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Nudging with Descriptive Social Norms to Overcome the Deaf Effect for IT Project Risk Warnings

CHAPTER OVERVIEW

Information technology (IT) project escalation (i.e., continued commitment to a failing IT project) is both a common and costly problem for organizations. Internal auditors, who are role prescribed to issue risk warnings should they determine that a project is going awry, complain that senior management, as message recipients, often turn a deaf ear to such warnings. This phenomenon, known as the deaf effect, can contribute to the problem of project escalation. To overcome the deaf effect, internal auditors, as messengers, need better ways of gaining the attention of message recipients. In this paper, we investigate the concept of nudging with descriptive social norms as a technique that internal auditors could use to help overcome the deaf effect. Specifically, we focus on two questions: 1) are recipients less likely to exhibit the deaf effect when they are nudged by the messenger with a descriptive social norm?, and 2) does the messenger-recipient relationship (i.e., whether the messenger is seen as a partner or as an opponent) influence the effectiveness of nudging? To address these questions, we conducted a scenario-based experiment. Our results showed that: (1) the deaf effect was reduced when the messenger included a descriptive social norm in the risk warning message, and (2) the influence of the descriptive norm on the deaf effect was moderated by the messenger-recipient relationship. Specifically, the inclusion of a descriptive social norm in the risk warning was more effective when the messenger was seen as a partner rather than an opponent.

Key words: IT project escalation, deaf effect, nudging, descriptive social norm, internal audit effectiveness, internal auditor

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3.1   INTRODUCTION

Information technology (IT) project escalation (i.e., continued commitment to a failing IT project) occurs quite frequently (30-40% of projects are affected) and represents a waste of valuable organizational resources, as these projects tend to receive continued funding in spite of the fact that they are unlikely to ever deliver the business value for which they were undertaken. Internal auditors represent a valuable line of defence against such waste, as they are role prescribed to issue risk warnings should they determine that a project is going awry. Yet, clearly internal auditors cannot be effective in halting escalation unless they can get senior managers to heed their warnings. Too often, internal auditors complain that senior management turns a deaf ear to such warnings, a phenomenon known as the deaf effect (Keil and Robey, 1999; 2001).

While there have been a few studies of the deaf effect (Keil and Robey, 1999; 2001), they have tended to focus on characteristics of the messenger and his/her relationship with the recipient that tend to be stable and not easily changed. What is needed and largely missing from the extant literature is knowledge about what the auditor can do to craft the message in a way that overcomes the deaf effect. Aside from one experiment by Nuijten et al, (2016) that investigated the effect of gain-loss framing, we know of no studies that have examined how auditors can contextualize their message so as to more strongly influence message recipients. In this paper, we draw on the concept of nudging with descriptive social norms (Cialdini and Goldstein, 2004) as a technique that internal auditors could use to help overcome the deaf effect. Nudging stems from the idea that small changes in the way that information about choices are presented can lead to better decisions. Thaler and Sunstein (2009), along with others, argue that using descriptive social norms can influence the decision making of individuals in such a way as to produce desired behaviour without forcing compliance.

In this study, we examine whether nudging with descriptive social norms has the potential to help auditors to overcome the deaf effect by inducing message recipients to be more receptive to risk warnings. Our aim is to address two research questions: 1) Are recipients less likely to exhibit the deaf effect when they are nudged by the messenger (i.e., internal auditor) with a descriptive social norm?, and 2) Does the messenger-recipient relationship (i.e., whether the messenger is seen as a partner or as an opponent) influence the effectiveness of nudging?

The remainder of the paper is organized as follows. First we situate our study within the small, but growing, stream of literature on the deaf effect in information systems projects. Then we provide a brief overview of nudging and the theory on why descriptive social norms can be an effective tool for nudging. After introducing our research model and hypotheses, we describe our research methodology, followed by the results

we obtained. We conclude the paper with discussion and implications for research as well as practice.

3.2   LITERATURE REVIEW AND THEORY BASE

Keil and Robey (1999, p. 82) coined the term "deaf effect," defining it as a situation in which actors in positions of authority "turn a deaf ear to signs of trouble." In this and a subsequent article (Keil and Robey, 2001) they provide specific examples of the deaf effect in IS projects based on interviews with both internal and external auditors who spoke of their frustration in blowing the whistle on a troubled project only to find that their risk warnings were ignored (or worse, caused them to be fired from their job). Following the initial field-based observations of the deaf effect reported by Keil and Robey (1999; 2001), several researchers including Cuellar (2009) began to conduct scenario-based laboratory experiments to investigate the factors that influence the deaf effect. In a recent paper Nuijten et al, (2016) draw on stewardship theory and show that when an auditor is seen as a collaborative partner, message recipients will be less likely to turn a deaf ear to risk warnings issued by the auditor. The theory behind this is that decision makers are more likely to be responsive to risk warnings when the messenger has the clear goal to contribute to management performance instead of exposing management failures. Thus, prior research suggests that the messenger-recipient relationship (MRR) is a key factor that influences the deaf effect. In our research, we leverage the work of Nuijten et al, (2016) by examining how the information delivered by a messenger can be presented in a way that provides a further nudge to the recipient.

Behavioural economists have introduced the idea that nudging can be an effective means of eliciting desired behaviour without exercising strong forms of control or forcing compliance (Thaler and Sunstein, 2009). The concept of nudging relates to the messenger-recipient relationship in the sense that nudging occurs within the context of that relationship and it involves presenting information in a way that promotes a desired response without forcing compliance. In this study, we develop a research model that brings together nudging and MRR.

Specifically, we posit that nudging with descriptive norms will be more effective when the technique is used in a stewardship based model whereby the descriptive norms being espoused by the messenger are generated in an MRR context in which the messenger is viewed as a partner rather than an opponent.

While prior research has advanced our understanding of the deaf effect, the effect of nudging with descriptive social norms has not been examined in this context. This gap in our understanding is an important one to explore because nudging with descriptive

social norms represents an intervention that would be easy to implement in practice and there are good theoretical reasons to believe that it could reduce the deaf effect.

Nudging with Descriptive Social Norms

One of the most effective ways to nudge is through social influence (Thaler and Sunstein, 2009). For example, it has been shown that the behaviour of peers affects productivity and tax compliance in field settings (Tayler and Bloomfield, 2011). Similarly, Mas and Moretti (2009) found that cashiers in a retail setting became more productive when a highly productive worker was introduced into their shift. Examples like these clearly show that the social influence of peers can be significant.

The cumulative findings from prior research on normative social influence show that the actions of other people have a powerful effect on both behavioural intentions and actual behavior (Sherif, 1936; Deutch and Gerard, 1955; Cialdini et al, 1990; Cialdini and Goldstein, 2004; Jacobson et al, 2011). Many norms-based interventions appear to have an influence on human behavior (e.g. Cialdini et al, 1990; Cialdini et al, 1991; Cialdini, 2005; Schultz et al, 2007; Griskevicius et al, 2008) and numerous studies can be found on the effect of descriptive social norms in the areas of sociology, psychology and behavioural research. Research has shown that communicating a descriptive social norm (i.e., how most people behave in a given situation) induces conformity to the communicated behavior (Nolan et al, 2008; Schultz, 1999; Griskevicius et al, 2006).

Thaler and Sunstein (2009) further explain the use of a descriptive social norm in nudging and its positive effects on eliciting desired behavior. They recount numerous examples in which messengers can nudge individuals to behave in a certain way simply by informing them about what other people are doing. One example of this is the online promotion of organ donation in the state of Illinois where their website brings the power of social norms into play by plainly stating: "87% of adults in Illinois feel that registering as an organ donor is the right thing to do" (Thaler and Sunstein, 2009, p. 184). Such nudges work because we generally like to do what most other people consider to be the right thing to do in a given situation.

3.3   RESEARCH MODEL AND HYPOTHESES

Influence of descriptive social norms and how they could apply to the deaf effect

Descriptive social norms can serve as a decisional shortcut for behaviour (Cialdini et al, 1990). They are thought to influence behaviour because they provide information about the right way to act in certain situations (Cialdini, 1984; Cialdini and Goldstein, 2004; Jacobson et al, 2011). For example, Goldstein et al, (2008) examined how hotel guests

behave when a card has been placed on the bathroom towel rack asking them to reuse their towels. In a field experiment, they tried to increase towel reuse by testing the effect of putting different messages on the card. One of the messages included a social norms appeal, stating "JOIN YOUR FELLOW GUESTS IN HELPING TO SAVE THE ENVIRONMENT," and emphasized that the majority of hotel guests reuse their towels. This message proved to be much more effective than messages without a social norms appeal such as "HELP SAVE THE ENVIROMENT." Similar results were also obtained by other researchers, for example, by Schultz et al, (2008) (in their towel re-use experiment in hotel rooms), Lapinski et al, (2013) (for the effects of social norms and behavioural privacy on hand washing), Maloney et al, (2013) (on effects of descriptive norms on voting behavior), and Lapinski et al, (2007) (water conservation attitudes and behavior).

Mollen et al, (2013), examined the influence of social norms on food choices by conducting a field experiment in an on-campus food court. Effects of different messages on students' food choice were compared against each other and a no-message control condition. They found that a healthy descriptive norm message resulted in healthier choices as compared with the no norm control condition. Similarly, in an experiment with 1,200 Australian citizens, Wenzel (2005a; 2005b) found that simply informing taxpayers of the high rate of compliance increased compliance levels.

Similarity enhances the power of descriptive social norms. Cialdini and Goldstein (2004) posited that when making choices, people look at those who are similar to them. For example, Nolan et al, (2008) found that California residents' energy saving was mostly influenced by their belief that other people were saving energy (the social norm). Moreover, the key factor for their choice to save energy was specifically which other people – other Californians, other people in their city, or other people in their specific community. Based on the idea that people are most influenced by similar others, the effect of social norms became stronger as the group was becoming closer and more similar to the people of their own community. Similarly, in the Goldstein et al, (2008) experiment on hotel towel reuse described earlier, the most effective message displayed to the guests was the one mentioning that the majority of guests had reused their towels when staying in the specific hotel room in which the guest was staying (Goldstein et al, 2008).

On the basis of the abovementioned literature related to nudging and descriptive social norms, we theorize that when decision makers are nudged by an internal auditor with risk warnings containing a descriptive social norm they will be more likely to listen to these risk warnings. The underlying logic for this assertion is that decision makers are more likely to heed the advice of the internal auditor if they believe that their peers, when facing similar situations, tend to follow the advice of the auditor with respect to risk warnings. Thus we state the following hypothesis:

H1. *Decision makers will be less likely to exhibit the deaf effect and continue a failing course of action when the risk warnings and recommendations communicated by the messenger contains a descriptive social norm indicating what the decision makers' peers normally do under these circumstances.*

While this would appear to be a straightforward and therefore potentially uninteresting hypothesis, it is important to note that descriptive social norms may not always be effective (Jacobson et al, 2011). Indeed, there is no guarantee that providing a descriptive social norm will work as intended. For example, in an attempt to reduce the theft of petrified wood from Arizona's Petrified Forest National Park, visitors were exposed to the following message: "Many past visitors have removed petrified wood from the Park, changing the natural state of the Petrified Forest" (Cialdini, 2003; Cialdini et al, 2006). While the message was designed to reduce the theft of petrified wood, it had the unintended effect of increasing the theft of wood by about 8%, as people interpreted the salient message to be "theft is common" rather than "theft is bad" (Griskevicius et al, 2006). Similarly, Schultz et al, (2007) in their field experiment on household energy consumption also showed that normative messages could have undesirable effects. Following this, it is by no means certain that in our study context, nudges based on a descriptive social norm will necessarily have the desired effect in terms of reducing the deaf effect.

Influence of messenger-recipient relationship on the deaf effect

In deaf effect situations, messengers report risk warning messages to decision makers who have the choice to assign relevance to these messages and take corrective action or not to listen to the risk warning and continue the project as planned (Nuijten et al, 2016). In our domain of interest, the auditor plays the role of the messenger who delivers a risk warning and the project owner plays the role of the recipient (and decision maker) who must decide whether or not to act on the risk warning. Nuijten et al, (2016) differentiate between a messenger-recipient relationship (MRR) in which the auditor is seen as a collaborative partner and one in which the auditor is seen as an opponent. In their study, Nuijten et al, (2016) found that decision makers are more likely to heed the auditor's risk warning and discontinue the course of action when the messenger is considered to be a collaborative partner instead of an opponent. In our study, we re-test the effects of the MRR on the deaf effect. Thus, we hypothesize the following replication hypothesis:

H2. *Decision makers will be less likely to exhibit the deaf effect and continue a failing course of action when the messenger issuing risk warnings and advocating project redirection is seen as a collaborative partner.*

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Interaction of messenger-recipient relationship and descriptive social norms

Lapinski and Rimal (2005) and Rimal et al, (2005) suggest the need to understand the role of potential moderators that can influence the nature of the relationship between descriptive social norms and behaviours. In a study along these lines, Berger and Rand (2008) show that descriptive social norms can actually decrease (rather than increase) compliance when the descriptive social norm is associated with an undesirable group. Extrapolating from this finding, we theorize that it may also be important to consider the source of the descriptive social norm and how the target recipient views the source. Prior work has shown that decision makers are more receptive to a risk warning when it comes from an internal auditor who is perceived as a Collaborative Partner rather than an Opponent (Nuijten et al, 2016). Thus, decision makers are more likely to listen to a risk warning when the messenger is someone who aims to help management instead of revealing management's non-performance.

   Based on the above, we theorize an interaction between the messenger-recipient relationship (MRR) (i.e., whether the messenger is seen as a Partner or an Opponent) and the use of a descriptive social norm designed to nudge behaviour. Specifally, we theorize that decision makers should be more receptive to a risk warning message containing a descriptive social norm when it comes from an internal auditor who is seen as a Collaborative Partner then when it comes from an internal auditor who is considered to be an Opponent. In other words, MRR is likely to moderate the relationship between a descriptive social norm and the deaf effect. Specifically, we expect that when the messenger is seen by the decision makers as a Collaborative Partner, the influence of the messenger's use of a descriptive social norm in reducing the deaf effect will be greater. We also expect that when the messenger is seen as an Opponent the messenger's use of a descriptive social norm will be less effective and may even backfire. Thus, we state the following hypothesis:

> **H3.** *The MRR (i.e., whether the messenger is seen as a Partner or an Opponent) will moderate the influence of a risk warning message containing a descriptive social norm on the deaf effect. Specifically, the recipient will be more likely to listen to a risk warning message containing a descriptive social norm when the messenger (i.e., auditor) is seen as a Collaborative Partner. Conversely, a risk warning message containing a descriptive social norm will be less effective or even counterproductive when the messenger is seen as an Opponent.*

Based on our literature review and theorizing, we developed the research model shown in Figure 3-1 which we test in this study.
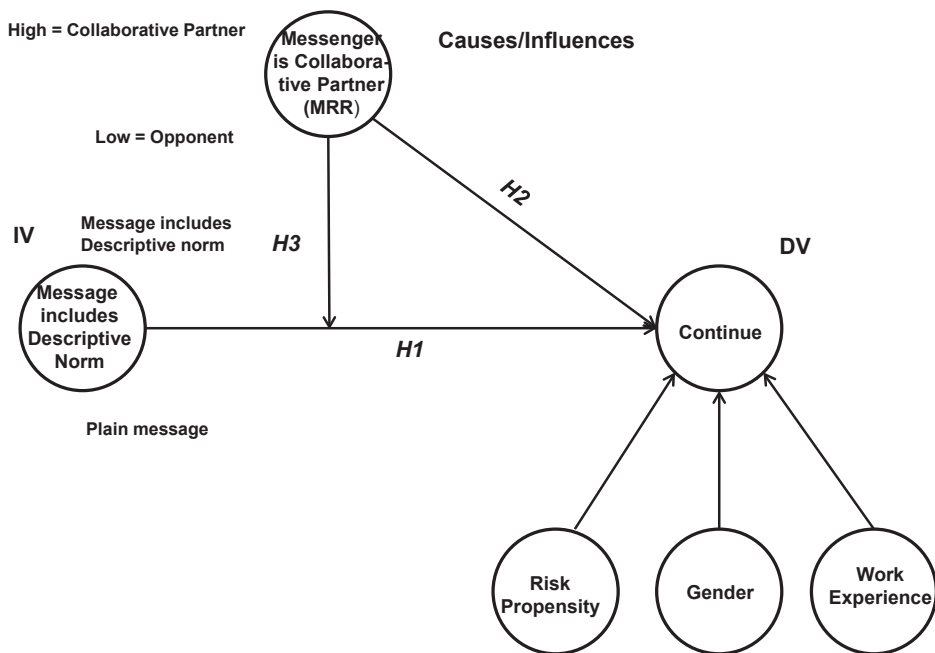
Figure 3-1. Research Model

As shown in the model, our dependent variable is a decision-maker's willingness to continue a troubled project, which serves as a proxy for the deaf effect, as it provides an indication of the degree to which the auditor's risk warning and recommendation to redirect the project influences the decision-maker. Our predictor variable is whether or not the message delivered by the auditor contains a descriptive social norm. The model suggests that MRR (whether the messenger is seen as a Collaborative Partner or an Opponent) will moderate the relationship between a descriptive social norm and the deaf effect.

In our analysis, gender, work experience, and risk propensity were included as control variables. We based this inclusion on the results of prior work by Cuellar et al, (2006) revealing that the deaf effect can be influenced by both gender and work experience, as well as prior work by Lee et al, (2014) showing that risk propensity can also influence the deaf effect.

3.4   METHOD

To test our model we conducted a scenario-based laboratory experiment. We created the setting for the investigation of the phenomenon and we had control over the in-

dependent variable(s) and the random assignment of the participants to the treatment and non-treatment conditions (Boudreau et al, 2001). We manipulated the risk warning message of the internal auditor (by including or not including nudging with a Descriptive Social Norm) and the Messenger-Recipient Relationship (MRR) (Collaborative vs. Opponent) in a 2x2 factorial design.

Participants

Our participants consisted of 171 undergraduate students who were enrolled in Accounting and Information Systems courses at two Belgian Universities. The students had an average age of 23 years and an average work experience of 1.5 years. Seventy-five percent of the students had a European nationality and the majority were Belgian citizens. Sixty-three percent were male and 37% were female.

   Prior to starting the experiment at the beginning of class, participants were told that the study was about business decision making in an information system project situation. Participation in the experiment was voluntary and participants were told that their answers would be anonymous. Then we assigned randomly participants to one of the four experimental scenarios (i.e. treatment groups). Of the 171 responses, 147 were usable; 24 responses could not be used either because they were incomplete or because multiple responses were provided to the main question (i.e., the decision to continue).

   Keil et al, (2007) and Keil and Park (2009) provide an extensive discussion of the appropriateness of student subjects in the immediate domain of experiments involving bad news reporting on IT projects. They state that the decision to use student subjects must be evaluated on a case-by-case basis (Keil and Park, 2009) and argue that for studies focusing on theory application such as ours, data from student subjects are acceptable (Keil et al, 2007). While the appropriateness of student subjects has been debated, Sitkin and Weingart (1995) suggest that the use of student subjects is often appropriate when the experiment involves human decision making. Prior research on the deaf effect has employed student subjects (Cuellar et al, 2006; Lee et al, 2014). Moreover, Nuijten et al, (2016) tested a core model of the deaf effect including the MRR construct with both students and practitioners and found that the pattern of results was consistent regardless of the type of subject used in the experiment. This finding is consistent with prior work showing that "real-world decision makers possess information-processing characteristics and biases that are extremely similar to their student counterparts" (Ashton and Kramer, 1980, p. 3). Finally, according to Cook and Campbell (1979), it is perfectly appropriate to trade off some external validity in order to achieve strong internal validity. In this respect, experiments with student subjects are beneficial because they provide a relatively homogenous subject pool, and enable the experiment to be conducted in an isolated and controlled setting (i.e. a classroom), using standardized procedures. Once internal validity has been established for the purpose of theory testing, external valid-

ity can be further addressed by testing across multiple contexts and different types of participants.

Scenario and Treatments

In our scenario we asked the participants to consider themselves to be the project owner of an information systems project within an insurance company. The scenario used in this experiment was based on one used by Nuijten et al, (2016) and involves a situation in which the subject (playing the role of a project owner) is informed that Mr. Johnson from the Internal Audit department has recently found serious problems with the project and advises that the project should be redirected (i.e., not continue as planned).

Consistent with prior studies in behavioural economics that have used similar treatments (e.g., Goldstein et al, 2008; Kredenster et al, 2012), we created the following message for our descriptive social norm treatment: "Mr Johnson informed you that MOST of your PEER COLLEAGUES Project Owners within THIS company REDIRECT the project under these circumstances. Subsequently, Mr. Johnson advised you to JOIN YOUR FELLOW PEERS and REDIRECT the project LIKE YOUR PEERS DO." As a control, we crafted the following message that did not include a descriptive social norm: Mr. Johnson advised you to REDIRECT the project.

In a manner consistent with Nuijten et al, (2016), we independently manipulated the messenger-recipient relationship (MRR) to be either collaborative or not. For the collaborative treatment, we stated: "Mr. Johnson (the Internal Auditor) has a long history of working COLLABORATIVELY with IS project teams with the goal of helping to identify and manage project risks, thus enabling project owners to be successful. He is seen by the project management as adding value to the process. Thus, Mr. Johnson is treated as a TRUSTED PARTNER to management." For the opponent treatment, we stated: "Mr. Johnson (the Internal Auditor) has a long history of working AGAINST IS project teams with the goal of exposing project failings, thus embarrassing project owners. He is seen as policeman who does not add any value to the development process. Thus, Mr. Johnson is treated as an OPPONENT WHO IS NOT TO BE TRUSTED."

The complete scenario and manipulations can be found in the Appendix.

Constructs and Measures

Our independent variables were manipulated and treated as dichotomous variables. The presence or absence of a descriptive social norm was captured in the variable SocNorm (1=Message including a descriptive social norm; 0=Message without a descriptive social norm). Messenger recipient relationship was captured in the variable MRR (1=collaborative partner; 0=opponent).

In our experiment we use the decision to continue a troubled information systems project (Continue) despite the auditor's risk warning and recommendation to redirect the project as the dependent variable. Consistent with Nuijten et al, (2016) we assessed this construct by applying two measurement items (Continue1 and Continue2).

Consistent with prior studies (Keil et al, 2000; Cuellar et al, 2006), risk propensity (RiskProp) was measured using four items adapted from Sitkin and Weingart (1995). In the Appendix all of the construct measures that were employed are shown.

3.5 RESULTS

Manipulation Checks

We conducted manipulation checks to ensure that our treatments were effective. The descriptive social norm manipulation check consisted of a single item which was used to assess whether subjects noticed and were able to recall whether or not the scenario contained a descriptive social norm. Possibly due to the placement of the manipulation check at the end of the experiment, it may have been difficult for participants to remember the details of the manipulation and thus forty-four participants did not pass the manipulation check question. To be on the conservative side and to ensure the manipulation validity of our study we only included respondents who passed the manipulation checks on social norms. Thus, we retained 103 responses for subsequent analysis.

As a manipulation check for MRR we adopted the 3-item scale used by Nuijten et al, (2016). A two-way ANOVA with interaction was conducted by entering the manipulations as independent variables and using the MRR manipulation check as the dependent variable. The two-way ANOVA confirmed that the MRR manipulation was effective and that there was no significant interaction effect. The results of this ANOVA are shown in Table 3-1a.

Table 3-1a. Manipulation Test ANOVA

Independent variable	Type III Sum of Squares	F	Sig.
Main Effect SocNorm	.468	.366	.547
Main Effect MRR	126.611	99.058	.000
Interaction Effect SocNorm * MRR	.097	.076	.784

Dependent Variable: MRR-manipulation check

R2 is .501

Measurement Model Assessment

For testing our research model, we chose Partial Least Squares (PLS) analysis. By using PLS we could assess both the measurement model and structural model together (Gefen et al, 2000; Gefen et al, 2011).

SmartPLS (Ringle et al, 2005) version 2.0 was used for the analysis. Before testing our structural model, we determined the validity of our measurement model through tests of convergent and discriminant validity as described by Chin (1998) and Fornell and Larcker (1981).

Convergent validity

Two different assessments were made for convergent validity: (1) individual item reliability, and (2) construct reliability. Individual item reliability was assessed by examining the item-to-construct loadings for each construct that was measured with multiple indicators. In order for the shared variance between each item and its associated construct to exceed the error variance, the standardized loadings should be greater than 0.70. As seen in Table 3-1b, all of our loadings exceeded this threshold.

Table 3-1b. Item to Construct Loadings

Construct	Item	Item-to-Construct Loading
Continue	Continue1	0.971
	Continue2	0.967
Risk Propensity	RiskProp1	0.791
	RiskProp2	0.819
	RiskProp3	0.791
	RiskProp4	0.775

We also considered the construct reliability for each block of measures, as shown in Table 3-1c. Composite reliability scores and Cronbach's alpha scores both measure the internal consistency among a given construct's items. Unlike Cronbach's alpha, the composite reliability score does not assume that all indicators are equally weighted. Therefore Cronbach's alpha tends to be a lower bound estimate of reliability (Chin, 1998). Bearden et al, (1993) claim that a score of .7 indicates extensive evidence of reliability. Table 1c shows that the reliability for each of our constructs exceeds this threshold. Fornell and Larcker (1981) view Average Variance Extracted (AVE) as a measure of construct reliability. The guideline threshold for AVE is 0.5, which means that 50 percent or more of variance of the indicators is accounted for (Chin, 1998). As Table 1c indicates, both of the multi-item constructs in our measurement model exceeded the established criterion for AVE.

Table 3-1c. Construct Reliability

	AVE	Composite Reliability	Cronbach's Alpha
Continue	0.939	0.968	0.935
RiskProp	0.631	0.872	0.805

Discriminant validity

We conducted two tests for discriminant validity. First, we calculated each indicator's loading on its own construct as well as its cross-loadings on all other constructs. In Table 3-2 we see that each indicator loads higher on its own construct than it does on any other constructs. We also see that the indicators for a given construct have a higher loading with their own construct than do the indicators associated with any other construct. This provides good evidence of discriminant validity (Chin, 1998).

Table 3-2. Item to Own Construct Correlation vs Correlations With Other Constructs

Construct	Item	Continue	Gender Expt2	RiskProp Expt1	WorkExp
Continue	Continue1	**0.97**	0.12	0.42	-0.01
	Continue2	**0.96**	0.17	0.39	0.05
RiskProp	RiskProp1	0.32	0.04	**0.79**	0.08
	RiskProp2	0.34	0.16	**0.81**	0.10
	RiskProp3	0.32	0.05	**0.79**	-0.02
	RiskProp4	0.34	0.12	**0.77**	-0.01
WorkExp	WorkExp	0.01	-0.10	0.04	**1.00**
Gender	Gender	0.15	**1.00**	0.12	-0.10

PLS Structural Model Assessment

Having an adequate measurement model in place, we tested our hypotheses by examining the structural model. The explanatory power of a structural model can be evaluated by examining the R-squared value for the ultimate dependent variable. Figure 3-2 shows that the explanatory power of our structural model is adequate with an R-squared of .422 for our dependent variable Continue.

   After calculating path estimates for the structural model, we applied bootstrapping to generate the corresponding t-values. With significance levels of .05, .01 and 0.001, the t-values for a one-tailed test would be 1.645, 2.326 and 3.091, respectively (which is acceptable given the directional nature of the hypotheses). Path coefficients and t-values for the models are presented in figure 3-2.

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As shown in figure 3-2, the SocNorm to Continue path is significant (path-coefficient of -0.150 and t-value of -1.805 and p= 0.036) and in the expected direction, thus indicating support for Hypothesis 1. The figure also shows that the path from MRR to Continue is significant (path-coefficient of -0.441 with t-value of 5.325 and p < 0.001) and in the expected direction, thus indicating support for Hypothesis 2.

In order to test our moderation hypothesis, we constructed an interaction term using the product indicator procedure as described by Chin et al, (1996). Figure 3-2 shows that the interaction term (SocNorm x MRR) was significant at the p < .05 level in a 1-tailed test (t=- 1.730 and p = 0.042), indicating that the effect of SocNorm on the deaf effect is strengthened when we shift from a messenger who is seen as an Opponent to one who is seen as a Partner. This result supports Hypothesis 3.
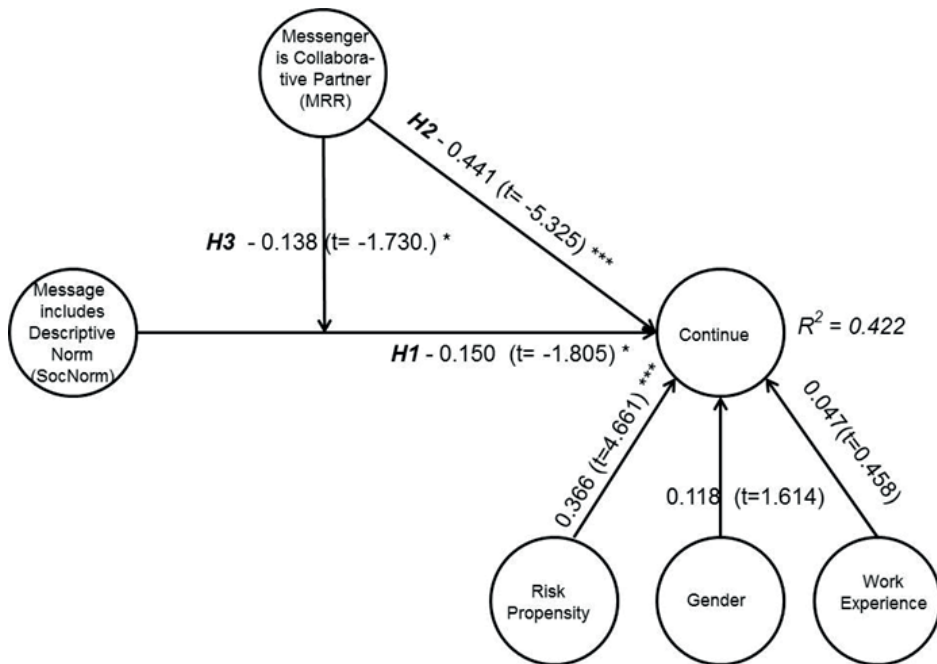

Figure 3-2. Structural Model Results
*significant at p < .05 level (one-tailed test)
** significant at p < .01 level (one-tailed test)
*** significant at p < .001 level (one-tailed test)

For interpretation of the moderating effect we present the interaction plot in Figure 3-3 below. In order to facilitate accurate interpretation of the figure, we performed a regression analysis in which we used the standardized versions of our control variables, i.e. risk propensity, gender and work experience, as suggested by Dawson (2014). Consistent with Aiken and West (1991), two lines were plotted, each representing one of the two

values of the moderator (MRR). The lines are not parallel, but do not intersect within the scale of treatment and measurement conditions we used in our experiment. As the sequence of the two lines stayed unchanged, this type of interaction is called "ordinal" (Jaccard and Turrisi, 2003, p.78).

The results of the moderation analysis show that the interaction effect between Soc-Norm and MRR on Continue is consistent with our expectations.
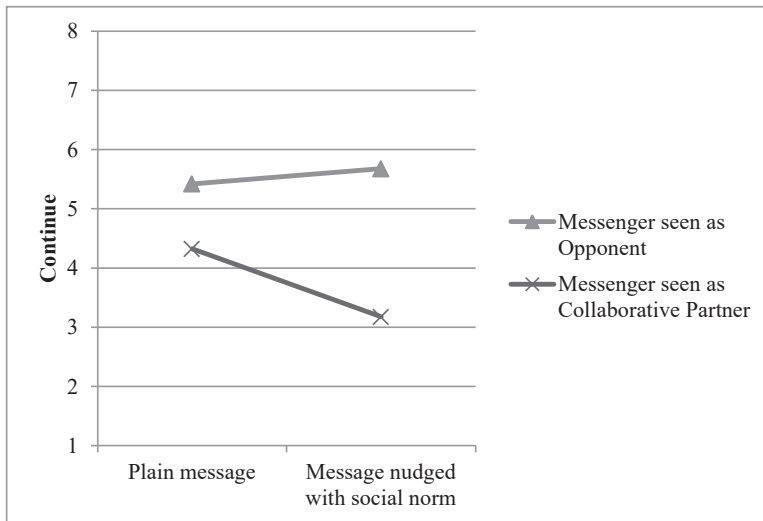

Figure 3-3. Interaction plots with MRR as moderator

We performed simple slope tests of these lines to determine if their slopes are significantly different from zero. As we can see from Figure 3-3, nudging with a descriptive social norm has the intended effect - i.e., reduces the deaf effect (as measured by the decision to continue) when the risk warning message comes from an internal auditor who is seen as a Collaborative Partner. To confirm this we performed a simple slope test in SPSS. The simple slope test revealed that the slope of this line was significantly different from zero (std. beta = -.326; p = .019). Based on the interaction plot, nudging with a descriptive social norm appears to have no effect or even a slightly opposite effect when the risk warning message comes from an internal auditor who is seen as an Opponent. A simple slope test revealed, however, that the slope of this line was not significantly different from zero (std. beta = .094; p = .525).

3.6   DISCUSSION

Before discussing the implications of our study, it is appropriate to consider the main findings and the limitations. The study's three main findings are:

(1) Nudging with a descriptive social norm can significantly reduce the deaf effect response to a risk warning issued by an internal auditor.

(2) The influence of a descriptive social norm on the deaf effect is strengthened when the messenger is seen as a Collaborative Partner rather than an Opponent. When the messenger is seen as a Collaborative Partner, decision makers are more likely to pay attention to the risk warning message of the internal auditor. However, when the messenger is seen as an Opponent, nudging with a descriptive social norm is ineffective.

(3) Decision makers are less likely to continue a failing course of action when the messenger who delivers a risk warning is seen as a Collaborative Partner rather than an Opponent. This finding is consistent with a previously reported study (Nuijten et al, 2016) and has replication value.

Limitations

This research involved a laboratory experiment which allowed us to achieve high internal validity but at some cost in terms of external validity. Experimental designs for studies such as ours should not be evaluated based on the degree to which they reflect actual organizational settings, but rather on whether they contribute to our ability to test causal relationships that extend our understanding of human decision making (Dobbins et al, 1988). To achieve a high level of internal validity our study took a necessarily narrow focus and involved a small number of variables so as to achieve a high degree of control. Hence, in our experimental approach we were unable to include all the complexities of real work situations. This trade-off of higher internal validity for lower external validity is common in laboratory experiments and should not be considered to be a flaw. At the same time, any generalization of the findings of this study to other settings should be done with caution. It is possible that the results would be different in other settings as there are other organizational and political factors that may also affect managers' deaf effect responses to risk warnings.

The use of student participants could also limit the external validity of our results. Although students often serve as valid surrogates for managers in this type of research, further research is needed to determine if these findings can be replicated with more experienced participants.

Despite the above limitations, this study contributes to our understanding of how internal auditors can reduce the deaf effect and thereby influence the trajectory of troubled IS projects by issuing risk warnings that contain descriptive social norms. This

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is the first empirical study that we are aware of that examines whether nudging with a descriptive social norm can improve the effectiveness of the Internal Audit function with respect to the management of IT projects.

Implications

Prior research on the deaf effect has focused on characteristics of the messenger and his/her relationship with the recipient that tend to be stable and not easily changed. By focusing on what the auditor can do to craft the message in a way that overcomes the deaf effect, our research contributes to this discourse and addresses an important theoretical gap. Specifically, we introduce a novel research model that builds on prior work by Nuijten et al, (2016) and combines MRR with the idea of nudging with descriptive social norms.

Ours is the first study to show that nudging with a descriptive social norm can significantly reduce the deaf effect response to an auditor's risk warning. Further, our results suggest that nudging with descriptive norms is more effective when the technique is used in a stewardship based model whereby the descriptive norms provided by the messenger take place in an MRR context in which the messenger is viewed as a partner rather than an opponent. Finally, our results confirm the findings of Nuijten et al, (2016) who reported that when the messenger is seen as a collaborative partner this can have a direct impact in terms of reducing the deaf effect.

The study has important practical implications because it suggests that auditors can use tactics from behavioural economics (i.e. nudging) to reduce the deaf effect. Unlike other factors which have been discussed in the deaf effect literature, nudging is a technique that can be quickly and easily applied. That being said, the effectiveness of nudging will be maximized when auditors have invested the time to establish collaborative relationships with the managers to whom they must deliver risk warnings.

Further research is warranted to explore the effect of other types of nudging on the deaf effect response to risk warnings. One approach is to make things easy for message recipients by, for example, minimizing bureaucratic procedures or obstacles that could prevent them from taking appropriate actions to deal with risks. Another approach might be to change the character of project review meetings so that the default is that a project will not go forward in the presence of major risks that remain unaddressed. Conversely, if the situation can be structured in a way such that ignoring the auditor's risk warning and pressing forward requires effort to justify, this will have the effect of nudging the recipient in the desired direction. Another approach to nudging could involve choosing the best time in which to deliver the risk warning. For example, it may be the case that a recipient will be more likely to act on a risk warning immediately after a performance appraisal as opposed to before such an appraisal takes place. We hope that our work will encourage others to investigate other types of nudging that could be effective in reducing the deaf effect.

APPENDIX 1.

Scenario and Measures

Imagine that you are the Senior Vice President of the Pensions Operations department within a large insurance company. You inherited a prestigious IS-project called PENSION-VIEW. As Project Owner, YOU became responsible for the successful implementation of PENSION-VIEW and for realizing the benefits for your organization with this in-house developed system.

With this IS-project you could be the first insurance company in the market that grants all citizens (customers and potential customers) access to the complete set of their personal pension information. If your insurance company is the first in the market to provide this service at a reliable level, the expected gain to your company would be 60 million euros, as documented in a detailed business case for the project.

Your main competitors have all decided to wait for the supplier of a standard software-package to provide a module to the insurance-market that integrates and presents their pension data. If your implementation is too late or does not prove reliable during the first month of operations, you will miss your competitive advantage and your organization will gain nothing.

The main challenge and risk of the PENSION-VIEW project are the large number of interfaces to retrieve reliable information from other information systems that contain pension data.

Your PENSION-VIEW project is close to implementation and under time-pressure to continue implementation as planned.

According to standard procedures, Mr. Johnson from the Internal Audit department has recently reviewed the testing-procedures of your project.

Mr. Johnson reports that he has found serious weaknesses in the design and execution of the testing activities on the data exchange with other information systems that may lead to reliability problems in the first month of operations with severe consequences for the company. As a consequence, he reports that the project should be redirected (thus, not continue as planned).

Scenario 1 (with manipulation) (SocNorm = Nudged (Normative) message):

Mr. Johnson (the Internal Auditor) has a long history of working COLLABORATIVELY with IS project teams with the goal of helping to identify and manage project risks, thus enabling project owners to be successful. He is seen by the project management as adding value to the process. Thus, Mr. Johnson is treated as a TRUSTED PARTNER to management.

Mr Johnson informed you that MOST of your PEER COLLEAGUES Project Owners within THIS company REDIRECT the project under these circumstances. Subsequently,

Mr. Johnson advised you to JOIN YOUR FELLOW PEERS and REDIRECT the project LIKE YOUR PEERS DO.

Scenario 2 (without manipulation) (SocNorm = Not Nudged (Plain) message):

Mr. Johnson (the Internal Auditor) has a long history of working AGAINST IS project teams with the goal of exposing project failings, thus embarrassing project owners. He is seen as policeman who does not add any value to the development process. Thus, Mr. Johnson is treated as an OPPONENT WHO IS NOT TO BE TRUSTED.

Mr. Johnson advised you to REDIRECT the project.

Scenario 3 (with manipulation) (SocNorm = Nudged (Normative) message):

Mr. Johnson (the Internal Auditor) has a long history of working AGAINST IS project teams with the goal of exposing project failings, thus embarrassing project owners. He is seen as policeman who does not add any value to the development process. Thus, Mr. Johnson is treated as an OPPONENT WHO IS NOT TO BE TRUSTED.

Mr Johnson informed you that MOST of your PEER COLLEAGUES Project Owners within THIS company REDIRECT the project under these circumstances. Subsequently, Mr. Johnson advised you to JOIN YOUR FELLOW PEERS and REDIRECT the project LIKE YOUR PEERS DO.

Scenario 4 (without manipulation) (SocNorm = Not Nudged (Plain) message):

Mr. Johnson (the Internal Auditor) has a long history of working COLLABORATIVELY with IS project teams with the goal of helping to identify and manage project risks, thus enabling project owners to be successful. He is seen by the project management as adding value to the process. Thus, Mr. Johnson is treated as a TRUSTED PARTNER to management.

Mr. Johnson advised you to REDIRECT the project.

As you left the meeting with Mr. Johnson, you saw two courses of action. You could decide to REDIRECT the project (thus, not continue as planned). Or, you could decide to CONTINUE as planned (thus, move the system into production as planned).

You must decide which of the two courses of action to take.

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MEASURES

Continue (dependent variable)

Variable	Item Wording
Continue1	(1=Definitely Redirect; 8=Definitely Continue) Indicate whether you would decide to continue the project as planned or redirect, and how strong your leaning would be
Continue2	(1=Strongly Disagree; 7=Strongly Agree) I will certainly continue the PENSION-VIEW project as planned (i.e., without redirection)

MRR (moderator variable)

Variable	
MRR	(1=Collaborative partner; 0=Opponent)

SocNorm (independent variable)

Variable	
SocNorm	(1=Message including a descriptive social norm; 0=Message without a descriptive social norm)

MRR_{mc} (used as a manipulation check)

Variable	(Anchors) Item Wording
$MRR_{mc}1$	(1=Strongly Disagree; 7=Strongly Agree) I consider Mr. Smith to be a trusted partner to my PENSION-VIEW project
$MRR_{mc}2$	(1=Strongly Disagree; 7=Strongly Agree) I consider Mr. Smith to be a collaborative partner to my PENSION-VIEW project
$MRR_{mc}3$	(1=Non-Trusted Opponent; 7=Trusted Partner) I consider Mr. Smith to be a _____ to my PENSION-VIEW project

Risk Propensity (used as a control variable)

Variable	Item Wording (Anchors: 1=Extremely LESS likely than others; 7=Extremely MORE likely than others)
RiskProp1	Your tendency to choose risky alternatives based on the assessment of other people on whom you must rely
RiskProp2	Your tendency to choose risky alternatives relying on an assessment that is high in technical complexity
RiskProp3	Your tendency to choose risky alternatives which could have major impact on the strategic direction of your organization
RiskProp4	Your tendency to choose risky alternatives despite considerable failures in risky choices you made in the past