



Data Conversion: The Linkage of Attribution Styles to the Outcomes of Information Systems Change Process

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ABSTRACT

Attribution provides a framework for studying whether people perceive the causes of a behavior to be internal (caused by the person) or external (caused by another person, an outside source, or the situation). The ability to attribute responsibility to an external cause allows an individual to shift blame for negative consequences to a person other than themselves, and most research has supported this contention. Accordingly, tangential evidence also exists implying a positive correlation between attribution and the outcome of a data conversion projects. The series of studies that involve prior information and expectancies can thus be seen to confirm the studies dealing with expected and unexpected outcomes. That is, expected outcomes were generally attributed to stable causes and unexpected outcomes to unstable causes. This concept concerns the everyday causal explanations that people produce when they encounter novel, important, unusual or potentially threatening behavior and event. This paper described our research experiences in deploying attributional factors in information systems projects. Occupational Attributional Style questionnaires were deployed as instruments to assess how an IT practitioner can use casual attribution for occupational outcomes with respect IT systems. Our results showed that for organizational change to be successful, managers must give sufficient thought to what they are trying to achieve, why they are trying to achieve it, and how they are going to do so.

Keywords: *Attribution, information systems, behavioural psychology, cognition*

1. INTRODUCTION AND BACKGROUND

Attribution theory is one of the categories of social psychology which was put forward by Fritz Heider, Harold Kelley and Edward E. Jones [1]. This theory explained the way a person interprets the causes of events, the behavior of himself and others too. Researchers of attribution [2] found that both failure and success activated emotional responses that, in turn, triggered an attributional process that impacts the outcome of an event. Reference [3] noted that people tend to attribute negative effects to others rather than themselves, a pattern of behavior that was even more frequent in a stressful situation. Similarly, research results had shown that people have the tendency to attribute failure to external causes and success to themselves [2], [4], [5].

In real-life organizational settings, a number of moderator variables influence the leader's attribution, and the response is constrained by those moderator variables as well as by boundary conditions, such as organizational norms and policies, and decision rules. Reference [6] indicated that conversion projects require more discipline and stricter adherence to procedures.

This paper described our research experiences in deploying attributional factors in information systems projects. Occupational Attributional Style Questionnaires (OASQ) were deployed as instruments to assess how an IT practitioner can use casual attribution for occupational outcomes with respect IT systems. Our results showed that for organizational change to be successful, managers must give sufficient thought to what they are trying to achieve, why they are trying to achieve it, and how they are going to do so.

Section I presented a brief introduction to the research subject area, section II reviewed some related research work in attributions theory. We presented a relationship between organizational culture, attribution theory and information systems in section III, the methodology and results were discussed in sections IV and V and section VI concluded the work.

2. REVIEW OF RELATED WORK

The majority of the initial research on attribution theory focused on the perspective of the actor, and was mostly structured in the form of laboratory experiments [7]. Early research [7], [8], [9], [10], [11], [12] identified a causal dimension in attribution: locus of control. Reference [11] categorized internal attribution as: ability, efforts and motivation, and external attribution: task difficulty, chance or luck. A number of studies; [9], [11], [13]; [14]. [15], [16] following the model by [13], examined the circumstances under which different attributions were liable to be made. Reference [17] noted two most influential articles that have provided a reasonable summary of most research on attributions: differences in perceptual focusing or visual perspective, differences in psychological perspective, and differences. [18] pointed out that most data conversion management strategies have not been treated with rigor in many IS publications. In addition, other IS literature has indicated that little evidence exists of the major conversion problems unleashed during migration of data [6], [19], [20], [21], [22], [23], [24]. According to [18], though system conversion takes place at the tail end of the systems development life cycle, its effective management is extremely important for the long-term survival



and success of a system. The choice of a conversion strategy from the current information technology (IT) environment to a new environment is not easy, as is evident from other IT literature.

Reference [12] presented a series of studies of the effect of ability and effort information on the consequences of success and failure. In one of their experiments, subjects indicated how proud or ashamed they would feel in a number of achievement situations. Subjects were given three kinds of hypothetical information about themselves: a) which of five levels of outcome they produced (excellent, fair, borderline, moderate failure, clear failure), b) how motivated they were (high or low effort), c) how much ability they had (high or low). For each of the situations, subjects indicated the pride or shame they thought they would experience by selecting from one to ten gold stars (for pride) or from one to ten red stars (for shame). Pride-shame ratings were higher with more successful outcome, with high effort and with a low ability.

Reference [25] compiled data, which showed the effect of information about outcome, ability and task difficulty on reward and punishment behaviour. Subjects were instructed to teach a task to a confederate trainee by administering one of five levels of reward-punishment feedback on each of a series of trials. Subjects received one of four patterns of information; the trainee was described as being high or low in competence and as working on either a difficult or an easy task. Accordingly, the entire subject was presented with the same pattern of confederate outcomes, which consisted of mixed successes and failures. They found that the observed effect of difficulty and competence information is mediated by effort attributions. Meanwhile, [26] argued that effort is the only perceived cause that was used to account for the goal directedness or intention of a causal agent; outcomes attributed to effort have been caused intentionally. Obviously, attributing an outcome to effort implies that the person involved was goal directed; by contrast, when outcomes are attributed by ability, there is no direct implication of intention or goal directedness.

Research undertaken by [27] revealed that a number of dimensions of attribution (explanatory) style that are related to varied occupational attitudes and behaviors including job satisfaction, commitment, involvement and motivation. The reformulated teamed helplessness model of depression put forward the view that individuals vulnerable to depression can be distinguished from those who are not by the habitual causal judgment they use to describe good and bad personal life experiences. This theory proposes that a depressive style of describing the cause of various types of behavior is characterized by a lowered self-esteem and a tendency to view (negative) events as caused by internal factors that are stable and factors that exert an individual is an optimist or a pessimist. Reference [28] noted that self-enhancement is often seen in people resorting to the process of constructive social comparison, using self-appraisal based on conjecture or rationalization rather than actual social reality. Such self-serving biases in social comparison are demonstrated by people's tendencies to claim that they can or will do good things more frequently than their peers. Research by [29] and [30] found evidence that people view themselves as being more likely to perform well on relevant tasks than others. On the

other hand, their ability may be reduced if they are informed of others performing better. Likewise, [31] observed that internal performance is achieved by under-estimating the number of people who can perform at an equally high level.

Reference [32] used the OASQ to examine attributions for work-related events. Using a sample of 90 workers who varied in occupational status, social class and income, they showed that positive judgments for positive events were significantly correlated with job satisfaction, motivation and the demographic variables of occupational status and salary. These findings were replicated with the dimensions of Attributions style, and, the process of social comparison are both concerned with the factors motivating individuals to obtain causally relevant information [17]. Both involve the comparative appraisal of personal performance versus other causes, and are at the core of the way in which individuals evaluate their opinions and abilities and achieve feelings of self worth [33]. The outcome of social comparison is partly dependent on internality and controllability in a study using a revised OASQ [34]. A study was conducted using slightly different, but equally valid, dependent variables focusing specifically on the relationships between attributions style and social comparison [32].

3. ORGANIZATIONAL CULTURE, ATTRIBUTION THEORY AND INFORMATION SYSTEMS

There have been substantially more data conversion implementations and recommended methodologies than research-based investigations [22]. This may explain the lack of scholarly research publications pertaining to managing conversion projects. [18] noted that comprehensive implementation management has not been treated with rigor in most IS (Information Systems) publications. In summary, they indicated that information systems literature has not addressed critical issues towards managing successful implementation. Following this observation, [22] noted that the implicit assumption appears to be that project team managers will be willing, the end user receptive, and the organization easily adaptive to the changing IT environment. Nonetheless, his further probe proved unrealistic. [35] asserted that data conversion is a complex problem requiring more of our attention than it has received in the past. They further noted that relatively little work has been done to find a solution to make data conversion easier. In conclusion, they believe that conversion is done infrequently because of its complexity, but, will take place frequently when better techniques are known, automatic or semi-automatic aids are available, and when greater data independence is achieved.

Reference [36] indicated that both IS researchers and practitioners have come to view implementation primarily as a process of organizational change and learning. However, if this notion is accepted, then the question will be how does the organization maintain a good strategy and at the same time, achieve a successful implementation? Reference [37] recommended the following: 1) view implementation as starting from the beginning of development process, and 2)



understand that the implementation success is greatly influenced by: methodologies, strategies and techniques. [38] argued that conversion is a research and business issue, and that there are few generally accepted approaches to conversion. They pointed out that the few successful migration-like projects reported in the literature only described ad hoc solutions to conversion problems. As a recommendation, they advised that management and users should undertake an intensive study to find the most appropriate approach for solving potential conversion problems. In conclusion, they indicated that data conversion management has received scant attention in the research community until recently.

Reference [22] in his theory of systems evolution, conceptualized that most computer-based systems experience slow and superficial changes from their inception to their disappearance. He theorized that the life cycle of a system at some point may be affected by factors external in the manner that the system cannot accommodate, thus producing change. He further developed a maxim to his credit: a) No matter how good the technology, it has little chance of success if business conditions do not foster its introduction. b) No matter how good the technology, if people do not want it, it will not work. The researcher further argued that the core of this simple maxim has been forgotten, especially in the rush to new information technology. A research by [39] found that in most organizational settings, senior managers are usually reluctant to disclose sensitive information regarding impact of change, adherence to procedures, employee turnover, and their attribution leadership model. They also noted that employees might not want to disclose management weaknesses due to job security, and organizational culture may pose serious threats to disclosure of critical information. It was observed by [40] that software is increasingly turning into a commodity; thus, people increasingly expect systems that are customized to their needs. The author further noted that this situation is forcing nearly every software development organization to develop multiple variants of their systems to serve the specific needs of different customers or market segments. His conclusion indicated that many, if not most, software development organizations are finding that they need to build families of systems or product lines.

Reference [28] indicated that organizational culture is a popular but elusive concept which has been variably defined as: a system of publicly and collectively accepted meanings which for a group at a particular time, a pattern of basic assumptions developed as the group or organization learns to cope with its environment, and more simply, as the way they do things arrogantly. The authors further noted that despite the numerous cultural change programs that have been initiated by organizations in recent years, efforts directed at identifying specific, observable and measurable features of organizational culture met with far less success. Further, they consistently argued that...the transmission of cultural values are the neglected areas in organizational psychology, and whereas attempts have been made to measure culture's concept at the team level, group climate, there remains a dearth of research focuses upon deeper stratas of shared culture in work groups.

4. METHODOLOGY

The specific research methodology adopted in this study is the Occupational Attributional Style Questionnaire (OASQ). The OASQ was used to assess how a person makes causal attribution for occupational outcomes and it described hypothetical events that were specifically related to work settings. The scale contained ten demographic items that presented a brief description of a hypothetical situation that were commonly experienced by, or relevant to employed individuals in the IT system. Subjects were asked to respond to the single most likely cause and outcome of the events described. Responses were rated using nine separate seven-point scales described in [41].

A. Description of the Scales

Factor 1: *Internality*

High scorers on this scale tend to view events as being caused by internal factors. That is to say that these individuals tend to attribute events to something they, themselves did or had an influence upon. A good attributional style suggests that people should internalize positive situations but not negative situations. Low scorers on this scale tend to view events as being caused by outside events that they had no control or influence over

Factor 2: *Stability*

High scorers on this scale tend to view the factors surrounding an event as being permanent and fixed. This is a good attributional style for positive situations but not negative situations. On the other hand, low scorers on this scale tend to view factors surrounding an event as flexible and changing. For that reason, this is not considered a favorable situation.

Factor 3: *Globality*

High scorers on this scale will see the factors that brought about the events as being widespread encompassing and involving the majority of situations and events. Thus these factors are able and likely to have the same effect on other events. This is a good attributional style for positive situations but not negative situations.

Factor 4: *Externality*

High scorers on this scale attribute events to outside, environmental influences, and not to their own *actions*. This is a good attributional style for negative situations but not positive situations. Low scorers on this scale do not attribute events to external, environmental influences but rather to more specific and immediate factors.

Factor 5: *Personal Control*

High scorers on this scale tend to believe that they have control over their lives and the events that take place around them. These individuals tend to believe that their



actions determine the outcome of a situation. This is a good attributional style for positive situations but not negative situations. Low scorers on this scale tend to see life in a more fatalistic way. They tend to feel they have little control over what will happen in the future in their lives and attribute events to impersonal occurrences.

For positive events, a successful attributional style consists of:

1. High internality
2. High stability
3. High globality
4. Low externality
5. High personal control

For negative events a successful Attributional style usually consists of:

1. Low internality
2. Low stability
3. Low globality
4. High externality
5. Low personal control

The questionnaires were distributed to the prospective respondent and in order to increase probability of honest and candid responses, respondents were asked not to identify themselves. Complete confidentiality of responses were assured and maintained. Cronbach's alpha was used to calculate the internal consistency and reliabilities for each scale which included dependent variables (positive, negative and combined attributions). Each of these variables included three descriptive statistical measures (mean, standard deviation and alpha). The independent variables for the factor structure includes: Factors 1 - chance, Factor 2 - internal, and Factor 3 – and the structure of the five attribution items: internality, stability, globality, externality, personal control, b) Eigenvalue, and Variance.

The Eigenvalue was used to determine one of a set of discrete values of a parameter. In this case, the parameter is the study factors. On the other hand, the variance was used to find the variations among the factors. c) demographic/other independent variables (gender, age range, educational level, occupational status and salary range), dependent variables (positive and negative attribution) with the dependent variable dimensions (internality, stability, globality, externality, personal control). In addition, the relationships between the dependent study variables (positive and negative), and attributional style dimensions (see appendix A) were analyzed.

5. RESULTS DISCUSSION

A. Descriptive Statistical Analyses

This section contains the results of the descriptive statistical analyses with tables that reflect the measure of central tendency and the dispersion of both dependent and

independent variables [42]. The descriptive statistics computed for dependent variables (internality, stability, globality, externality and personal control) include.

- a) measure of central tendency (mean);
- b) variability (standard deviation);
- c) spread of the distribution (alpha).

Table 1 displays data for Chronbach's alpha including the mean, standard deviation and alpha for the five scales: internality, stability, globality, externality and personal control. The validity of the instrument used was previously established, and this section is intended to support the validity and reliability of this instrument. Cronbach's alpha reliability coefficient estimates the internal consistency of a set of items with a numerical range from .50 to .59 (poor), .60 to .69 (acceptable), .70 - .79 (good), .80 to .89 (very good), and from .90 to .99 (excellent) [43]. Using the Chronbach's alpha test of the variables, a composite reliability coefficient of .71 was obtained. This means that the reliability as noted previously, exceeded the minimum criteria of .70. Subsequently, each of the dependent variables had alpha scores ranging from acceptable to good.

Table 1: Means, Standard Deviation and Alpha Scales for this Study

Attributions	POSITIVE		Alpha	NEGATIVE		Alpha
	Means	SD		Mean	SD	
Internality	4.60	2.50	0.72	2.32	1.10	0.72
Stability	4.32	.79	0.73	2.54	.96	0.72
Globality	2.35	1.06	0.67	4.11	1.02	0.69
Externality	2.34	1.12	0.67	2.06	.84	0.69
Personal control	2.37	1.10	0.69	2.13	.85	0.69

The second reliability procedure was provided by the use of factor analysis. A VARIMAX rotation was implemented to improve the statistical interpretation. From the factor extraction, only the factors with eigenvalues greater than 1.0 were selected. The rotated and loaded factor matrix was evaluated with the following criteria. Reference [44] indicated that a factor loading higher than .71 was considered excellent, .63 very good, .55 good, and .45 fair, and .32 poor. For the purposes of this study, only items with factor loading greater than .50 were considered statistically significant. A series of factor loadings and rotation were conducted with most items not satisfying the criteria dropped at appropriate stages. This process of repetition and elimination of items was continued until the factor solution satisfying the required criteria was



obtained. The final factor solution yielded ten significant items; loading on three factors accounted for 77% of the positive attribution items, and 88% for the negative attribution.

Table 2 shows the rotated factors ranging from good to excellent, and from .50 being the minimum to .98 maximum factor score.

B. Inferential Statistical Analysis

To identify relationships between management attribution and attribution items: internality, externality, globality, stability and personal control, a Pearson correlation coefficient was performed. The purpose of any correlation study is to access the relationships between the variables. For the correlation table in Figure 7, only coefficients greater than or equal to .2500 were considered statistically significant relationships for this research [46]. A level of confidence of .05 was used in all statistical analyses. For this study, each of the five positive and five negative attribution items (dependent variables) and demographic (independent variables) were examined to assess the strength of the hypothesized relationships.

Attributional correlates of salary seem to be consistent: high salaries were positively correlated with personal control, externality and globality, but negatively correlated with positive internality and stability. These results suggest that explanatory style can predict reference in thought deficits in thought in work setting. Therefore, the null hypothesis was rejected with 95% confidence. The results of the factors and attribution style items considered significant are presented in Table 7. Significant correlation at .01 is flagged with two stars, and one star for correlation at the .05 significant level.

Statistically significant correlations were not found between the following independent variables: gender, age and education, and positive attribution styles: internality, stability, externality, globality and personal control. Position and salary were negatively correlated with stability at the .023 significance level, and positively correlated with personal control at the .003 significance level.

Table 2: Factor Analyses

F A C T O R S

	Internality	Externality	Personal Control
<u>Positive</u>			
Internality	.79	.90	---
Stability	---	---	---
Globality	.78	.84	.55
Externality	---	.69	.50
Personal control	.73	.56	.60
Eigenvalue	0.75	2.68	1.94
% Variance	35.07	20.25	22.87

<u>Negative</u>			
Internality	.79	.90	.55
Stability	.72	.71	.62
Globality	.74	.78	.52
Externality	.69	.54	.61
Personal control	---	.98	.69
Eigenvalue	2.34	2.01	1.34
% Variance	46.76	20.17	16.68

Note: Factor 1 = internality, Factor 2 = externality, Factor 3 = Personal control

Positive: Positive attribution styles based on the positive events

Negative: Negative attribution styles based on the negative events (See appendix C)

The positive correlation between salary and position were consistent with what was proposed from the previous study [46]. The researcher found that high salary were positively correlated with internal, personal control and important judgments but negatively correlated with external, chance and superior control attribution. Education and age were negatively correlated at the .019 and .013 respectively between internality and externality from negative attribution style. Under the combined attribution style category, age was negatively correlated with internality at the .026 significant level, while salary was negatively correlated with internality and stability, and, positively correlated with globality and externality.

6. CONCLUSIONS

Based on the findings reported in this study, the following conclusions are presented:

Conclusion 1: It is concluded that optimistic attribution style of external, global and personal control is associated with good reference in thought that may lead to job and project success.

Conclusion 2: It is concluded that the association between attribution style (positive, negative and combined), and attribution items (internality, stability, externality, globality, and personal control) supports the need for IT professionals to attribute failures and successes to internal and external rather than externals only.

Conclusion 3: It is concluded that there is both a positive and a negative relationship between project success and IT professionals' style of attribution. These attribution styles are very important as to the direction an IT professional may lead his/her subordinates.

Conclusion 4: It is concluded that management problems such as extended project time, high staff turnover, cost overrun, adherence to standard operating procedure (SOP), and user



disagreement were the dominant reason for project failures. James (1999) suggested that the business impact of a failure is a key consideration in deciding whether or not to adopt a risk-reducing conversion strategy with its accompanying costs.

Conclusion 5: It is concluded that managerial decisions were the leading reason for data conversion project success or failures. Weiner (1985) suggested that people naturally make attributions (judgments of, as well as responsibility and blame) along a number of quite specific dimensions.

Conclusion 6: It is concluded that pessimistic style predisposes people to poor performance, and poor performance is then triggered by failure in those individuals with predisposing style.

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APPENDIX

Table 3: Correlations between Demographic variables and Attribution Dimensions

	<i>Sex</i>	<i>Age</i>	<i>Education</i>	<i>Occupational Status</i>	<i>Salary</i>	
Positive						
Internality	.369	.065	.880	.109	.719	
Stability	.542	.221	.844	.023(-.180*)	.044(-.159*)	
Globality	.447	.074	.937	.249	.058	
Externality	.721	.083	.634	.093	.072	
Personal control	.259	.097	.992	.003 (.230**)	.002(.248**)	
Negative						
Internality	.310	.581	.019 (-.185*)	.151	.207	
Stability	.187	.735	.260	.985	.638	
Globality	.503	.500	.107	.895	.991	
Externality	.307	.013(-.196*)	.472	.336	.139	
Personal control	.847	.114	.354	.260	.189	
Combined Attribution Items.						
Internality	.411	.026 (-.175*)	.090	.962	.039 (-.163*)	
Stability	.498	.679	.829	.909	.000 (-.442**)	
Globality	.814	.179	.051	.448	.000 (.475**)	
Externality	.126	.085	.051	.579	.000 (.570**)	
Personal control	.665	.686	.896	.782	.368	

Note: ** Correlation is significant at the .01 level (2-tailed)

* Correlation is significant at the .05 level (2-tailed)