

Research Paper

Relationship of Awareness and Belief in Heredity/Environment Mechanisms on Internality Dimension of Attribution for Success

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ABSTRACT

Present study was conducted to examine the role of belief in and awareness of heredity/environment mechanisms on causal ascriptions for events related to success. To fulfill the objectives of the investigation, study was divided in two phases. In first phase, total 800 subjects were administered measures of awareness of heredity/environment mechanisms and belief in heredity/environment. In the second phase of the study, a sample of 270 subjects was selected on the basis of scores of heredity/environment belief and awareness of heredity/environment mechanisms following a single step double criterion. All the subjects of the second phase were administered a questionnaire measuring causal ascriptions for events of success and failure. Appropriate statistical analysis was applied on the collected data and results revealed significant main as well as interactive effects among the variables.

Keywords: Phase, Environment, Belief, Awareness, Success, Heredity

Beliefs are the fundamental building blocks in our conceptual structure (Fishbein & Ajzen, 1975). On the basis of direct observation or information received from outside sources or by way of various inference processes, a person learns or forms a number of beliefs about an object. Bar Tal (2000) has defined beliefs as the basic units of knowledge categories such as ideology, values, norms, decisions, inferences, goals, expectations, religions, dogmas, or justifications. They are stored in individuals' minds and are also expressed in various human products such as books, newspapers, films or even paintings. 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.

Behaviour is influenced by both genetic and environmental factors. The genotype provides the physical basis essential to execute the behaviour and further determines the limitations of environmental influences (Parkash 1998). The importance of knowledge of the mechanisms of heredity and its role in shaping and determining human characteristics and behaviour is reflected in the words of L.C. Dunn (c.f. Gardner, 1983) that eugenics, " cast a long shadow over the growth of sound knowledge of human genetics".

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Generally, there is a particular set of causal explanations that are relevant for any particular situation. It is true even if people disagree on the relative importance of various causal factors. Weiner (1974) has indicated that attributions can be characterized by two basic dimensions: Internality (Internal v/s external) and stability (stable v/s unstable). Elaborating on Heider's insight, various theorists have agreed that explanations of behaviours and events can be categorized as internal or external attributions (Jones and Davis, 1965; Kelly, 1967; Weiner, 1974). Internal attributions ascribe the causes of behaviour to personal dispositions, traits, abilities and feelings. External attributions ascribe the causes to situational demands and environmental constraints. Research in attribution theory (Eswara 1972, Weiner and Kukla 1970) suggested that the attributional dimension of internality directly influences the subject affective reactions to task performance. These studies support the hypothesis that if one attributes failure to an internal cause, self-depreciation and negative affect result, whereas attribution of failure to an external cause minimizes this effect. Similarly, positive affects following success are minimized by attributions to external causes.

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) in their study reported 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.

Studies related to belief in heredity/environment were also conducted in Indian context also. In their study; Singh, Shyam and Aruna (2001) examined the belief in heredity/environment and 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. In another study, Singh and Shyam (2002a) 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. Singh, Shyam and Kumar (2004) in their study 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.

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The causal ascriptions people make about the outcomes of behavioural events, differ widely due to several factors e.g., Jones and Nisbet (1971) reported that there is a pervasive tendency for actors to attribute their actions to situational requirements, whereas, observers tend to attribute the same action to stable personal dispositions. Cultural variations also make a difference if subjects are asked to attribute the cause of actions. Miller, (1984) noted that adult Hindus tended to attribute behaviour to situations whereas, adult American tended to attribute behaviour to traits. Similar types of situation attributions were observed among Saudis (Al-Zahrani and Kaptowitz, 1993) and Chinese (Deweck, Chiu and Hang, 1995, Morris and Peng, 1994). 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 the literature and the conceptual framework, clearly highlight that in general there are very few studies relating to belief in heredity/environment and its relationship with causal ascriptions for outcomes of behavioural events, yet findings of the available researches were suggestive of the importance of such studies. Therefore, considering the relative paucity of such studies, present study mainly exploratory in nature was designed to assess the influence of belief in heredity/environment on causal ascriptions for events of success. Knowledge of heredity/environment mechanisms besides affecting belief in heredity/environment may perhaps affect the causal ascriptions to behavioural outcomes; therefore, it was included in the study to eliminate the possibility of its confounding effect.

Objectives

- To study the effect of knowledge of heredity/environment mechanisms on internality dimension of attribution for events of success.
- To study the effect of belief in heredity/environment mechanisms on internality dimension of attribution for events of success.
- To study the interactive effect of belief in and awareness of heredity/environment mechanisms on internality dimension of attribution for events of success.

Hypotheses

- Awareness of heredity/environment mechanisms would have significant effect on the internality dimension of attribution for events of success.
- Belief in heredity/environment would have significant effect on internality dimension of attribution for events of success.
- There is a possibility of obtaining significant interactive effect of awareness of heredity/environment mechanisms and belief in heredity/environment on internality dimension of attribution for events of success.

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; age range between 18 to 81 years) 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 (134 males and 136 females) was selected on the

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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 +1 S.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). Questionnaire measuring causal ascription for events of success and failure was administered to all the subjects of second phase.

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

Tools Used

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

I. 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 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.

II. 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

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answer was scored as zero. Thus, the score ranged from 0-20, high score indicating high awareness.

III. Causal ascriptions for events of success and failure: For measuring causal ascriptions to events of success, a questionnaire containing seven events of success and seven events for failure was prepared. The subjects were required to read each event carefully and ascribe causes for events of the success and failure. They were also required to ascribe (7-point scales, 7 being, internal, stable and global and 1 being external, unstable and specific) the causes to internal, stable and global or external, unstable and specific dimension of attribution style. The events were described in Hindi. The re-test reliability (30 days gap) of the scale was very high ranging from 0.95 to 0.99 for internality ($r=.96$), stability ($r=.96$), globality ($r=.98$) dimensions for the events of success. It was also high for composite ($r=.99$) score as well as importance ($r=.98$) attached the events. The re-test reliability for the events of failure was also very high and the co-efficient of correlations ranged from .95 to .98. The scores on various dimensions of attributions on protocols for causal ascription to events of success and failure were correlated with scores on various dimensions of attribution of BASQ (Feather and Tiggermann, 1984) which ranges from 0.71 to 0.86 for events of success and 0.56 to 0.67 for events of failure. These coefficients of correlation indicate the validity of the questionnaire which ranged from moderate to high for various dimensions. All 14 protocols describing events of success and failure had to be rated on 7 point scale. Thus, the score ranged from 7 to 49 each for events for success and failure.

Procedure

Heredity/environment belief scale and heredity/environment awareness checklist were administered to all the 800 subjects during first phase of study. On the basis of scores on both the tasks of first phase and by adopting a single step double criterion, 270 subjects were selected for second phase of study. All the subjects of second phase were administered questionnaire measuring causal ascriptions for events of success and failure. Scoring of all the measures/tools was done as per prescribed procedure.

RESULTS

For achieving the objectives of the study, scores of only internality dimension for events of success are included in present article. Data was analyzed by using a 3 x 3 ANOVA along with analysis of variance for simple effects and Duncan's post-hoc test was applied wherever required. The results are presented in Table 1 to 3.

Table 1: Summary of ANOVA for Internality Dimension of protocols describing events of success by groups varying in H/E belief (H, H/E & E) and Awareness (high, moderate and low) categories

Source of Variance	SS	Df	MS	F
H/E belief (A)	374.07	2	187.03	3.43*
H/E awareness (B)	2190.07	2	1095.03	20.07**
H/E belief X H/E Awareness (AXB)	746.13	4	186.53	3.42*
Within (error)	13805.47	261	52.89	

*Significant at 0.05 level

**Significant at 0.01 level.

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Table 2: Analysis of variance for simple effect of belief in heredity/environment on internality dimension of success events with high (b₁), moderate (b₂) and low (b₃) awareness

Awareness	Sources of Variance	SS	Df	MS	F
b ₁	Belief in H/E	574.87	2	287.43	10.59**
	Within groups	2361.53	87	27.14	
b ₂	Belief in H/E	74.87	2	37.43	.51 ^{ns}
	Within groups	6437.23	87	73.99	
b ₃	Belief in H/E	470.47	2	235.23	3.76*
	Within groups	5440.43	87	62.53	

*Significant at 0.05 level

** Significant at 0.01 level

ns = non-significant

Table 3: Mean ratings on internality dimension for events of success by groups varying in H/E belief (H, H/E & E) and H/E awareness (high (H), moderate (M) & Low (L))

Belief (A) → Awareness (B) ↓	H (a ₁)	H/E (a ₂)	E (a ₃)	Total
H (b ₁)	45.73 ^a	40.90 ^b	39.97 ^b	42.20 ¹
M (b ₂)	36.47 ^a	37.53 ^a	38.70 ^a	37.57 ²
L (b ₃)	36.97 ^a	32.13 ^b	37.00 ^a	35.37 ²
Total	39.72 ¹	36.86 ²	38.56 ¹	

Subscripts a and b shows Duncan's post hoc test for significant mean comparisons. (A X B)

Subscripts 1, 2, 3 shows Duncan's post-hoc test for significant main effects (A and B)

Main effect of belief in heredity/environment on internality dimension of attribution for events of success was found significant (F=3.43 p<.05 df=2,261 (Table 1). Post-hoc comparison by Duncan's test revealed that the polarized believers attributed events of success to internal factors more than the balanced believers (Table 3). The polarized believers (i.e., heredity and environment believers) did not differ in their attributions for events of success (Table 3).

Awareness of heredity/environment mechanisms also significantly influenced the causal ascriptions for events of success on internality dimension. The mean scores were 42.20, 37.57 and 35.37 respectively for the high, moderate and low awareness groups (Table 3). These mean scores differed significantly (F=20.07, p<.01 df=2,261) (Table 1). Duncan's post-hoc comparisons (Table 3) revealed that the highly aware group attributed success to internal factors more than the groups having moderate level of awareness of heredity/environment mechanisms. The interaction of awareness of heredity/environment mechanisms and belief in heredity/environment was found significant (F=3.42, df=4,261) at 0.01 level of confidence (Table 1). Analysis of variance for simple effect (Table 2) revealed that the heredity, balanced and environment-oriented belief groups differed significantly in the (b₁) high awareness (F=10.59, p<.01 df 2,87) and in the (b₃) low awareness condition (F=3.76, p<0.5 df= 2,87). Post-hoc comparisons by Duncan's test (Table 3) revealed that in the high awareness condition the heredity believers attributed outcomes of success to

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internal factors more than the balanced and environmental believer who among themselves did not differ. In case of low awareness, the polarized believers (i.e., the heredity and environment believers) attributed events of success to internal factors more than the balanced believers.

DISCUSSION

The heredity/environment belief exerted a significant influence on causal ascriptions for events of success (Table 1). The heredity and environment believers ascribed events of success to internal factors whereas the balanced believers ascribed to external factors (Table 1 and 3). Awareness of heredity/environment significantly influenced ascription of causes to events of success (Table 1). Subjects having high awareness of heredity/environment mechanisms ascribed events of success to internal factors (Table 1 & 3). The interaction of belief in heredity/ environment and awareness of heredity/environment mechanisms was found significant on internality dimensions of attribution (Table 1). The heredity believers having high and low awareness ascribed events of success more to internal factors than those having moderate awareness of heredity/ environment mechanisms (Table 2 and 3). Thus, all the three hypotheses of our study viz., that the main as well as interactive effect of belief in heredity/environment, awareness of heredity/environment mechanisms would be significant is supported by the results in the case of events of success.

The findings of the study can be explained in terms of the explanations put forward by Heider (1958) and subsequently supported by Weiner and his associates (Weiner and Kukla, 1970) for events of success and failure. They proposed that four factors that may serve to explain success or failure on a task viz. ability, effort, task difficulty and luck. Ability and effort are internal factors whereas; task difficulty and luck are external. Ability and task difficulty are stable whereas effort and luck are unstable. Frieze and Weiner (1971) reported that compared to failure, success on a task tended to be attributed more to ability, effort, luck and easiness of task. Here, in this study the heredity believers have consistently attributed success events to internal factors. Ability and effort may have been attributed by the heredity believers more to heredity than the balanced and environment believers and therefore they took the credit of success to themselves by attributing success to internal factors. Secondly, it appears that the heredity believers have displayed a higher degree of positivity bias. Taylor and Brown (1988) have reported the widespread existence of positivity bias in human cognition.

Limitations and Suggestions

Every researcher has to work within particular constraints, and as a result, their study may have some restrictions or flaws. The current study is no exception to it. Several factors have been reported to cause changes in causal attributions including age, gender, residence, and deprived vs. enriched status. Though, the investigator was aware of these and groups of heredity, balanced, and environment believers with high, moderate, and low awareness of heredity/environment mechanisms were formed from a large initial sample using single step double criteria, yet, further studies controlling these variables may be undertaken to rule out the possibility of confounding effects.

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Conflict of Interest

The author(s) declared no conflict of interest.

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