

Home environmental influence on intellectual abilities of twins

■ Bimla Dhanda*, Chandra Kala Singh and Kiran Sain

Department of Human Development and Family Studies, I.C. College of Home Science, C.C.S. Haryana Agricultural University, HISAR (HARYANA) INDIA

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*Author for correspondence

ABSTRACT

The present study was designed to explore the home environmental influences on twin's intellectual abilities in rural areas of state Haryana. A sample of 500 pairs of twins (183 MZ pairs, 317 DZ pairs) in the age group of 2-5 years were studied with cross-sectional design. The assessment of twins for these abilities was done with help of Stanford-Binet Intelligence scale (Binet, 1916). The Home Inventory (Caldwell and Bradley, 1984) was used for assessment home environment. The results related significant association between intellectual abilities of monozygotic twins and in dizygotic twins.

INTRODUCTION

The home has an important informal but active role in physical, mental development, and social development of the child. Home environment rather than heredity, providing the best available evidence for the importance of environmental influences on personality, and cognition of the twins. Researchers have established a link between poverty and children's cognitive abilities and social-emotional competence (Mayer, 2002). Strong facts obtained that increases in family income have a positive impact on children (Costello *et al.*, 2003). Psychological researchers typically distinguish five major domains of individual differences in human behaviour, cognitive abilities, personality, social attitudes, psychological interests

and psychopathology (Lubinski, 2000).

The child is born with certain inborn tendencies or powers. The twin situation, particularly impact of parent rearing practices, proved influential in twin's intellectual development as observed in the home. Cognitive ability combined output of families, but prior twin and adoption studies have suggested that this is the result of both genetic and environmental factors (Kenneth *et al.*, 2015). In the home where mothers and fathers talk with toddlers, which require children to have more communicative responsibility in the interaction in fact toddlers talk more, use more diverse vocabulary, and produce longer utterances (Rowe *et al.*, 2004). In addition, home learning environment may stimulate more generalised and motivational experiences in children in terms of learning

and academic success and establish the links between learning at home and learning at school (Melhuish *et al.*, 2008). On other hand parents living in poverty have children who are at risk for cognitive, academic and social emotional difficulties. In this study, we used twins study a powerful design to investigate the role of the rearing environment in intellectual ability.

Keeping that mental development of the child takes place with the help of many experience in the family, the present study was conducted with the objective to explore contribution of home environment in the intellectual abilities of twins.

MATERIAL AND METHODS

To explore the influence of home environment on intellectual abilities the present twin study on a large sample for 1000 twins in the age group of 2 to 5 years including both types of twins monozygotic and dizygotic was conducted in rural areas of state Haryana. The assessment of twins for intellectual abilities was done with help of Stanford- Binet Intelligence scale (Binet, 1911). The Home Inventory (Caldwell and Bradley, 1984) was used for assessment home environment. Obtained on these abilities were analysed to draw the inferences.

OBSERVATIONS AND ANALYSIS

The findings of the present study as well as relevant discussion have been presented under following heads :

Association of intellectual abilities of twins with their home environment :

The current analyses were based on a sample of the twins' intellectual abilities and data obtained at the time of each home visit. The results related association

of intellectual abilities and home environments were explained and found that strong and significant association between intellectual abilities of monozygotic twins ($\chi^2=35.1^{**}$) and ($\chi^2=19.5^{**}$) in dizygotic twins. It indicated that in their home the amount of intellectual stimulation through parent talks to the child, the degree of warmth of parents and facilities like as books, magazines, newspapers and computers provided to the child enhanced learning experiences as shown in Table 1.

There was strong and significant association between intellectual abilities of monozygotic twins and in dizygotic twins with their environment. Petrill *et al.* (2010) reported that organization of home with safety strongly linked with higher intellectual scores.

Pre-school-age children's view of themselves is linked with attachment experiences as attachment experiences seen as shaping their views about others and expected behave from others to towards them (Toth *et al.*, 2000). Turkheimer *et al.* (2003) conducted an analysis of socio-economic status (SES) by heritability interactions and found that lowest level of socio-economic family accounted for almost all of the variation in IQ.

Results further indicated that in their home the amount of intellectual stimulation through parent talks to the child, the degree of warmth of parents and facilities like as books, magazines, newspapers, and computers provided to the child enhanced learning experiences. The findings supported with the research that both genetic and environmental influences were important to initial reading performance but shared environmental influences were significant for development in reading performance over time (Petrill *et al.*, 2010). According to Dickens and Flynn (2001) the evolving environment can cause huge cognitive gains over time with no assistance from better genes.

Home environment	Monozygotic				Dizygotic					
	Low	Medium	High	Total	χ^2	Low	Medium	High	Total	χ^2
Low	39 (45.9)	34 (40.0)	12 (14.1)	85 (100.0)	35.1**	66 (32.0)	75 (36.4)	65 (31.6)	206 (100.0)	19.5**
Medium	34 (22.7)	45 (30.0)	71 (47.3)	150 (100.0)		55 (24.7)	67 (30.0)	101 (45.3)	223 (100.0)	
High	40 (30.5)	58 (44.3)	33 (25.2)	131 (100.0)		78 (38.0)	73 (35.6)	54 (26.3)	205 (100.0)	
Total	133 (30.9)	137 (37.4)	116 (31.7)	366 (100.0)		199 (31.4)	215 (33.9)	220 (34.7)	634 (100.0)	

** indicates significance of value at P=0.01

Figures in parentheses denote percentages.

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