Abstract

Satisfaction is a key indicator of system success, and so has been the subject of much IS research. The nostalgia effect, whereby individuals feel satisfied or dissatisfied when thinking about past goal attainment or failure, has been observed to influence analysts’ decisions with respect to ongoing systems development. The Yield Shift Theory (YST) of Satisfaction offers an explanation for the nostalgia effect as a function of changes in an individual’s active goal set. This paper reports on an exploratory field investigation of nostalgia effect among 105 working IS/IT professionals in India reflecting on past collaboration experiences. The study revealed a measurable nostalgia effect, and revealed a strong association between satisfaction responses and the antecedents proposed by Yield Shift Theory.

1. Introduction

If a large scale system development project fails, an organization stands to lose not only its considerable investment in the system [4], but also benefits it could have gained had system succeed. Research shows that satisfaction is a key antecedent of IS success [9][14]. In addition, recent research shows that customer satisfaction has a significant impact on spending growth even at the macroeconomic level [10]. For this reason, there is much satisfaction research in the IS Literature [7][14][21][17][23]. Satisfaction becomes an important consideration at the dawn of the development cycle. Research shows that under certain conditions, when users are involved in design choices and development processes, they report higher judgments of system quality and higher user satisfaction at deployment time [24][15][14].

The importance of satisfaction continues throughout the life cycle of a system. People who feel dissatisfied with their first use of a system tend not to adopt it [2][12]. People who feel satisfied with their initial experience may not remain satisfied [13] and may discontinue its use [18]. People who feel dissatisfied with the user experience, even for non-technical reasons, may stop using it [3][25]. User dissatisfaction is associated with reductions of IS/IT budgets, rendering it harder for IS/IT professionals to provide satisfactory services [11]. Users may even outsource their whole IT infrastructure if they feel dissatisfied with in-house services [14]. Satisfaction is also crucial to outsourcing providers for customer retention [16].

There are many potential objects-of-satisfaction in an information system, such as hardware, software, work practices, data, people, services, and information. IS researchers have reported satisfaction responses to objects ranging from a single technical component [22] to technology-supported work practices [1][18], to complete IS/IT infrastructures [6]. Dissatisfaction at any level can put system success at risk. A better understanding of satisfaction phenomena may therefore be useful to IS professionals both to improve their systems and to increase the likelihood that good systems will succeed.

Most satisfaction effects are an immediate response to current changes of circumstances – something happens, and people feel satisfied or dissatisfied. Briggs, Reinig, and Vreede [5] observed a satisfaction effect they called a nostalgia effect that appears to play a role in systems development projects. A nostalgia effect is a current satisfaction response to objects and events in the past. The satisfaction effect is not that people remember feeling satisfied or dissatisfied by past events, but rather that they experience a current feeling of satisfaction or dissatisfaction with respect to past events, well after goal attainment success or failure. Individuals sometimes feel positive or negative satisfaction responses as they reflect on past successes or failures, even though such reflection invokes no change with respect to current conditions. Nostalgia effects can manifest, for example, during requirements workshops.
or during post-implementation reviews when stakeholders relate anecdotes of past projects.

When presented multiple options for consideration, users and analysts alike may judge these options against past experiences. They may for example, share anecdotes about similar experiences in the past and express strong feelings (satisfaction or dissatisfaction) towards the particular approach. In one instance we observed during a UI/UX design workshop for a large-scale collaborative software system, a stakeholder responded negatively to a proposal that the UI could be simplified and cognitive load could be reduced by using a single interface component for input to any of three different objects on the screen. Outward signs of negative emotions manifested in the vocalics, facial expressions, and gestures of the stakeholder. The stakeholder said, “We tried that 20 years ago. It was a disaster. People never knew where their contribution was going to go. Let’s don’t go down this road again. We know it’s a dead-end.”

Persuaded by the stakeholder’s agitation, other stakeholders agreed to abandon the suggestion. Further probing by the designer, however, revealed that the earlier attempt had been part of an interface with many design flaws. The designer demonstrated that a graphical approach could eliminate the earlier ambiguity and simplify the current interface. The higher-complexity layout was nonetheless adopted.

In another instance, a key stakeholder in an architecture design workshop for a new decision support system evidenced positive affective arousal while relating anecdotes about successful system design efforts in the 1980s. After reflecting on the anecdotes, the stakeholder insisted that the team adopt the same methods for the current project. The old methods, however, were not adequate to address the design challenges of creating a state-of-the-art system. Other stakeholders resisted the approach. The project failed.

When people re-interpret nostalgia effects in the context of current systems, it could have an impact on system success. Research has shown, for example, that prior satisfaction levels with a collaboration process are predictive of future satisfaction levels with that process [20]. It would, therefore, be useful to IS/IT professionals to have a better understanding of the nostalgia effect phenomenon in particular and the influence of prior experience more generally. To date, however, evidence for the nostalgia effect has been anecdotal. It would therefore be potentially useful to conduct an exploratory field investigation of the nostalgia effect. Such is our goal in the present study as we seek to empirically demonstrate the effect. In the next section we consider Yield Shift Theory as a possible explanation of the nostalgia effect. We then report a field study that measures nostalgia effects among working IS/IT professionals in India and examines a possible association between satisfaction responses and the antecedents proposed by Yield Shift Theory.

2. Yield Shift Theory

The Yield Shift Theory (YST) [5] is a cognitive theory of satisfaction developed to explain IS satisfaction phenomena. YST defines the satisfaction response as “a valenced affective arousal with respect to some object that has reference to some state or outcome desired by an individual” [5] page 275). YST proposes a deductive-nomological network of causal relationships to explain the onset, magnitude, direction and cessation of satisfaction responses. It also adds an affective component to how satisfaction is conceptualized and measured, as advocated by scholars explicating the nature of satisfaction [8].

YST assumes that individuals hold multiple goals to which a subconcious cognitive mechanism ascribes some level of utility – the goodness, worth, or value an individual ascribes to the goal. Rational individuals will pursue higher utility goals ahead of the relatively lower utility goals. However, if individuals were to pursue higher-utility goals to the exclusion of lower-utility goals all the time, it could be detrimental to their survival because some high-utility goals are unattainable. YST therefore assumes that a subconscious cognitive mechanism automatically assesses the likelihood that a goal may be attained, and generates a perception of yield for the goal that is proportional to its utility, but reduced in inverse proportion to the likelihood ascribed to attaining the goal (Figure 1).

YST assumes that human attention resources are limited, so individuals cannot attend to all their goals simultaneously. Goals that are currently subject to cognitive processing are said to be active. YST assumes a subconscious cognitive mechanism...
automatically detects the magnitude and direction of changes or *Shifts* in net yield of the set of currently active goals. A shift could result from changes in the utility or likelihood of one or more goals in the active set, or could result from changes to the goals that comprise the active set. YST posits that a subconscious mechanism automatically triggers a satisfaction response proportional to the magnitude of the yield shift, and with a valence in the direction of the shift (Figure 2).

Figure 2. The Satisfaction Response is a function of shifts in yield for the set of salient goals. Yield Shifts may result from changes of utility or likelihood for one or more of the goals in the active set, or from changes in which goals comprise the active set (Briggs, Reininger, & Vreede 2008)

YST suggests two possible mechanisms by which explanation nostalgia effects could be invoked. First, when one reflects on past success or failure, past goals would temporarily displace current goals in the active goal set. The yield of those past goals could differ from the yield of the current goals they displace, giving rise to a positive or negative yield shift for the active set as a whole, and so to a positive or negative satisfaction response. Second, recalled shifts in yield with respect to those goals could then give rise to further current satisfaction responses. This would account for observed nostalgia effects. If the logic of Yield Shift Theory holds, it would therefore have to be that perceived shifts in yield invoked by reflecting on past events would be associated with satisfaction responses. Because this study is exploratory science meant to discover and describe empirical relationships among constructs rather than experimental science meant to test a theoretical proposition, we framed the study with research questions rather than hypotheses:

**R1: Satisfaction with past processes.** Do people who report more positive shifts in yield with respect to past work processes score higher on a satisfaction-with-process instrument than people who report less positive shifts in yield?

**R2: Satisfaction with past outcomes.** Do people who report more positive shifts in yield with respect to the outcomes of past work score higher on a satisfaction-with-outcome instrument than people who report less positive shifts in yield?

### 3. Methods

#### 3.1 Dependent Variables

There were two dependent variables for this study, each a different potential object of satisfaction: Satisfaction-with-process (SP) and Satisfaction-with-outcomes (SO). Satisfaction-with-process was measured with a five item, seven-point Lickert scale that had been previously validated in two international studies of satisfaction with technology supported work practices [19][5]. The items were:

- I feel satisfied with the way in which today's meeting was conducted.
- I feel good about today's meeting process.
- I liked the way the meeting progressed today.
- I feel satisfied with the procedures used in today's meeting.
- I feel satisfied about the way we carried out the activities in today's meeting.

Satisfaction-with-outcomes was measured with a five item, seven-point Lickert scale that had been previously validated by the same studies. The items were:

- I liked the outcome of today's meeting.
- I feel satisfied with the things we achieved in today's meeting.
- When the meeting was over, I felt satisfied with the results.
- Our accomplishments today give me a feeling of satisfaction.
- I am happy with the results of today's meeting.

#### 3.2 Independent Variables

Because nostalgia effects may be invoked by the recall of past yield shifts, there were two independent variables for this study. A scale for recalled Utility-shift and a scale for recalled Likelihood-shift. Utility-shift was measured with a four item seven-point semantic anchor scale that had previously been validated in an international study of technology-supported work practices [5]. The semantic anchors were, “Much Less” and “Much More”. The items were:

- I got (less/more) from the meeting than I had anticipated.
I benefited (less/more) from this meeting than I expected.

The meeting did (less/more) good for me than I thought it would.

I gained (less/more) from the meeting than I believed I would.

Likelihood-shift was measured with a four item, seven-point semantic anchor scale that had also been previously validated by an international study technology-supported work practices [19]. The semantic anchors were, “Much Less” and “Much More”. The items were:

- The meeting made it (less/more) likely that I would attain something I want.
- Because of the meeting, I am (less/more) likely to succeed on something I care about.
- I am (less/more) likely to attain my goals because of this meeting.
- Due to this meeting I am (less/more) likely to get what I want.

3.3. Participants

One hundred five working IS/IT professionals participated in this study, which included a self-report of demographic data. Of the 105 participants, 77 were male and 26 were female. Two respondents did not report their sex. Participants ranged from 18 to 60 years of age with a mean of 34.0 and a standard deviation of 10.3. Two respondents did not report their age. Work experience among the participants ranged from one to 34 years, with an average of 10.3 years and a standard deviation of 8.6. All were born and lived in India, and all but one spoke English as a second language. Fifty-one spoke Gujarati as their first language. Twenty-six spoke Hindi, twelve spoke Marathi, and two spoke Telugu. One person spoke each of these as their first languages: Kannada, Ckzyeruti, Punjabi, Kathiyawadi, Tamil, Soudh, Crujarat, Banglf, Soudh, and Madyalam.

During the study, participants responded to an English language questionnaire. One of the questions asked, “Think about the technology used in conducting the particular meeting (flip chart, computer etc.). In how many meetings have you used technology and tools similar to the ones that were used in the meeting under focus?” Table 1. Shows the distribution of user’s previous experience.

3.4 Procedures

Researchers approached potential respondents at professional gatherings and asked them if they would respond to a meeting satisfaction questionnaire. Participants were instructed to think back to a work-related meeting in which they had participated over the last thirty days. They were asked to reflect on the work process, the outcomes of the work effort, and the tools and technologies the group used to support that work. After a few moments of reflection, participants were asked to respond to the Yield Shift and Satisfaction items with respect to that event.

4.0 Analysis

The mean of responses to items in each scale was used to address the research questions. Table 2 presents the mean responses for each scale. In cases where responses were missing, the mean response for a scale was computed using the completed items. Participants gave a wide range of responses to the items in each of the four scales (Table 2).

The instruments had been validated in earlier studies. A factor analysis showed that items for each scale loaded highly on the same factor, and did not

<table>
<thead>
<tr>
<th>Construct</th>
<th>M</th>
<th>S</th>
<th>Min</th>
<th>Max</th>
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<tbody>
<tr>
<td>Satisfaction-with- process</td>
<td>4.70</td>
<td>1.44</td>
<td>1.00</td>
<td>7.00</td>
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<tr>
<td>Satisfaction-with-outcome</td>
<td>4.89</td>
<td>1.34</td>
<td>1.25</td>
<td>7.00</td>
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<td>Utility-shift</td>
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<td>1.35</td>
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<td>Likelihood-shift</td>
<td>4.71</td>
<td>1.40</td>
<td>1.00</td>
<td>7.00</td>
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Table 2. Descriptive statistics for the mean response on the four constructs measured (N=105)
load highly on any other factor, demonstrating acceptable discriminant validity for the instrument. Chronbach’s Alpha showed an interitem reliability greater than 0.90 for each scale, demonstrating acceptable convergent validity among the items.

There was a statistically significant positive correlation between Satisfaction-with-process and Utility-shift ($r = .683$, $p < .001$). Utility-shift explained 46.6% of the variance in Satisfaction-with-process.

There was a statistically significant positive correlation between Satisfaction-with-outcome and Likelihood-shift ($r = .698$, $p < .001$). Likelihood-shift explained 48.7% of the variance in Satisfaction-with-outcome.

5.0 Discussion

Although earlier research demonstrates the emergence of satisfaction effects in IS/IT domains of interest, and demonstrates that satisfaction is an important indicator of system success, and although the existence of a nostalgia effect had been noted from anecdotal evidence, the effect had not been empirically demonstrated and explored. The results of this study provide empirical evidence that measureable nostalgia effects do manifest among IS/IT professionals, and suggest a strong association between satisfaction responses and the antecedents proposed by Yield Shift Theory.

5.1 R1: Satisfaction with Past Work Practices

When participants were asked to reflect on past work practices, they reported satisfaction responses ranging from very positive (7 on a seven-point scale) to very negative (1 on a 7 point scale). Those satisfaction responses correlated with both Shifts in Utility and Shifts in Likelihood. This answered Research Question 1. People who reported more positive shifts in utility and likelihood from their past work processes did score higher on a satisfaction with process measure.

5.2. R2: Satisfaction with Past Outcomes

Likewise, when participants were asked to reflect on the outcomes of past work practices, the reported satisfaction responses ranged from strong positive (7 on a seven-point scale) to strong negative (1.25 on a seven-point scale). These satisfaction responses were also associated with Utility and Likelihood shifts. This answered Research Question 2. People who reported more positive utility and likelihood shifts with respect to the outcomes of past work did score higher on a Satisfaction-with-outcome instrument.

5.3. Implications for practice.

There are several practical implications of these findings. Users of systems may discontinue the use of it if they feel dissatisfied, even for non-technical reasons. Because of nostalgia effects, it may be important for system designers to pay attention to not only technology design, but also to the design of the work practices supported by the technology. It may be important to address not only the pragmatic aspects of technology and work practices, but also hedonic aspects of the work practice. Because of a nostalgia

<table>
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<th>Utility-shift</th>
<th>Correlation</th>
<th>Variance Explained</th>
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<tbody>
<tr>
<td>Satisfaction-with-process</td>
<td>0.683**</td>
<td>46.6%</td>
</tr>
<tr>
<td>Satisfaction-with-outcome</td>
<td>0.698**</td>
<td>48.7%</td>
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Table 3. Correlations between Utility-shifts and Satisfaction responses. Utility-shift correlated significantly with satisfaction responses.

<table>
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<th>Likelihood-shift</th>
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<tr>
<td>Satisfaction-with-process</td>
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</tr>
<tr>
<td>Satisfaction-with-outcome</td>
<td>0.793**</td>
<td>48.7%</td>
</tr>
</tbody>
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Table 4. Correlations between Likelihood-shifts and Satisfaction Responses. Likelihood-shift correlated significantly with satisfaction responses.
effect, it may be that users could discontinue using a system even after pragmatic issues with the technology or the work practice have been resolved. It is possible that hedonic improvements to the system could help mitigate this risk. Hedonic improvements could leverage the nostalgia effect to invoke ongoing satisfaction responses if each use of the improved system were to remind users of how much they liked the improvement when it happened.

It may be important for system designers to develop explicit methods for addressing nostalgia effects. It may be important that designers recognize when stakeholder preferences derive from nostalgia effects and to guard against the possibility that nostalgia effects could interfere with the achieving of current goals. It is also important to recognize, however, that nostalgia effects, like other satisfaction effects, pertain to the private goals of the stakeholders. A nostalgia effect, whether positive or negative, provides a clue about the goals stakeholders seek to achieve with a system. It may be useful to encourage stakeholders to make those goals explicit, and to focus on how they could be attained with a proposed or current system. This approach could increase the likelihood of system success.

Yield Shift Theory suggests at least three approaches that IS/IT managers and designers could use to invoke positive satisfaction responses: utility shifts, likelihood shifts, and changes of goals. To invoke a utility shift, an IS/IT professional would have to demonstrate to a stakeholder that, by using a system to attain a goal, the user would receive more benefit than they had previously though. In the case of a business system, for example, they might demonstrate that the system could cut costs further or generate revenues faster than the stakeholder had previously anticipated. In the case of an online social community they might demonstrate that the system would provide them with a more-engaging community of interest or faster, more expert answers to their questions then they had expected.

To invoke likelihood shift, and IS/IT professional would have to demonstrate that the system would increase the likelihood they would attain their goals. For an online financial advisory system, for example, one could demonstrate that users of the system tended to anticipate the direction of the market more accurately than did non-users.

To invoke a change of goals, the IS/IT professional would have to focus stakeholders on different, higher-yield goals than those that brought them to the system. In the case of an online community of practice, for example, the canon of answers to technical questions might draw people into the system. One could however, demonstrate to stakeholders that, not only could they find answers, they could find people who know answers, and form working relationships with them. This change of goals could invoke a positive yield shift, giving rise to a satisfaction response.

One important implication of all these strategies is that the IS/IT professional must become personally acquainted with system stakeholders in order to learn what about their goals and expectations, their satisfactions and dissatisfactions. It may not be possible to predict from one’s own desk chair what the stakeholders value and why.

5.4. Implications for Research.

The results of this exploratory study suggest YST may be a useful perspective for understanding the nostalgia effect. Findings are consistent with the constructs and relationships proposed by the theory. Given the strength of the associations discovered, experimental work is warranted to formally validate or refute the propositions of YST. This work could be conducted with respect not only to the Nostalgia Effect, but also to other satisfaction effects that could not be explained by earlier theories (Table 5), among them anticipation effects, where people feel satisfaction responses before goals are attained or thwarted; differential effects where people who value an outcome equally manifest different satisfaction responses; mentor effects, where people feel satisfied after conversation with mentors; mixed feelings, where people feel both satisfied and dissatisfied simultaneously, and attenuation effects, where satisfaction responses diminish over time. [5].

5.5 Limitations and Future Directions.

Exploratory field studies like this one, this one trades off some rigor for reality. This paper measures the independent variable in a workplace setting rather than manipulating it in an experimental laboratory setting. While it is useful to measure correlations of independent variables with dependent variables in a field setting to discover and describe phenomena of interest, one can only rigorously test a theoretical proposition and so impute causality to a correlation by deriving experimental treatments to manipulate the independent variable. Further insights about the Nostalgia Effect and about the scientific utility of YST could therefore be gained through controlled experimental science and through applied Design Science, where each theoretically informed design choice can be used as a hypothetical treatment. This study explores nostalgia effects pertaining only to recent experiences – within the prior 30 days.
Further exploratory work is warranted to see whether measurable effects manifest with respect to experiences months and years past.

6.0 Conclusions

This study explored the nostalgia effect as it manifested among IS/IT professionals in the workplace. It examined the effect with respect to two different objects of satisfaction: collaborative work processes and outcomes. The study revealed a measurable nostalgia effect for circumstances that had occurred in the prior 30 days. It also demonstrated a strong association between satisfaction responses and the antecedents proposed by Yield Shift Theory: Utility Shifts and Likelihood Shifts. These findings suggest that Yield Shift Theory may be a useful explanation for Satisfaction Effects. Further research is therefore warranted to further describe and quantify the nostalgia effect and to further test the Yield Shift Theory of Satisfaction.

7.0 References


