not exhibit major qualitative differences in non-verbal intellectual structure. It also contradicted the suggestion
that mental abilities developed more independently in deaf children than in the hearing children. Braden (1985b) argued that deaf norms published for the Weschsler Intelligence scale for children - Revised (WISC-R) performance scale were unnecessary since there was no evidence to suggest that the internal consistency of the WISC-R performance scale was reduced when the performance subscales were administered to deaf children.

Zwiebel and Mertens (1985) used factor analysis for comparing the scores of 25 deaf children (6-15yrs) and 101 hearing children (10 to 12 years). On Snijders and Snijders - Oomen's (1959) non-verbal intelligence test, the results indicated that the factor structure for the deaf group differed from the hearing group. For deaf subjects, only one factor reflecting general intelligence emerged; for hearing subjects 2 factors reflecting general intelligence and abstract thinking emerged. Differences in cognitive structure were evident by age level for the deaf subjects. Differences in cognitive structure between hearing and deaf subjects of the same age were also found. The major difference between the deaf and the hearing subjects of the same age was the weak presence of an abstract thinking component, accompanied by a strong perceptual factor in the deaf subjects. They relied on visual, perceptual skills, while the hearing subjects depended on abstract thinking.
Ljubesic (1986) investigated the factor structure of cognitive abilities over 81 prelingually deaf children (aged 7.5 - 8.5 years). Analysis of results of verbal and non-verbal cognitive tasks revealed four factors visual education, verbal education, verbal understanding and expression and short term memory. When factor analysis was performed on seven non-verbal variables, visual education and short-term memory factors were extracted, indicating that non-verbal cognitive abilities had a similar structure for the deaf and hearing subjects.

Contradictory evidence in the literature had been found regarding existence of differences between deaf and normal children on cognitive development. Researchers reported a host of factors that led to observed differences in cognitive functioning of these children. Following are some of the reasons/factors explaining differential performance of the deaf and normal children on intelligence tests.

Instructions and Performance:

One of the most significant assessment problem of deaf children was related to the language deficits and other deprivations associated with deafness. This resulted in situations that impaired communication between the examiner
and the child being assessed. Efforts were made for long to resolve these problems. Since the use of spoken language with deaf children had questionable validity the assessors often modified procedures by changing the method of presenting instructions. These methods were pantomime, demonstrations and language communication involving speech, lipreading, written words, and in few instances, manual communications.

Graham and Shapiro (1953) used WISC Performance Scale to evaluate the effects of pantomimed (nonverbal) instructions on children's test performance. They selected three groups of 20 children each, ages 6 to 12. In one group the children had a marked hearing loss (60 dB or greater); the other two groups included children only with normal hearing. The three groups were matched on several demographic characteristics and were equated for intelligence by using the Goodenough Draw-a-Man-Test. The deaf children and one group of hearing children received pantomimed instructions. The other groups of hearing children received standard verbal instructions. The hearing children who received standard instructions performed at a significantly higher level on the overall performance scale and on three of the subtests: Picture Arrangement, Coding, and Mazes. The scores of the hearing children who received pantomimed instructions were significantly higher than the scores of
the deaf children for Picture Arrangement, Coding, and Mazes, but the deaf group scored higher on Object Assembly. Therefore, the use of pantomimed instructions, even on a test that is supposedly non-verbal, placed deaf children at a disadvantage. This finding had two significant implications for the testing of deaf children. Firstly, deaf children will be at a disadvantage, compared to hearing children, because less information was conveyed to them by pantomimed instructions. Even on performance subtests the deaf children will not have an equal opportunity to demonstrate their potential. Secondly, if deaf children knew sign language but did not have the advantage of the test being administered in this mode, the pantomimed instructions might place them at an even greater disadvantage because some gestures might be misinterpreted as codified signs.

Goetzinger and Houchins (1969) investigated the effects of pantomime and verbal instructions on student performance. They studied 40 hearing children and 40 deaf children to determine the effect of pantomime versus verbal directions. Pantomime instructions were given to all deaf children. Only half of the hearing subjects received pantomime instructions and the other half received verbal instructions. Results showed that pantomime directions did not hinder the performance of the deaf children.
It was important to note that the two previous studies compared the use of pantomime and verbal directions using hearing populations. The deaf individuals in both instances were given directions only in pantomime. They did not in fact participate in the comparison, but appeared to serve as a control group to which results were then generalised.

An alternative method for test directions used with deaf populations was the demonstration of test strategies. Using this method, the performance of deaf individuals had improved in learning situations. (Belmont, et al. 1976; Karchmer and Belmont, 1976). Rittenhouse and Spiro (1979) found similar improvements when investigating the effect of conventional and demonstration type of instructions for Piagetian tasks. 50 deaf children and 30 hearing children ranging between 7-19 and 7-16 years respectively were involved in the study. Each subject was presented with conservation tasks under two instructional conditions: conventional and attribute-specific. Conventional directions were given using simultaneous communication with deaf subjects and verbal speech direction with the hearing.

Both groups also received attribute specific directions with demonstrated relevant attributes and necessary task strategies. The performance of hearing subjects was higher by both methods of instructions, but this difference was
significantly reduced when attribute specific instructions were used. It was concluded that the latter directional set was less ambiguous to deaf children. Reynolds and Booher (1980) did their study on 56 deaf college students. They showed that on performance tests the best instructional format was predominantly pictorial with some ancillary verbal information.

Sullivan (1982) undertook two studies to investigate the effects of modifications in administration on subtest scaled-scores of the WISC-R performance scale with different groups of severely/profoundly hearing-impaired children. In experiment one he compared the standardised verbal subtest directions with total communication using 12 hearing-impaired subjects (aged 6 yrs 4 months to 12 yrs 4 months) from a public school. The total communication resulted in significantly higher scores. In experiment two he compared pantomime, visual aids, and total communication using 45 residential school subjects with genetic, questionable, and multiply handicapped etiologies. The total communication resulted in higher scores on all subtests in the genetcic and multiple handicapped groups. Lower scores were found on Coding subtest for the multiple handicapped group irrespective of the mode of administration. Differential sub-test administration patterns were found for the questionable group.
Organic and Functional Handicaps:

Much of the early work in the area of cognitive functioning was conducted with the expectation indeed that deaf children would manifest a variety of deficiencies in addition to their sensory deficit of the loss of hearing. Since deaf lacked one sensory system, it was hypothesised that this would result in the reduction of total amount of experience and a change in the integration and function of the other sensory systems (Myklebust, 1964). Deaf children were also found to suffer from multiple handicaps. Schein and Delk (1974) estimated that about one third of those who were previously deaf had multiple handicaps.

It was felt that if additional handicapping conditions were as prevalent as they seemed to be in the deaf population, then random samples of deaf subjects were likely to include a substantial number of individuals whose performances were likely to affect group means adversely. Even if subjects were screened so as to exclude subjects known to have multiple handicaps, the sample might include undiagnosed neurological impaired.

Wilson et al. (1975) selected 34 pupils on the basis of school records and gave them medical, pediatric, neurological, and audiological examinations. They also administered an extensive battery of tests, to the children

Social Interaction, Experiential and Language Deficit:

Vygotsky (1962, 1978) and Furth (1964) disagreed with Piaget in that cognitive development was independent of the processes of learning and social interaction. They found experiential deficits responsible for manifested backwardness of deaf children. Garton (1984) also suggested that the causal role of social interaction in the promotion of cognitive development was an important issue in developmental psychology.

Strategy and meta strategy skills were learnt by children from others (Sternberg, 1984) in the environment and the fact that deaf children experienced strategy and metastrategy deficits relative to their hearing peers did fit into the general theoretical argument of intelligence.

It was assumed by researchers that a greater grasp of language by deaf children should allow for a higher standard of performance in cognitive tasks. Best (1970) compared the performance of three groups of deaf children with varying
exposure to sign and spoken language with the performance of a group of hearing children on a variety of classification tasks. Generally their performance correlated with exposure to language. The hearing children performed most effectively on all classification tasks. Deaf children with exposure to both oral and manual language performed better than the other less exposed deaf children. Of additional interest was Best's finding that all groups were found to progress through the same stages of cognitive development and to use the same strategies for problem solving, although the progress of the hearing children, appeared to be more rapid than that of the deaf children. Correct verbal reasoning usually accompanied correct performance on the tasks, but there was no evidence that this relationship was a causal one. It was thus necessary to be cautious in making causal inferences from correlational results.

Schlesinger and Meadow (1976b) in their researches showed language deficit to have a strikingly adverse effect on aspects of cognition measured by intelligence test performance. The deaf children who had better communication skills were found to perform at an appreciably higher level than the deaf children whose communication skills were less developed. Even though every attempt was made to reduce the verbal skills necessary for understanding and responding to the tasks, skill in receiving and producing understandable
language was found to correlate highly with the IQ measures. Tentative evidence suggested the priority of language in the relationship between language and intelligence or cognitive processing. Deaf children who were exposed to two different modes of language input from their parents did not have significantly different IQ test scores as measured on the Stanford-Binet in 1970. However, in the 1972 study, IQ test scores were significantly different: Children who had received early and consistent bimodal language input (that is, total communication) ranked first with mean IQ scores of 111; children who received early and consistent oral language input only ranked second with mean IQ scores of 107.5; children who had received mixed and less effective language input ranked third with mean IQ scores of 97.7. Thus the deaf children, who appeared to have similar intellectual potentials in 1970 were seen to differ in their IQ scores two years later. The immediately identifiable differences between them were the kind of language inputs they had received during the intervening years. A higher level of communication skills seemed necessary for having a higher level of performance on the cognitive tasks. The researchers concluded that linguistic competence was an intervening variable mediating between IQ and the index of cognitive performance.

Oleron (1977b) reviewed studies of cognitive development and
found language deficit and lack of communication as significant causal factors for varying degrees of retardation. Watson et al. (1982) examined the relationship between nonverbal intelligence and English language ability in 25 (6-10 year old) deaf children. Intelligence measures included the performance scale WISC-R and the Hiskel-Nebraska Test of Learning Aptitude. Language measures were the Test of Language Development and the Reynell Development Language Scales. Average correlation of .45 was obtained between nonverbal IQ and the language measures. The average multiple correlation between the individual subtests in the intelligence scales and language measures was .68. Subtests that required visual memory were found consistently the best predictors of language performance. Language performance was attenuated and did not correlate with chronological age. The finding of significant correlations between nonverbal IQ and English language, inspite of the attenuated language performance, suggested that non-verbal intelligence and visual memory skills, in particular, might be important in understanding the success of some hearing impaired children in acquiring English and the failure of others.

Sharpe (1985) compared deaf and hearing adolescents at the level of formal operations by using their ability to solve analogies. Language bias was controlled by designing a research instrument containing figure analogies and word
analogies. The theoretical premise, that the oral mode of human communication provided sensory experience that facilitated the perception of contrast necessary to cognition and hierarchic cognitive development, led to the prediction that normal hearing students would demonstrate better analogical reasoning than congenitally profoundly deaf students.

Zwiebel (1987) investigated the cognitive development of three groups of Israeli deaf children (6-14 years) and 101 hearing 6th grade children. The three deaf groups were 23 deaf children with deaf parents and siblings (DpDs), 76 deaf subjects with hearing parents and deaf sibling, and 144 deaf subjects with hearing parents and sibling. Subjects completed Draw-a-person test, and a non-verbal intelligence test. Teachers evaluations were also conducted. DpDs group was superior to other deaf groups and comparable to hearing subjects on most of the intelligence test sub-scales. Results indicated the environmental factors and not heredity were responsible for the cognitive superiority of deaf children of deaf parents.

CONCLUSION:
The review on intellectual development of deaf indicated that performance tests were commonly used over deaf subjects. The results of various researches showed
differences between normal and deaf subjects, with deaf subjects scoring lower than normal subjects and exhibiting greater variance. However, there were no developmental cognitive gaps observed in case of deaf subjects. Factor analytic studies indicated contradictory results regarding mental abilities in normal and deaf children.

Standard instructions for normal children lead to higher performance than the pantomime instructions received by deaf subjects. Some of the recent researches highlighted a factor of organic dysfunction instrumental in lower performance of deaf subjects. The incidence of brain damage was present in some deaf children which lowered their average performance. Greater grasp of language on the part of normal facilitated intellectual growth. This led to differences between normal and deaf subjects. Opponents of the language deficit put forth the thesis of experiential deficit as a debilitating factor in intellectual growth. Social interaction was also seen as a factor in the growth of cognitive development.

ACADEMIC ACHIEVEMENT

Academic achievement of deaf had received only tangential attention so far. No study could be traced showing the overall academic achievement of either residential or day deaf Schoolers etc. Nor was any study done on multiple VS
single deaf students. Some studies were found which compared the reading achievement of deaf children of deaf parents to those of hearing parents. These studies reported consistently higher scores achieved by the deaf having deaf parents. These studies controlled intelligence, as measured by I.Q. tests.

Quigley and Frisina (1961) conducted a study on day students of residential schools to control for the school environment and to maximize the influence of the home environment. They found that deaf students of deaf parents (signers) were significantly superior in vocabulary than deaf students of hearing parents (non-signers).

Stuckless and Birch (1966) compared scores on elementary reading subtest of the Metropolitan Achievement Test and a Teacher rating written language test for deaf children of deaf parents and deaf children of hearing parents. The groups were matched on the variables of age, sex, type of school attended, age of entrance into the school, mental ability, integrity of central nervous system and socio-economic status. Results indicated a significant superiority of deaf children of deaf parents (early manual group) on both reading and language scores.

Using a matched pair design, Meadow (1967, 1968a) compared deaf children of deaf parents to deaf children of hearing
parents. Matching was done for gender, age, I.Q., residual hearing status, family size and socio-economic status. While selecting the sample, no children of hearing parents were included who had deaf siblings, had secondary handicapping conditions, were of an ethnic minority, were deafened after two years of age or whose deafness was the result of maternal rubella, RH incompatibility or anoxia. Results on reading achievement were in similar direction. Children of deaf parents were approximately 2.1 grade levels higher than the children of hearing parents. A third group of deaf children of hearing parents attending a day school was added to the study. Results indicated that mean reading level of deaf children of signing parents (deaf parents) was only 0.4 grade levels above that of day students of hearing parents.

Vernon and Koh (1970) matched students having genetic deafness on non-verbal intelligence, years of school since five and a half years of age, sex and age. The performance of deaf children of early manual group (deaf parent) was significantly higher than performance of early oral group (deaf children of hearing parents) on meaning, word meaning, and reading of Standard Achievement Test.

Parasnis (1983) did not find any significant differences between reading skills of deaf college students of deaf
parents (A.S.L. group) and deaf college students of hearing parents (delayed sign language group). The findings were explained in the light of homogeneity of the groups with respect to the level of education. Since all were college students it was expected that all would have higher reading ability and intelligence as compared to the deaf population in general. Only one study could be located referring to educational achievement of mainstreamed deaf students.

Allen (1984) showed that the integrated deaf subjects of eight years or more were different from non-integrated deaf subjects of similar age on reading achievement and mathematics performance. The contribution of integration though significant, was very small.

**Cross-sectional and Longitudinal Studies on Academic Achievement of Deaf Students.**

Fiedler (1969) studied 20 students at Clarks school in Massachusetts over a period of 10 years. The subjects were in the ages between 4-5 and 5-7 at the time of testing. Ten years later when these students were tested, it was found that three girls and six boys showed signs of educational retardation by five years or more. Only three of 20 students were not retarded academically.

Gentile and DiFrancesca (1969), DiFrancesca and Carey
DiFrancesca (1972), Trybus, Buchanan, and DiFrancesca (1973) and Ries, et al. (1973) reported that in a total of 288 programmes for hearing impaired children, Stanford Achievement tests were administered to 19,000 students. Analysis of about 17,000 scores revealed that during the first three years of schooling these students were better in reading than in other academic areas. After grade three, the achievement in spelling and arithmetic improved and became better than reading achievement. The average age of children tested was about 12.5 years which is normally equivalent to a median grade level of 6.5. The average achievement level of the tested children on arithmetic was 4.1 grade level and of grade level three on paragraph meaning. The findings indicated an extremely slow increment of achievement between 12 to 19 years of age.

Balow and Brill (1972) studied graduates from California School for the Deaf at Riverside from 1956-1971 and concluded that the mean grade level scores for students of hearing parents were less than children of deaf parents. Brasel and Quigley (1975) compared four subgroups of deaf children on Tests of Syntactic Ability and Paragraphs Meaning, Word Meaning, Language and Spelling sub-tests of the standard achievement. Results indicated that manual groups with deaf parents were significantly superior to the groups of hearing parents on all measures. It was thus
concluded that deaf children of deaf parents significantly outperformed children with hearing parents and children whose parents used manual English were the most superior.

Trybus and Karchmer, (1977) reported that the office of Demographic Studies (O.D.S.) (1974) retested 1,543 deaf children tested initially three years back. The data revealed the mean increment in reading achievement to be slightly less than 0.3 grade equivalent per year. It was also expected that deaf children in this programme would achieve and score higher than deaf children in other programmes. Thus despite facilitating conditions deaf children did not show progress of more than 0.3 grade level per year. Gains in reading comprehension scores analysed for different sub-groups showed that

1) Girls tended to gain more than boys.
2) Reading achievement increment was inversely related to hearing loss.
3) Singulary deaf showed more reading gains than those with multiple handicaps.
4) Early school entrance was related to accelerated reading gains.
5) Neither ethnicity nor parental hearing status was related to achievement.
6) However Whites scored higher than Spanish-Americans or
Blacks, and students with both deaf parents scored higher than those with either one deaf or both hearing parents.

One of the major issues regarding the education and development of deaf students had been whether or not to use manual communication with them (Jensema and Trybus, 1978). Studies comparing signing VS. non-signing parents without regard to parental hearing status typically found no relationship between parental method and children's educational skills. Kampfe and Turechek (1987) concluded that further research was needed before any unbiased recommendations were made.

**Correlational Studies on Intelligence and Achievement:**

There had been consistent agreement on recommending the use of non verbal tests as opposed to verbal tests for hearing impaired (HI) since nonverbal tests took into consideration the child's hearing and language deficits.

Birch and Birch (1956) collected data on 35 students from the Western Pennsylvania School for the Deaf between the ages of 3.11 and 8.6 years. Upon admittance to the school the Leiter International performance scale (LIPS) was administered. When the supervising teacher rated the students' achievement, 22 of the students had been in school
for more than three years, 10 for more than two years, and 3 for more than one year. A correlation of .71 between the LIPS and teacher rating scales resulted. However, standardized achievement tests were not administered in this study.

Brill (1962) evaluated 105 hearing impaired pupils between the ages of 8 and 20 at a school for the deaf. The correlation between the Achievement Tests and Wechsler IQs was .55, and the correlation between the Stanford Achievement Test and Wechsler IQs was .54. Brill concluded that, while the correlation was not high enough to make individual predictions, it did indicate a strong relationship between intelligence and academic achievement.

Hurley et al. (1978) compared the relative effectiveness of WISC-R and the Hiskey-Nebraska Test of Learning Aptitude for predicting school achievement of Black and White deaf children. Both tests correlated with school achievement. Even though the groups differed significantly in WISC-R performance I.Q, Hiskey Learning Quotient, and in CA (99-156 months), they did not differ in achievement level. While the WISC-R and Hiskey appeared to have some predictive validity for the Black sample, the findings of no difference in achievement suggested little practical validity of the measures.
Hirshoren, Hurley, and Kavale (1979) reported correlations for 59 prelingually deaf children between the ages of 8.3 and 13.0 in a state supported day school. The non verbal ability measure used was the Performance Scale of the WISC-R, and the achievement measure was the Stanford Achievement Test. Correlations between .09 and .35 resulted in the conclusion that the WISC-R Performance Scale did not seem to be a clinically useful predictor of school achievement for deaf children between 8 and 13 years of age.

Brooks and Riggs (1980) investigated the correlation between the Performance Scale of the WISC-R and the reading achievement section of the Stanford Achievement Test-HI by evaluating 40 deaf and hard-of-hearing students between the ages of 6.2 and 16.3 who were attending public schools from 27 school districts in the Belleville Area Special Education District in Southern Illinois. The correlation was higher when the Performance IQ of the WISC-R was converted to a mental age, which increased the units of measurement. The correlation rose from .19 (IQ) to .60 (Mental age). Neither of these correlations were considered significant.

Watson, Goldgar, Kroese, and Lotz (1986) studied 53 students between the ages of 7.6 and 18.10 attending a State school for HI investigated the correlation between the nonverbal ability measures (WISC-R Performance Scale and H-NTLA) and
the Stanford Achievement Test HI, Woodcock Reading Mastery Test, and Peabody Individual Achievement Test. Using grade equivalent scores, correlations between the H-NTLA and achievement measures (.27-.62) were consistently higher than for the Performance Scale of the WISC-R and achievement measures (.12-.53).

Mullen (1989) observed that when a nonverbal measure of cognitive functioning was used on deaf children the interpretation of the results and prediction of academic potential ought to be done with caution giving account of strengths and weaknesses of the chosen measure.

CONCLUSION:

From the ongoing literature it could be concluded that deaf children of deaf parents performed better than deaf children of hearing parents in general. It also appeared that the relationship between achievement and intelligence was significant.

MAINSTREAMING OF THE DEAF

In United States Section 414 (5) of the Education for All Handicapped Children Act of 1975 (P.L. 94-142) required that participating States established, "Procedures to answer that, to the maximum extent appropriate, handicapped children, including children in public or private
institutions or other care facilities, are educated with children who are not handicapped, and that special classes, separate schooling, or other removal of handicapped children from the regular educational environment occurs only when the nature or severity of the handicap is such that education in regular classes with use of supplementary aids and services cannot be achieved satisfactorily."

The benefit of learning to deal effectively with normally hearing peers was the focal justification of mainstreaming. These benefits could be offset however, by the reality of social rejection, antipathy, and the overt cruelty of the normals towards someone who was, or was perceived as handicapped. Regular Class placement itself was not synonymous with mainstreaming. To place a hearing impaired child in the regular classroom and provide him/her with resources did not assure mainstreaming really.

Following the passage of Act of 1975 Bodenheimer (1976) suggested that the problem of choosing between integration and segregation could be better understood as alternatives to integration and non-conformism. Deafness was used as a paradigm to demonstrate that healthy emotional development required an opportunity to develop (a) special characteristics (through segregated education) and (b) common social pattern (through an integrated education).
Thus both totally integrated and fully segregated education were seen as incomplete.

Impact on Deaf

Gresham (1982) reviewed 40 studies dealing with the social skills of mainstreamed handicapped children and found that mainstreamed children.

a) interacted less frequently and more negatively with non handicapped children.
b) were poorly accepted by their non-handicapped peers.
c) did not model the behaviour of non-handicapped children.

It was suggested that mainstream efforts were misguided because handicapped children were placed into regular classroom without the requisite social skills crucial for peer acceptance. Many mainstreamed children were thus, placed in more restrictive social environment. They were often debarred by their peers, socially isolated, and/or poorly accepted. The level of a handicapped child’s social skills should be used to determine the least restrictive social environment for individual handicapped child.

Vandell et al. (1982) reported results of a study in which eight hearing preschoolers involved in a low-key mainstreaming programme participated in a three week
training course that included discussions about the meaning of deafness, an opportunity to practice communication techniques effective with deaf children, and free-play interactions with deaf preschoolers. Prior to the intervention, no differences were found between the treatment and control subjects (n=8) on interaction frequencies and duration or in the types of acts used to initiate interactions. Significant differences were found, however, following the heightened involvement. Hearing treatment subjects began interacting significantly less with the deaf subjects than did hearing controls. Hearing treatment subjects also became less responsive to the deaf subjects attempts to interact than did hearing controls. While it was hypothesised that increased exposure would result in hearing treatment subjects using more gestures, touches, and messages incorporating multiple modalities, they used significantly fewer of these acts than did the hearing controls. The deaf subjects remained relatively unaffected by the intervention.

Ladd et al. (1984) in a study explored the interpersonal experiences of 48 deaf adolescents attending two year occupational education programmes with non-handicapped peers. Classroom interactions between deaf and hearing students and classmates’ perceptions of mainstreamed peers were assessed for students entering the programme during
three consecutive academic years. Results indicated that a climate conducive to integrated interactions and friendship did emerge into mainstreamed groups. Such results however, were not found in case of studies on mainstreamed deaf children by other authors.

Johnson and Griffith (1985) studied integration and indicated different and competing priorities of participants in mainstreaming programmes which could have a detrimental impact on the handicapped child. It was suggested that teachers should be prepared to handle it carefully.

Rodda et al. (1986) observed that attempts to integrate deaf students into regular education were not at all devoid of significant risks. If mainstreaming had to be done, administrators had to be quite cautious about it.

Saur et al. (1986) conducted a naturalistic study to identify important dimensions of the classroom experience for mainstreamed students. The dimensions identified in the study were participation, relationship and feelings. The participation of mainstreamed hearing impaired students was hindered by their being isolated spatially, temporally, and culturally from the class. Relationship in the mainstreamed classroom depended upon the mutual interactive competence of normally hearing and hearing-impaired persons. The feelings of mainstreamed students seemed to depend on their
acceptance of their hearing loss as well as on their acceptance by others in the classroom. The reasons behind deaf mainstreaming being counterproductive were basically methodological and attitudinal.

Attitudinal and Methodological Drawbacks of Mainstreaming

The available researches revealed that all deaf could not gain equally through mainstreaming. For a substantial percentage of mainstreamed deaf mainstreaming had negative impact because of factors either associated with deaf himself or factors springing from outside.

Northcott (1980) reviewed some of the American ideas on education of deaf in the light of P.L. 94-142 and made recommendations for educational alternatives. He worked out criteria to aid in determining which hearing-impaired children could be best served in a mainstreamed classroom, and listed necessary supportive services. Implications of the exercise were that not all hearing impaired could be mainstreamed, and for the ones mainstreamed there was a need to have a variety of educational options from which to select the best programme for each child. Similar findings were reported by Gresham (1982).

Allen (1984) examined relationship of achievement to demographic and handicapping characteristics of two groups of hearing impaired integrated (IHISs) and non-integrated
(NIHISs) students. Data on subjects aged 8 yrs or more, were taken from a data base created through the annual survey of Hearing-Impaired Children and Youths. Data analysis showed that IHISs and NIHISs differed with respect to their age, ethnic status, hearing loss, age at onset, and additional handicapping characteristics. They also differed on achievement levels in reading and mathematics. Although differences were statistically significant, it was noted that integration alone accounted for a very small proportion of achievement variation. It was felt that for any classroom programme to be successful the basic contributory factors would be the skill and attitudes of teachers. Research revealed that along with methodological drawbacks, mainstreaming failed to get support from teachers.

Santomier, (1985) examined the potential effects of teachers' negative attitudes and opinions regarding mainstreamed handicapped children. It was concluded that teacher trainers ought to improve attitudes and opinions towards mainstreaming and toward handicapped children. It was argued that establishment of a psychosocial atmosphere required:

1. A device to establish a positive environment.
2. Knowledge concerning the establishment of such an environment.
(3) Skills and techniques required to establish such an environment.

(4) Deliberate planning on the part of the programme teacher.

Thompson and Arora (1985) in a review of research concerning teachers' attitudes about integration noted that most ordinary class teachers were much more reluctant to approve the integration in practice, especially since it was not well defined. Teachers had a positive attitude towards integration in principle. Many teachers were likely to approve integration when they were confident of the resources needed to teach the special child. Evidence also showed that children made no more progress in segregated special schools, than they would be expected to do in ordinary schools and for some the experience of segregated special schooling had additional social and emotional disadvantages.

Leyser et al. (1986) attempted to identify asking over 400 undergraduate special and regular education student teachers if they perceived a need for training in competencies. Responses to a 53-item competency questionnaire revealed that both groups indicated a need for additional training in several similar areas, including communication, classroom management, evolution and professional knowledge. Thus in
order to implement successful mainstreaming a total push programme was needed.

Rule et al. (1986) noted that mainstream day care services were not widely available to parents of handicapped children. By merging special education services (assessment, individual educational programme, and service by specialists) with day care activities, handicapped children might receive education as well as care with their normally developing peers. A few programmes included procedures to train staff to minimise the obstruction and interference of handicapped children into mainstream classrooms.

Rodda et al. (1986) indicated that recent attempts to integrate deaf special education students into regular education involved considerable risks and that a selective application of mainstreaming might be counterproductive to effective education. Some of the issues (suggestions) included oral approaches to education, the group identity of deaf persons, educational policies, bilingual education and the role of parents in mainstreaming. It was concluded that by failing to accept the experience of the deaf community the present mainstreaming practices were doing little to remedy the real deficiencies in the education of the deaf.

Centre and James (1987) conducted a survey over 2,219
regular and 332 resource special education teachers from New Wales, Australia to elicit their attitudes toward the integration of individual disabled children. Results indicated teachers' lack of confidence both in their own instructional skills and in the quality of personal support currently provided to them. They were positive about integrating only those children whose disabling characteristics were not likely to require extrainstructional or management skills on the part of teachers.

Mertens (1989) based on, data collected from 49 hearing-impaired undergraduate deaf students who were asked to describe their high school experiences on an open ended questionnaire with a follow up interview, concluded that graduates of residential programmes described their social experiences significantly more positively than graduates of mainstream programmes. Reasons included their teachers' ability to sign, socialising with friends and participation in after-school activities. Positive feelings in mainstream programmes were associated with such factors as availability of supportive services, ability to voice and lip read, parent involvement, encouragement of interaction and awareness by the teachers.

Mulholland (1989) observed that formal educational
opportunities for residential staff were limited. Administrators ought to provide effective on-site training to them.

Legal Perspectives
Mainstreaming has attracted the attention of legal experts. The United States Supreme Court in Hendrick Hudson Central School Districts (HHCSD) Vs. Rowely (1982) recognised Congress' policy preference to mainstreaming handicapped children but the court in H H CSD Vs. Rowely (1982) also noted that despite the preference for mainstreaming handicapped children - educating them with nonhandicapped children, regular classrooms simply would not be a suitable setting for the education of many handicapped children. The act expressively acknowledged that the education in regular classes with the use of supplementary aid and services cannot be achieved satisfactorily. The act thus provided for the education of some handicapped children in separate classes or institutional settings.

Nevertheless several courts found the mainstreaming preference a critical factor in deciding in favour of a local school placement over a residential placement without a mainstreaming component. U.S. Court of Appeals for the Eighth Circuit interpreted the HHCSD Vs. Rowely (1982) decision to support its conclusion that a public school
placement was appropriate. In this case Sherry Grace, a deaf child who depended on sign language to communicate would be taught on a one-on-one basis by a certified teacher of the deaf for all her academic classes at a public school. She would be with non handicapped children for library, recess, lunch, and physical education. The court found this minimum contact with non-handicapped children necessary to meet the goal of mainstreaming.

The majority of Courts in Springdale Vs Grace (1982), looked into whether there was contact with non-handicapped children, even if it was limited to non-academic activities. The foregoing review indicated that minimum contact between deaf and non-handicapped children would also qualify as mainstreamed i.e. the courts recognise that the goals of mainstreaming can still be met even if the contact between the handicapped and non-handicapped was minimum and that too only outside classroom.

Therefore any situation which permitted a substantial contact (whether experimental or natural) between non handicapped and handicapped could be viewed as an integrated or mainstreamed one. Consequentially the deaf children who went to schools for deaf during the day time and came back home after school hours to be with their hearing sibling and friends could be understood as mainstreamed in comparison to
the deaf children who stayed in residential deaf schools for their education. Similarly, if in a family where only one offspring was deaf and commuted to school for deaf everyday, he was to be considered as mainstreamed in comparison to the multiple deaf offsprings in the same family attending day school. The multiple deaf offsprings, would not be considered as mainstreamed because they had a strong tendency to stick to people who were like them, sharing the same language. Even when they were surrounded by hearing people their natural inclinations and preferences were for the deaf (Furth, 1973; Kannapell, 1980).

It appeared that a strong reason behind the failure of mainstreaming was the indifference and lack of favourable attitudes of hearing people towards deaf. Researches also showed that not all hearing people discarded deaf. Hearing subjects with prior contact with deaf children perceived the deaf more favourably than those with no prior contact (Bikersteth et al., 1985). It appeared, thus, imperative to study the growth and development of deaf in situations where hearing people had favourable attitudes towards them, i.e., effects of natural types of mainstreaming rather than the experimental or forced classroom type which had consistently shown debilitating effects. In the present study the concept of mainstreaming was proposed to be used from a more liberal and naturalistic angle. It was felt that the
comparisons between institutionalised vs non institutionalised deaf, and single vs. multiple deaf should help in evolving sound principles of mainstreaming. Only one study could be found in the literature comparing single vs. multiple deaf. The following review was thus based on researches comparing basically institutionalised deaf with non institutionalised ones.

MULTIPLE VS SINGLE DEAF

Kusche et al. (1983b) studied 78 deaf high school children from the following family constellations:

a) 19 deaf children with deaf parents (Dc/Dp),
b) 19 controls with hearing parents and hearing siblings matched to the Dc/Dp groups (Dc/HP1),
c) 20 deaf children with deaf siblings and hearing parents (DC/DS) and
d) 20 deaf controls with hearing parents and hearing siblings matched to the DC/DS group (DC/HP2).

Subjects were administered a personal data questionnaire and the Standard Achievement Test, Subjects had previously completed the performance scale of WISC-R or WAIS and non verbal IQ scores were taken from the files. Subjects were matched on 16 variables to control for extraneous factors.

Dependent variables included non-verbal intelligence,
vocabulary, achievement, reading, comprehension, language achievement, and sign language experience. Findings showed that DC/DP and DC/DS groups evidenced significantly higher non-verbal I.Q. scores than DC/HP control groups, but they had scores remarkably similar to each other. Results indicated that relationships among non-verbal intelligence, verbal achievement and early sign language were quite complex.

**INSTITUTIONALISED VS NON-INSTITUTIONALISED DEAF:**
Templin (1950) compared two groups of deaf children and two groups of hearing children. In each category one group was attending the residential school and the other was attending a day school. The hypothesis tested was that environmental restrictions on experience would relate to restrictions on the ability to perform abstract reasoning. Environmental restrictions were of two types; internally imposed (the limitation of deafness) and externally imposed (the limitation of residential status). Using several tests of abstract reasoning on pairs of residential and day students matched on age, grade placement, I.Q. score, and sex, it was found that the scores of residential and day students did not differ significantly. Thus, it seemed that the apparent relationship between attendance at residential school and poor reasoning ability was spurious. The results also indicated that ability to reason was associated negatively
with hearing loss.

Barker et al. (1953) argued that social immaturity seemingly characterising deaf children and adults resulted from high proportion of deaf children attending residential schools, where the development of independence and responsibility might be stifled. Social immaturity was reflected in the perceptions of people.

Craig (1965) studied self perceptions of 48 subjects consisting of two deaf groups from residential school and a deaf group attending a regular public school. The children aged (9.5 to 12) were asked to decide which members of their class they would choose to sit near or to go to the beach with, and which they thought would choose them. Scores were derived for accuracy of self perception, direction of errors of self perception, self acceptance and sociability. The deaf children, in both day and residential schools, rated themselves significantly more positively than did the children in the other group.

Meadow (1968a,b) indicated that a residential setting might have deleterious effects on social maturity due to further isolation of the individual from his/her family and hearing peers.

Meadow (1968c) observed that on social emotional behaviour, day students were generally superior to residential students
with hearing parents. The residential students could offer significant advantages which had impact on the social development of deaf students. The advantages included clear communication, comfortable and meaningful peer relationships, opportunity to develop leadership roles in student activities and athletics etc.

Meadow (1969) studied sub-groups of 54 deaf children matched for age, sex, hearing loss and I.Q. score. One member of each pair had deaf parents and the other had hearing parents. A graphic cartoon like test was developed using written adjectives plus illustrations of manual signs for the adjectives. The results indicated that deaf children with deaf parents had higher and more positive self-images than deaf children with hearing parents. The above study was expanded by Schlesinger and Meadow (1972) to include another group of 74 deaf students of hearing parents, all of whom were attending day schools. The results of the study showed that average self-image test scores for the day pupils were almost identical to those of the residential school students with hearing parents, i.e. significantly less positive and lower than the deaf children of deaf parents in residential settings.

Using teachers' ratings on dimensions of maturity, independence and ability to take responsibility, Meadow
(1972) conducted studies on three matched groups of deaf children. One group of deaf children was staying in residential setting and had deaf parents. Second group comprised of deaf children of hearing parents in the residential setting and the third group was of deaf children of hearing parents in non-residential setting. A logical fourth group of deaf children of deaf parents in non-residential setting of a substantial size was not available. The results indicated that deaf children of deaf parents in residential setting were rated highest followed by deaf children of hearing parents in non-residential setting. The deaf children of hearing parents in residential setting were rated last and significantly lower than the other two groups.

Evans (1975) concluded that residential school children, regardless of the communication philosophy of the school, would fail to learn contemporary ways of family life, dating and consumer behaviour until they were fully exposed to sufficient participation in different social systems.

Narayanan (1983) tested the hypothesis that institutionalised handicapped persons would show symptoms of personality disturbance. He administered the Rorschach Test to 23 boys and 11 girls (aged 11-28 yrs) who were residents in a school for the deaf. 26 usable protocols were
obtained. Analysis showed that subjects had a low level of awareness of others, experienced pain and showed an inferior level of striving for integration. Findings suggested that deaf experienced distortion in personality, inconsistent and ambivalent relationship with parents and social marginality. It was concluded that a handicap led to problems only when the individual perceived the handicap as a condition of inadequacy. Residential school life was found related to social immaturity.

Feinstein and Richard (1987) examined the psycho-social problems of 410 deaf adolescents attending a residential school. Findings suggested that deaf adolescents were more vulnerable to problems of adjustment than the hearing adolescents. This increased vulnerability was due to the greater family emphasis on communication, family interactions and adjustment to the outside world rather than to the deaf personality.

Mulholland (1989) observed that the concept of "Least Restrictive Environment" had become the cornerstone on which placement decisions for hearing-impaired children were made. Living outside the family unit was considered restrictive. Deaf residents, therefore, ought to be provided atmosphere and programmes which counteracted restrictiveness of placement.
CONCLUSION:

The review of researches on mainstreaming indicated that in general there was less acceptance of deaf children by normal children which had detrimental impact on their development. However deaf children staying in residential schools too, did not benefit much as they could not pick up the contemporary ways. There were indications that deaf children with either deaf parents or deaf siblings faired better on intelligence tests than deaf children of hearing parents.

LANGUAGE OF THE DEAF: MANUAL COMMUNICATION, SIGN LANGUAGE AND TOTAL COMMUNICATION

A probe into the cognition of deaf, required an overall understanding of their language and it's role in the development and understanding of deaf as such. Although the manual communication encompassed primitive idiosyncratic gestures to highly complex forms, these were often considered legitimate language systems. Manual communication used signs, each of which represented a complete idea. Each sign consisted of three elements: (a) the position(s) of the hands; (b) the configuration(s) of the hands; and (c) the movement(s) of the hands to different positions. American Sign Language (ASL) was one such system. It included - systems used throughout the United States and Canada that had a high degree of manual
intelligibility. It was a linguistic system having its own rules that did not necessarily follow the same constraints as the formal English System. Other manual systems, with varying approximations to English did also exist.

Proficient users of manual communication were known to have a variety of options at their disposal. They could communicate completely through signs using no finger spellings or they could communicate completely through fingerspellings. Most individuals tended to use a combination. Generally the more informal the situation, the greater was the tendency for signs to dominate. As a situation became more formal there was an increasing tendency to use spellings.

In Russian sign language there were no word changes nor helping words. Also signs could not be connected with definite parts of speech. Depending on the context, the same gesture could mean 'knife' or 'to cut', 'glass' or 'to drink', 'teeth' or 'white'. The structure of what was considered the minic-gesticulatory system differed from spoken sentence structure. Sign language did not prepare deaf children for learning the grammatical structure of the spoken language.

Another method of communicating with deaf was known as: Oral-Aural Method. In this method, the child received input
through speech reading (lipreading) and amplification of sound, and they then expressed themselves through speech. It did not use signs and finger spellings. The total communication approach combined the Oral-Aural Method with finger spellings and signs.

Hearing impaired children were found to be subjected to greater hazards in their social development (Levine, 1960) and tended to have difficulty in forming relationships with hearing children because of their feelings of isolation (Neyhus, 1964, Mindel Vernon, 1971). The deaf used sign language as their primary mode of communication and formed a sub-culture that contributed to their self and group identity (Furth, 1973; Kannapell, 1980).

Plantade and Girardin (1976) observed that deafness may co-exist with psychosis in a significant number of cases. The failure to develop language was associated with deafness which in turn affected the development of social and cognitive skills. They emphasized the development of the language of the deaf.

Markowicz and Woodward (1978) observed that language played a major role in maintaining ethnic identity of the deaf community. They were seen as dichotomizing others as members or non members, using American Sign Language as a criterion. Alegria (1979) observed that the sign system of
communication, spontaneously used by deaf people, was not generally viewed as having a genuine linguistic status. As a consequence it was systematically excluded from the deaf child's education. Similarities however, between oral and sign languages appeared at the level of processes of acquisition. The deaf children exposed to sign language from birth were found to be more competent in oral tasks than those exposed to oral language, even in cases where they received early and intensive oral training. The exposure of the deaf to sign language from birth facilitated the normal development of their linguistic dispositions shared by all human beings and their satisfactory communication experiences with the environment.

It was interesting indeed to read several deaf authors recount their experiences/explanations why they felt socially isolated and why deaf sub-cultures were formed?

Kannapell wrote:

"Hearing people were always interested in how well I talked or heard or wrote English. They did not seem to be interested in making friends with me. The teachers always corrected the errors I made in writing or talking and the supervisors always said, "Don't do this", or "Don't do that". They never sat down for a moment to chat with me or other students as friends. This is why I socialised only
with deaf people for a long time" (Kannapell, 1980).

To Kannapell taking away or changing the sign language from a deaf was like taking away his identity, his confidence which could be detrimental to his overall psychological growth. This introspective report truly confirmed the findings of researchers about deaf having a feeling of ostracization and feeling comfortable only in the deaf group sharing their language.

Hyot et al. (1981) observed the importance of visual (sign) communication for the healthy development of deaf children. On the basis of their interviews with 10 therapists and supervisors who had clinical experience with deaf patients, they found that if auditory communication was stressed it would lead to interesting and important implications. Washabaugh (1981) discussed the impact of social life on the sign languages of the deaf and the manner in which an individual's intellectualised knowledge of sign language of the deaf had been influenced by his/her social and intellectual context. From a sociolinguistic point of view, significant issues were acquisition of sign language and variation in sign language that resulted from the social pressures on the deaf. While sign language and oral language were essentially similar, deaf and hearing communications were different. When deaf shared the sign
language, the language became a binding force for deaf children giving rise to a feeling of belongingness with a particular group (The deaf group).

Francoise (1982) observed that sign language nurtured the symbolic function of language, provided deaf children with a sort of security and guaranteed them an identity. This security and identity helped them in maintaining an 'in group' feeling.

Though the deaf had an ethnic feeling they were expected to live in the wider society. Feinstein (1983) contended on the basis of clinical consultations and group therapy with early adolescent deaf boys, that problems in communication exerted a profound effect on their development. Communication affected family life, peer group processes, and academic adjustment. Subjects experienced ongoing problems in the social fabric of their home and school, narcissistic vulnerabilities and deafness against shame. The language processing affected the peer group at a time when it played a particularly important role in development.

Barnum (1984) contended that due to the interest differences in oral-aural and visual-manual languages particularly the mediums through which they were learned, the overwhelming majority of deaf children could not learn English effectively through speech reading and written English.
They also could not receive their education through speech reading, written English or manual forms of English and subsequently achieve anything comparable to the achievements of their hearing peers. Research showed that native signers did better academically and maintained that advantage throughout their school years. Instructions through a natural sign language was also a benefit and the transition to teaching through English could be successfully accomplished at about 5th grade level. It was also suggested that classroom teachers should give deaf children positive feelings about themselves and their language and allow them to feel proud of their culture.

Preisler (1984) examined communicative strategies used by 15 deaf children in social interactions with other deaf children. Subjects (n=5) with early sign language experience communicated more effectively than subjects (n=10) with late sign experience, seven of whom had received oral/aural training. Orally trained deaf subjects did not know many fundamental rules of social communication.

Reagan (1985) observed that the deaf culture was demarcated by language (i.e. A.S.L.). It had a strong group identification, a high rate of endogamy, and a large organizational network. Therefore while developing the education programmes for the deaf, it was necessary to form
bilingual/bicultural instructional programmes.

Unlike most of the oral languages sign language was not highly universal and changed due to external pressures and policies.

Maxwell and Sybil (1986) showed from results of interviews with 9 black deaf adults (aged 44-71 years), 10 black deaf 15-17 years old and 17 hearing teachers that there were larger differences between sign language of black deaf persons educated before and since racial integration of the schools. These differences were found related to educational policies.

Scott et al. (1989) designed an experiential speech reading course to provide hearing-impaired students with real life communication experiences. The course was administered along with traditional speech reading courses. Results indicated increased students’ self-perceptions of communication success in real life situations.

CONCLUSION

The argument that sign language as currently used by the deaf did not constitute a true language and perhaps not even a complex symbolic system was found no longer tenable in view of current researches. The review on language of the deaf indicated that sign language was having cultural
characteristics as it played an important role in maintaining ethnic identity. Members of the deaf community dichotomized others as members or non-members. Language of deaf (sign) was observed having the same structural characteristics as oral languages. Deaf were found depending on other visual modes as well. Exposure to sign language since birth facilitated development of linguistic dispositions and integrated the deaf better with deaf and normal populations. However, a deaf could function better in deaf and normal cultures if a bilingual/bicultural instructional approach was followed.

Research reports on deaf children typically did not mention the various influences on the children's communicative behaviour to which they might have been subjected in their normal day to day life. Moreover, studies that sought to control communicative modes by adopting a specific intervention system such as signing exact English or finger spelling, did not always systematically monitor the accuracy of modelling or the extent to which the model was uniformly available in the child's home and school settings.

OVERALL SUMMARY

The over all review of literature revealed that parents of deaf were generally perceived as showing greater expression of frustration than the parents of hearing children, thus inadvertently becoming detrimental to the growth and
development of their deaf children. However, there was greater acceptance of the deaf child if he was born to deaf parents. Deaf children were found to be less socially mature and lower in their ability to receive messages through facial expressions than normal children because of their lessened opportunities to receive interpretations and verbal explanation to emotions of others.

On the intellectual development, which was measured using performance tests the normal children out performed deaf children. There were contrary findings using factor analytic studies. It was observed that instructions determined the scores earned by the subjects on different tests to a significant extent. Academic achievement of deaf children of deaf parents was seen as better than the deaf children of hearing parents. However, the relationship between academic achievement and intelligence was found significant.

Mainstreaming or integration of deaf generally proved detrimental to their growth and development. However, deaf children in residential schools too did not gain much as they were aloof from the contemporary ways. Their language did not have a proper linguistic status and was seen as precipitating a strong 'we-group' feeling and feeling of security in them. They felt isolated from the normal world. It emerged that recognition of their language could have far reaching implications on their growth and development.