

A Study of The Relationship Between Awareness of Heredity/Environment Mechanisms and Belief in Heredity/Environment

Dr. Satish Kumar¹, Dr. Sandeep Kumar^{2*}

ABSTRACT

Present study, mainly exploratory in nature, was intended to examine the relationship of belief in heredity/environment with awareness of heredity/environment mechanisms. To fulfill the objectives of the investigation, a total 800 subjects were administered measures of awareness of heredity/environment mechanisms and belief in heredity/environment. Results revealed that awareness of heredity/environment mechanisms was found negligibly associated with belief in heredity/environment.

Keywords: *Heredity, Environment, Belief, Awareness, Incidental, Awareness*

One's belief in heredity or environment i.e. who believe that behavioral characteristics are determined by heredity or environmental factors, may influence his/her causal ascriptions for events of success and failure, outcomes. The heredity believers perceive the characteristics as determined by genetic factors e.g., ability determined by heredity, there are chances that he/she may attribute successful behavioral outcomes more to internal i.e., ability and effort; factors than external, and failure/unsuccessful outcomes to lack of these i.e., ability and effort. The environmental believers on the other hand may perceive the behavioral characteristics influenced and determined by environmental factors and chances are high that they will attribute successful outcomes to external factors more than internal factors. Though there are very few studies in this area yet the available studies (Shyam, 2004; Singh and Shyam, 1997) have reported variations in the attributions of heredity, balanced and environment believers. Knowledge/awareness of the mechanism of heredity and/or environment may have influence on one's belief in heredity or environment and can also cause variations in our attribution for events of success and failure.

REVIEW OF LITERATURE

In their study, Furnham, Johnson and Rawles (1985) found that males, people with lower levels of education and older people tend to have stronger belief in the influence of heredity than females, younger and educated ones. Conservatives hold belief in heredity, whereas, agnostics, atheists and people with left-wing views tend to attribute the origin of most human characteristics to the environment. Meerum, Terwogt, Hoeksma and Koops (1993)

¹Associate Professor in Psychology, Vaish College, Bhiwani (Haryana)

²Assistant Professor in Psychology, Government College Jassia, Rohtak (Haryana)

*Corresponding Author

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constructed a measure of belief in heredity/environment taking items relating to 16 diverging human characteristics. Regression analysis was conducted and it was found that the relationship between belief in the influence of heredity and age was curvilinear (in that the middle aged, "around age 25 years, hold the weakest belief in heredity). There was a negative linear relation between belief in heredity and education (i.e., low education corresponds to stronger belief in heredity). Parents of adopted children and people with incomplete information about their own genetic backgrounds were found to hold strong belief in the influence of heredity. In another study conducted by Van Kampen, Koops, Meerum, Terwogt and Reijnder (1990), it was reported that foster parents and adopted children differ from natural parents and children in their belief wherein the former were found to be more inclined towards heredity. In their study, it was also found that incomplete knowledge about one's own genetic background was also found to hamper belief in the influence of the environment. Nilsson and Ekehammer (1989) in their study did not find any variation in the belief in heredity/environment due to sex; however, they found that the knowledge of one's own genetic background has an impact on the belief in heredity/environment.

Singh, Shyam and Aruna (2001) examined the belief in heredity/environment among 270 subjects. Results of the study revealed that sex and level of knowledge were significant sources of variation in belief in heredity/ environment. Males and teachers were more environment oriented in their beliefs than females and students. Singh and Shyam (2002a) administered a measure of belief in heredity/environment for 20 human characteristics to 3001 subjects from Northern Indian states (viz. Haryana, Delhi, Uttar Pradesh and Rajasthan). They found that by and large, there exists a balanced belief in heredity/environment. Females and ruralities were heredity oriented in their belief, whereas, males and educated people were environment oriented in their belief.

Studies relating to heredity/environment belief and other specific contexts such as pathological states are also conducted. Sheoran (2002) examined the effect of belief in heredity/environment on person perception (i.e., self and others) and found that the balanced believers had positive self-perception on three characteristics (i.e., activity/energy, numerical ability and body weight) than the polarized i.e., heredity and environment believers. In case of perception of others, the potency of heredity/environment belief emerged as selective i.e. it was effective for few characteristics viz., linguistic ability, creativity and body weight; restrictive effect on perception of humor in lower social class protocols. In another study conducted by Singh, Shyam and Kumar (2004) it was reported that balanced believers exhibited higher positive self-perception than those of polarized believers. Balanced believers also rated others with higher scale values on emotional instability, linguistic ability, anxiety, altruism, leadership, humor and body weight whereas, with lower scale values on egocentrism and reasoning ability. Blackburn (1996) reported that belief in biology and genetics was one of the dominant themes for obesity management programmes. Those who believed that their obesity was due to their biology and genetics had poor feelings of self-control and consequent change in behavior. Soodak and Powell (1996) explored the belief of school teachers in regard to their efficacy to perform specific behaviors such as student outcome. They found that the teachers who believed that outcome of the student is determined by heredity, put less efforts in their teaching.

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Significance of the Study

Review of the literature clearly highlights that, in general, there are very few studies relating to belief in heredity/environment and its relationship with awareness of heredity/environment mechanism, yet findings of the available researches are suggestive of the importance of such studies. Therefore, considering the relative paucity of such studies, present study was designed to assess the relationship of awareness of heredity/environment mechanisms and belief in heredity/environment.

Objective

The main objective of the study was to investigate the relationship of knowledge of heredity/environment mechanisms with belief in heredity/environment.

Hypothesis

To achieve the objective of the study, following hypothesis was formulated:

“Awareness of heredity/environment mechanisms would have a significant relationship with belief in heredity/environment”.

METHODOLOGY

Sample

To fulfill the objective, the study was conducted in two phases. In the first phase, a survey was conducted on a large sample (i.e., N = 800) drawn from the general population. A measure of belief in heredity/environment for human characteristics and heredity/environment awareness checklists were administered to all the subjects. In the second phase of the study a sample of 270 subjects was selected on the basis of scores on heredity/environment belief and awareness of heredity/environment mechanisms following a single step double criteria procedure. Heredity/environment belief and awareness of heredity/environment mechanisms were taken as independent variables, both having three levels. Three belief groups i.e., heredity believers, balanced believers and environmental believers were formed taking subjects scoring more than mean +1 S.D. in the environment believers group, below mean -1 S.D. in the heredity believer group and scoring in between mean ± 1 S.D. in the balanced believers group. Heredity/ environment awareness variable also had three levels - high, moderate and low. Three groups were formed taking subjects mean +1S.D. in high awareness, mean -1 S.D. in the low awareness and subjects falling in between Mean ± 1 S.D. in moderate awareness group. Thus, in the second phase of the study a 3 x 3 factorial design was used (as shown in Figure 1). There are nine cells and equal numbers of subjects (n=30) were taken in each cell. Thus, the total number of the subjects in this phase was 270.

Figure 1: Design of the Study

		Heredity/Environment Belief		
		Heredity believers (H)	Balanced believers (H/E)	Environment believers (E)
Awareness of Heredity/Environment Mechanism	High	n=30	n=30	n=30
	Moderate	n=30	n=30	n=30
	Low	n=30	n=30	n=30

N=270

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Tools Used:

The following tools were used for achieving the objectives of the study:

- 1. Measure of the belief in heredity/environment for human characteristics:** A measure of belief in heredity/environment for human characteristics (Singh and Shyam, 2002) was used for measuring belief in heredity/ environment for human characteristics. The checklist consists of 20 human characteristics of different types such as performing arts, orderliness, emotional instability, egocentrism, linguistic ability, cleverness, sociability, altruism, activity/energy, entrepreneurship, general intelligence, creativity, numerical ability, leadership, humour, body weight and bravery. The scale consists of connotative descriptions (in Hindi) of all the characteristics and arranged in the form of a checklist subscribed with a three point-scale. Items finally selected (i.e. 20 human characteristics) had an endorsement rate of around 0.5 (i.e. 50%) and discriminated well between heredity and environment believers. The Kuder-Richardson reliability (KR-21) coefficient of the measure is 0.68. The checklist was standardized on a sample of 3001 subjects drawn from a heterogeneous population. The respondents were required to check each characteristic as determined by heredity (1), both heredity and environment (2) and environment (3). Scores on the scale may range from 20 to 60, high scores indicating belief in the environment.
- 2. Checklist for the Awareness of heredity/environment mechanisms:** A checklist prepared by (Singh, Shyam and Kumar (2004) was used to assess the awareness of the respondents about the mechanisms of heredity and environment influencing human characteristics. In it, there are 20 items which were prepared by taking the help from the literature and discussion with subject's experts as well as keeping the common man in mind. Items were simple, clear and in easy language. Some items were of multiple-choice type, while others were of 'Yes-No' type, still others were open ended requiring the subject to give a brief description. A correct answer to a question was given a score of one and a wrong answer was scored as zero. Thus, the score ranged from 0-20, high score indicating high awareness.

Procedure

Heredity/environment belief scale and heredity/environment awareness checklist were administered to all the 800 subjects. Scoring of the heredity/ environment belief scale and heredity/environment awareness checklist was done as per prescribed procedure.

RESULTS

Scoring of all the measures was done as per prescribed procedure. The obtained data was tabulated; Pearson coefficient of correlation was calculated between awareness of heredity/environment mechanisms and heredity/environment belief scores.

Our objective of the study was to assess the relationship of awareness of heredity/environment mechanisms and belief in heredity/environment. For achieving the stated objective, scores of 800 subjects on heredity/environment belief and awareness of heredity/environment mechanism scales were arranged and coefficient of correlation was calculated. The obtained coefficient of correlation was $-.073$. This indicated that the association of awareness of heredity/environment mechanisms and belief in heredity/environment was negligible but the direction was negative and thus the two variables seem to be independent.

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Keeping the direction of the relationship in mind, three groups of subjects were formed on the basis of awareness of H/E mechanisms scores, taking subjects above mean $+1\sigma$ ($X = 10.89 + 3.24$ S.D.) in the high awareness group, below mean -1σ ($10.89 - 3.24$ S.D.) in the low awareness group and falling in between mean $\pm 1\sigma$ ($X = 10.89 \pm 3.24$ S.D.) in the moderate awareness group, and simple ANOVA for belief in heredity/environment scores was calculated. Obtained results are given the [Table 1](#) (Means and S.D's) and [Table 2](#) (Summary of ANOVA).

Table 1: Means and S.D.'s of low, moderate and high awareness group and total (N=800) subjects on belief in heredity/ environment scores

	Low Awareness (n= 181)	Moderate Awareness (n= 473)	High Awareness (n=146)	Total Subjects
Mean	41.38 ^a	40.59 ^{ab}	39.64 ^b	40.53
S.D	7.05	6.04	6.86	6.65

Subscripts a,b,c, shows Duncan's post hoc test for significant mean comparisons

Table 2: Summary of ANOVA for variations in H/E belief scores among low, moderate and high awareness of H/E mechanisms

Source of variance	SS	Df	MS	F
Between Groups	243.96	2	121.98	2.95*
Within Group	32916.10	797	31.30	

**Significant at 0.05 level.*

The high awareness group obtained a mean of 39.64 (S.D. = 6.86), moderate awareness group got a mean of 40.59 (S.D. =6.04), and low awareness group obtained a mean of 41.38 (SD=7.05) on heredity/environment belief. These mean scores of the three groups differ significantly $F=2.95$, $p<05$ ($df=2,797$). Post-hoc comparisons were done by Duncan's test and are indicated by alphabets a, b and c subscribed over the mean scores (Table 1). Post-hoc comparisons revealed that the group having low awareness of heredity/environment mechanisms has significantly higher scores than the group having high awareness of heredity/environment mechanisms indicating that highly aware group tend to be heredity oriented in their belief than the low awareness group (having environment-oriented belief). The moderately aware group neither differs from high awareness nor from the low awareness group in their belief in heredity/environment (Table-1). The coefficients of correlation between belief in H/E and awareness of H/E mechanisms scores of the three awareness groups (i.e., high, moderate and low) were calculated and the obtained coefficients of correlation were $r = .170$ for awareness and belief in H/E in the highly aware group, $r = -.016$ for the moderately aware group, and $r = -.075$ for the low awareness group. This again indicates the weak association and curvilinearity in the relation of belief in H/E and awareness of H/E mechanisms.

DISCUSSION AND CONCLUSION

It was hypothesized that awareness of heredity/ environment mechanisms would be significantly associated with belief in heredity/environment. The scores of 800 subjects on awareness of heredity/environment mechanisms and belief in heredity/environment were subjected to bivariate correlation. The coefficient of correlation between awareness of heredity/environment mechanisms and belief in heredity/environment was $- 0.73$ indicating

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that the relationship between the two is almost negligible; however, the direction indicated that increase in awareness was associated with heredity orientation.

To examine the relationship of the two, more specifically three groups of subjects were formed taking subjects above mean $+1\sigma$ in the high awareness group, in between mean $\pm 1\sigma$ in the moderate awareness group and below mean -1σ in the low awareness group. When the heredity/environment belief scores of these three groups having low, moderate and high awareness were correlated with awareness of heredity/ environment mechanisms, increase in awareness was associated with environment orientation in high awareness group whereas, in case of low and moderate awareness of heredity/environment mechanisms groups, increase in awareness was associated with lowering of scores of heredity/environment belief i.e., heredity orientation. Thus, awareness of heredity/environment mechanisms has weak and variable (i.e., different in case of high and low and moderate awareness groups) effect. The direction of relationship changes with increase or decrease in awareness scores within separate groups formed on its basis. Thus, there appears to be a lack of continuity of the effect. Thus, the first hypothesis of the study was not supported. The findings can be explained by looking at the nature of heredity/environment belief, which can perhaps be considered as a societal belief and societal beliefs are durable (Bar Tal, 2000). More specifically, he said that societal beliefs are durable but not stable. These may not change overnight but change through a prolonged sometime years long process and is in a way concurrent with social change. Though resistant, societal beliefs may change depending on various internal societal factors such as available and free flow of information, the extent and type of pressure to conform and availability of communication channels among society members (Bar Tal, 2000). This indicates that knowledge in the form of information may help in changing societal beliefs. However, there are some central and fundamental beliefs, which constitute a societal ethos. Such belief plays a key role in defining a society's identity and may perhaps rarely change. The weak association between awareness of heredity/environment mechanisms and heredity/environment belief may be an indicator of change resistant nature of heredity/environment belief. Moreover, beliefs are beliefs and may or may not be rational. Several studies have reported that beliefs persist despite lack of evidence or even in the presence of contrary evidence e.g., Rushton (1994) argued that the equalitarian hypothesis - relating to the equality of cognitive ability in blacks and whites - has persisted despite increased contrary evidence. Similarly, Murray (1999) also supported this hypothesis and said that the belief in genetic determination of intelligence is overstated and needs to be scrutinized. The belief that schizophrenia has a major genetic component (Marshall, 1996) and that genes are the fundamental determinants of behavior, have persisted despite having questionable evidence. Thus, the weak association between beliefs in heredity/mechanisms seems to support the contention that beliefs are hard to crack.

Limitations and Suggestions:

Every researcher has to work under certain limits and consequently or otherwise their work may also have limitations or shortcomings. Present study is no exception to this. Several factors such as age, sex, residence, deprived vs. enriched status have been reported to be causing variations in causal attributions. Though, the investigator was aware of these and group of heredity, balanced and environment believers having high, moderate and low awareness of heredity/environment mechanisms were formed following single step double criteria, from a large initial sample, yet to rule out the possibility of confounding effect further studies may be taken up controlling these variables. Secondly, the study was conducted taking normal subjects from the general population and findings revealed that the

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heredity believers having high awareness of heredity/environment mechanisms displayed greater degree of 'positivity bias' this again needs to be verified taking clinically diagnosed groups. It can also be ascertained by assessing and comparing, balanced and environment believers on depression, anxiety, self-image, self-esteem and such other measures.

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Conflict of Interest

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