Research Article

Media Naturalness and Compensatory Adaptation: Counterintuitive Effects on Correct Rejections of Deceitful Contract Clauses

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***Abstract*—Research problem:** *Deciding whether to accept or reject contract clauses in software purchasing contracts is a complex communication-related task, which is likely faced daily by a multitude of software purchasing professionals in a variety of organizations.* **Research question:** *What are the effects of viewing contract clauses as video clips, compared to viewing clauses as text only, in terms of cognitive effort, communication ambiguity, and correctness in the acceptance or rejection of clauses in software purchasing contracts?* **Literature review:** *The literature on the Media Richness and Media Naturalness theories suggest that viewing contract clauses as video clips should reduce cognitive effort and communication ambiguity. However, while Media Richness theory suggests that correctness in the acceptance or rejection of clauses in software purchasing contracts should increase with the use of video clips, Media Naturalness theory suggests a neutral overall effect.* **Methodology:** *An experiment was conducted in which student participants were asked to either accept or reject 20 clauses from a software contract, placing themselves in the position of buyers. Of the 20 clauses, 6 were intentionally deceitful and potentially harmful to the buyer. Approximately half of the participants reviewed the contract clauses as web-based text, and the remaining as web-based video clips.* **Results and conclusions:** *Viewing contract clauses as video clips was associated with significantly less cognitive effort and less communication ambiguity than viewing the clauses as text only. Counterintuitively, increases in perceived cognitive effort and communication ambiguity were associated with more successful identification and rejection of deceitful contract clauses. The combination of these competing effects led to an overall neutral effect of the medium on the correctness in the acceptance or rejection of clauses. These findings are consistent with expectations based on Media Naturalness theory, particularly its compensatory adaptation proposition, and inconsistent with expectations based on Media Richness theory.*

Index Terms*—Compensatory adaptation, experimental research, Media Naturalness theory, Media Richness theory, multicountry research, partial least squares, software contracts, software purchasing.*

Clauses in legal software purchasing contracts are influenced by many years of rule-making in the context of statutory and/or common law. This is true for most developed and developing countries. As such, contract clauses tend to be complex. At the same time, contract clauses aim to create a binding document that is beneficial to at least one of the parties of a contract. In some cases, clauses that are beneficial to one party are detrimental to the other party. In these cases, it is in the interest of the latter party to reject the detrimental clauses.

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The literatures on the Media Richness [1]–[3] and Media Naturalness [4] theories, two influential communication media theories, suggest that viewing contract clauses with richer or natural media, such as video clips, should reduce cognitive effort and communication ambiguity. However, while Media Richness theory suggests that correctness in the acceptance or rejection of clauses in software purchasing contracts should increase with the use of video clips, Media Naturalness theory's compensatory adaptation proposition posits that the overall effect should be neutral.

Given this, our goal with this study is to answer the following research question: What are the effects of viewing contract clauses as video clips, compared to viewing clauses as text only, in terms of cognitive effort, communication ambiguity, and correctness in the acceptance or rejection of clauses in software purchasing contracts?

This paper is organized as follows. We start with a review of the relevant literature, where we focus on Media Richness theory and, particularly, Media

Naturalness theory. We conclude our literature review with a set of hypotheses to be tested. We then discuss the methodology used in the study, and proceed by discussing the results. We end with a discussion of the study's conclusions and limitations, as well as suggestions for future research.

Literature Review

This section situates our study within the relevant literature. We start with a discussion of our theoretical orientation, and the themes used to select the literature to be reviewed. We then define and discuss various elements related to clauses in legal software purchasing contracts, Media Richness theory, Media Naturalness theory, cognitive effort, communication ambiguity, and correct rejections of deceitful contract clauses. This discussion includes several theoretical expectations, which are explicitly summarized through a set of hypotheses at the end of the section.

Theoretical Orientation This study focuses on two influential and competing communication media theories, namely, the Media Richness and Media Naturalness theories, with special emphasis on the latter. In the context of our study, these two theories would lead to similar predictions regarding cognitive effort and communication ambiguity, but contradictory predictions regarding correct rejections of deceitful contract clauses. As such, this study serves to contrast the two theories, and illustrate the counterintuitive prediction by Media Naturalness theory that communication media obstacles lead to compensatory adaptation by media users, ultimately leading to neutral effects on outcomes of tasks that involve communication.

Selection of Literature for the Review Our literature review focused on various themes that together provide a foundation for our study. These themes refer to clauses in legal software purchasing contracts, Media Richness theory, Media Naturalness theory, as well as the following constructs and their relationships with one another: cognitive effort, communication ambiguity, and correct rejections of deceitful contract clauses.

Clauses in Legal Software Purchasing Contracts In the context of contract law [5], clauses in legal software purchasing contracts aim to capture many years of rule-making in the context of statutory and/or common law [6]–[8]. As such, contract clauses tend to be complex [9]–[11]; the source of complexity may be referred to by derogative terms such as “legalese”.

Moreover, contract clauses aim to create a binding document that is beneficial to at least one of the parties of a contract [12]. In cases where contracts are written primarily by one of the parties, such as a software vendor in the case of software contracts, often contract clauses are designed to be particularly beneficial to the party that writes the contract [8], [12].

Let us consider the following scenario, which illustrates in a practical way the focus of our study. Several people are asked to review the clauses of a software purchasing contract, and accept or reject them individually. Let us assume that some of the clauses are intentionally deceitful, being harmful to the buyer and beneficial to the seller. Finally, let us assume that half of those individuals are shown the clauses as text on webpages, while the other half are shown the clauses as video clips with a person stating the clauses orally. Which of the groups, text or video, will do better at identifying the deceitful clauses?

Media Richness Theory Media Richness theory was built around a central hypothesis, namely, the Media Richness hypothesis. This hypothesis states that different communication media possess different degrees of a trait called richness, which is generally high in face-to-face communication and goes down as media selectively remove face-to-face communication elements [1], [3]. The hypothesis also states that in complex (or equivocal) tasks, the use of richer media will lead to better task outcomes.

Several studies have found support for the Media Richness hypothesis [2], [13], [14]. Media Richness theory is particularly relevant in the context of the deceitful clause identification scenario above. This theory would suggest that the group-viewing video clips would do better at identifying the deceitful clauses, because it would be using the richest medium [2], [15].

Media Naturalness Theory It is commonsense to believe that communication media obstacles will tend to impair the outcomes of tasks that involve communication. However, empirical evidence to the contrary, namely, that communication media obstacles may lead to the same or even better outcomes in tasks that involve communication, was presented in a widely cited article published more than 10 years ago in the IEEE Transactions on Professional Communication [16]. A few years

later, another widely cited article in the same publication [4] presented a theory of how that could happen: Media Naturalness theory.

Media Naturalness theory has been proposed as an alternative to Media Richness theory [4], [17]. It is also particularly relevant in the context of the deceitful clause identification scenario above, because it leads to a prediction that directly contradicts the media richness-based prediction. In the contract review scenario above, Media Naturalness theory would suggest that the group viewing clauses as text would not do worse at identifying the deceitful clauses. Most likely, it would perform at about the same level as the group viewing clauses as video clips.

The underlying reason is counterintuitive, and somewhat contrarian [18] with respect to much of the related literature. According to Media Naturalness theory's compensatory adaption proposition [17], [19], viewing clauses as text would pose communication obstacles to the individuals. This would make them (mostly involuntarily) compensate for those obstacles [20], [21], which would, in turn, lead to a neutral overall effect in the identification of deceitful clauses.

Media Naturalness theory argues that an increase in media naturalness in the context of a knowledge-intensive communication-related task would affect three main constructs: cognitive effort, communication ambiguity, and physiological arousal. The constructs cognitive effort and communication ambiguity are associated with communication obstacles. An increase in them, due to a decrease in media naturalness, would pose obstacles for communication. Physiological arousal is not directly associated with communication media obstacles [17], [19], although obstacles may emerge as secondary effects. Since our study focuses on compensatory adaptation in response to communication obstacles, it does not incorporate physiological arousal in is formulation.

Cognitive Effort Cognitive effort is defined here as the amount of mental activity involved in a communication-related task. The amount of cognitive effort experienced by an individual can be measured directly, with the use of techniques, such as magnetic resonance imaging; or indirectly, based on perceptions of levels of mental effort, difficulty, and time pressure associated with communicative tasks. The latter is the approach employed in this study.

Communication Ambiguity: Communication ambiguity is defined here as the amount of mismatch between what is trying to be conveyed and what is actually understood in a communication-related task. As with cognitive effort, it is measured in this study through perceptions. The perceptions are related to the related levels of ambiguity, vagueness, confusion, and lack of clarity involved in the communication-related task.

Media, Cognitive Effort, and Communication Ambiguity: Viewing contract clauses with the goal of deciding whether to accept or reject them is arguably a complex activity that places cognitive demands on individuals and may lead to ambiguity. It is this type of activity that would fit the definition of equivocal activity in Media Richness theory, as contract clauses may lead to multiple and conflicting interpretations, providing the context in which media effects would be observed [1], [22].

Deciding whether to accept or reject contract clauses is also the type of complex and knowledge-intensive activity in which Media Naturalness theory posits media effects would be observed [17], [19]. It is therefore a reasonable expectation that using a more natural medium for communication would lead to reduced cognitive effort and communication ambiguity [4], [20]; an expectation that is also compatible with Media Richness theory [2], [3].

Cognitive Effort, Communication Ambiguity, and Correct Rejections of Deceitful Contract Clauses: A decrease in media naturalness, or richness, will be associated with an increase in cognitive effort and communication ambiguity [4]. Downstream effects are where the media naturalness and richness theories clearly diverge [20]. If an individual is restricted to a low richness medium (such as text on a webpage), as many were in this study and many more are in real-world situations involving software contracts, Media Richness theory would suggest that the ability of the individual to reject deceitful clauses would be compromised [2].

Media Naturalness theory, on the other hand, suggests that the opposite would happen, as the increase in cognitive effort and communication ambiguity would induce compensatory adaptation [17], [21]. This would lead the individual to make decisions more carefully and, thus, perform at the same level at correctly rejecting deceitful clauses.

Cognitive Effort and Time to Make Decisions About Contract Clauses: Increased cognitive effort

and communication ambiguity could induce more careful decision making, according to Media Naturalness theory. Not only does this counterintuitive expectation clearly allow for a "showdown" between the media naturalness and richness theories, but it also provides a possible explanation for the many paradoxical results found in the past in connection with the Media Richness theory [23]–[26]. One fundamental difference incorporated into the compensatory adaptation notion is that Media Richness theory is arguably more deterministic than its media naturalness counterpart [27], [28].

A significant amount of empirical research has suggested that there is a time delay between a user's perception of inadequacy of a medium for a task, and the user's possible adaptation to and/or of that medium for the task. (For reviews, see [29] and [30].) Although coming from a different standpoint, more characteristic of evolutionary psychology research [20], Media Naturalness theory conceptually formalizes this empirical observation by arguing that the increased cognitive effort induced by a decrease in medium naturalness, in the context of a task that requires intense communication to be accomplished, leads individuals to take longer to accomplish that task [4]. Increased time is posited as a mediating effect between cognitive effort and task performance, and as part of a (frequently involuntary) compensatory adaptive response to a medium of low naturalness [17]. Such adaptive response is posited as a separate path through which task performance may be balanced.

Mediating Effect of Compensatory Adaptation: An argument that is implicitly put forth by Media Naturalness theory is that compensatory adaptation mechanisms are significant mediators of task performance. In other words, when the circumstances exist for compensatory adaptation to take place, of which two mechanisms would be expending more time communicating and changing one's communication behavior [17], much of the variance in task performance would be mediated by compensatory adaptation.

This implies that compensatory adaptation mechanisms, when taken together, have the potential to be perfect mediators of the relationship between media naturalness and task performance in this study [31]. This is contingent on individuals having enough time to engage in compensatory adaptation [20].

Research Hypotheses The discussion above outlined several expectations regarding communication media (text and video clips), cognitive effort, communication ambiguity, correct rejections of deceitful contract clauses, amount of time taken to make reject/accept decisions about contract clauses, and the mediating effect of compensatory adaptation. These expectations are explicitly summarized through the hypotheses below.

H1. Viewing contract clauses as video clips will be associated with less perceived cognitive effort than viewing the clauses as text only.
H2. Viewing contract clauses as video clips will be associated with less perceived communication ambiguity than viewing the clauses as text only.
H3. Perceived cognitive effort will be positively associated with the degree to which correct rejections of deceitful contract clauses are made.
H4. Perceived communication ambiguity will be positively associated with the degree to which correct rejections of deceitful contract clauses are made.
H5. Perceived cognitive effort will be positively associated with the amount of time taken to make reject/accept decisions about contract clauses.
H6. The amount of time taken to make reject/accept decisions about contract clauses will be positively associated with the degree to which correct rejections of deceitful contract clauses are made.
H7. When compensatory effects are controlled for, viewing contract clauses as video clips will have no effect on the degree to which correct rejections of deceitful contract clauses are made compared to viewing the clauses as text only.

METHODOLOGY

This section starts by providing a brief description of the methodology employed in our study, and the rationale behind its choice. This is followed by a section explaining how the data were collected, a process that is detailed in subsequent sections addressing issues related to the participants in the study, the experimental task, the instrument used for data collection, the procedure used to analyze the data, and the steps taken to ensure reliability and validity.

Choice of Research Methodology The main theoretical foundation for our study comes from Media Naturalness theory, which is an evolutionary theory of communication media that is expected to apply to all humans. In other words, the underlying brain mechanisms associated with our findings were not expected to be significantly different in student participants, when compared with those of professional software buyers, nor to differ significantly based on national culture. Therefore, we decided to conduct a series of controlled experiments with university students in two different countries—US and Mexico. This allowed us to compile a sizeable sample, which reduces the likelihood of type I and II errors [32], while still being able to conduct a controlled experiment.

Participants Most participants were university students in business-related areas with at least some experience with software purchasing contracts. Faculty teaching these students were contacted and agreed to incorporate the experiment into their courses in ways that would enrich the students' learning experience. Institutional Review Board approval was obtained prior to the experiment being conducted. All participants signed a consent form explaining that participation in the experiment was voluntary, and that the data they provided were going to be made anonymous prior to analysis and storage.

How Data Were Collected The data were collected through an experimental task, and subsequently analyzed using variance-based structural equation modeling [33], [34]. The following sections describe the experimental task and instrument.

Experimental Task: The participants were asked to either accept or reject 20 clauses from a software contract (see Appendix A), placing themselves in the position of buyers. Of the 20 clauses, 6 were intentionally deceitful and potentially harmful to the buyer. They were interspersed among nondeceitful clauses. The deceitful clauses contained statements such as the following:

- "Delivery" shall imply Acceptance of the Goods and/or Services.
- "Completion Date" is defined as the date specified by the Vendor . . . or whatever date the Vendor deems appropriate, or whenever the Vendor decides when the work can be completed regardless of time limits.

For the participants in Mexico, the software contract was translated from English to Spanish, and backtranslated for a semantic check [35], [36]. The clauses used in the study were created based on different sources, including clauses from existing commercial software packages and the Software Legal Book [37]. The decisions to have significantly fewer deceitful than nondeceitful clauses (about one-third of the clauses were deceitful), as well as to have the deceitful clauses interspersed among nondeceitful clauses, followed recommendations by Levine et al. [38] and Miller and Stiff [39].

The experimental task consisted of a controlled web-based experiment in which the contract clauses were presented one by one via two different communication media conditions as well as web-based text and video. In the text condition, the 20 clauses were presented in text format on the computer screen within a web browser window. In the video condition, the participants were asked to accept or reject the same 20 clauses, but the clauses were presented to them through web browser-embedded video clips. Here, a webpage was shown to allow the participants to adjust the volume of their headphones before the clauses were presented. The video clips showed the face and part of the shoulders of a person, with facial expressions easily visible in the video. The person on the video clips, an adult male, was reading the clauses from cue cards that were positioned on top of a video camera.

An adult male was used to avoid perception biases that might artificially inflate the number of rejections of contract clauses, thus also potentially inflating the number of correct rejections. There seems to be a longstanding bias in favor of the use of adult males in news broadcasting, making them the conventional "face" of what broadcast agencies present as reliable news [40]. This could have a possible effect on perceptions of credibility by participants in a study like ours. Communicating equivocal and complex messages, as are the clauses in a contract, can benefit from avoiding unconventional elements [41], [42]; hence, the use of an adult male in the video clips. While this research decision reflects what could be seen as illegal discriminatory practices, it should not be construed as an indication that the researchers condone such practices.

Only one clause could be seen at a time. Participants had to check only one option of the two that were presented (accept or reject), none of which was selected by default. That is, the participants were required to explicitly pick one of the two choices. The participants were not time pressured.

They spent as much time as they wanted reviewing the contract. In the video option, the participants were able to play the video as many times as they wanted.

Conditions were further subdivided into nonprimed and primed. In the nonprimed condition, the contract clauses were displayed immediately after the presentation of a brief software purchasing scenario and a login webpage. In the primed condition, a warning screen was displayed to the participants immediately before webpages with the clauses were presented. The warning message recommended careful study of the clauses, alerting the participants that some of them might be deceitful and, thus, not advisable to accept.

The experimental task lasted about 30 minutes. That was followed by the administration of a questionnaire. The total time spent on the web-based experiment was between 35 and 50 minutes. An extra assignment grade was offered to students as an incentive. They were told that the grade was dependent on performance.

Instrument: The questionnaire used is provided in Appendix B. For the participants in Mexico, the questionnaire was translated from English to Spanish, and backtranslated for a semantic check [35], [36]. In addition, correct rejections (of deceitful clauses) were counted, and the amounts of time taken to make reject/accept decisions were measured, for each participant. Data on the following variables were also collected: class level (freshman, sophomore ... graduate), gender, age, grade point average, and work experience.

How Data Were Analyzed Variance-based structural equation modeling [33], [34] was used in the analysis of the data. Variance-based structural equation modeling is a multivariate analysis approach that bears some similarities to covariance-based structural equation modeling but that builds on nonparametric techniques, such as resampling [34], [43]. As such, it is more appropriate when parametric conditions, such as multivariate normality, are not satisfied [33], [34], as a Kolmogorov-Smirnov test [44] suggested was the case in the study described here.

The variance-based structural equation modeling analysis included a confirmatory factor analysis and a full collinearity test, where the measurement instrument was validated, followed by the estimation of multivariate coefficients for various structural equation models. Estimates were obtained for models with data from each country separately, as well as with a combined dataset including data from both countries. The software WarpPLS 3.0 was used in the analysis [45].

Country is a particularly important control variable in this study because of the evolutionary basis of the theoretical model being tested. Having an evolutionary basis is no guarantee that an effect will be a human universal [46], but finding a certain degree of similarity in an effect across different cultures goes some way toward legitimizing that evolutionary basis [47], [48]. Given this, separate analyses led to country-specific results that were compared using the pooled standard error and Satterthwaite methods outlined by Kock [34]. These comparisons suggested that the country-specific results were essentially the same, obviating the need to present them separately.

Ensuring Reliability and Validity Loadings and cross-loadings for the two latent variables used in this study are shown in Table I. These were calculated through a confirmatory factor analysis. Also shown in the table are the chance probabilities (P values) obtained through the confirmatory factor analysis for the loadings, which are shown within parentheses. All loadings and cross-loadings displayed are after an oblique rotation [49], [50]. The two columns at the right show the composite reliability and Cronbach alpha coefficients for each latent variable.

All loadings were significant at the $P < 0.001$ level. Moreover, all loadings were found to be greater than the threshold of 0.5. Together, these two results suggest that the latent variable measurement model employed has acceptable convergent validity in the context of this study [51].

Composite reliability coefficients are, like Cronbach alpha coefficients, measures of response consistency. The former tend to be higher since they take loadings into consideration in their estimation. All composite reliability and Cronbach alpha coefficients are greater than the threshold of 0.7. This suggests, based on reasonably conservative criteria, that the latent variable measurement model employed has acceptable reliability in the context of this study [52]–[54].

Table II shows the correlation between the two latent variables, and the square roots of the average variances extracted for each latent variable. The latter are shown on the diagonal and within parentheses. The correlation between the two latent variables is actually between the latent variable scores, which were calculated by aggregating

TABLE I
LOADINGS AND CROSS-LOADINGS FOR LATENT VARIABLES

	AMB	CE	*P* value	CR	CA
AMB1	(0.806)	-0.054	<0.001	0.859	0.754
AMB2	(0.852)	0.083	<0.001		
AMB3	(0.800)	-0.039	<0.001		
CE1	0.122	(0.874)	<0.001	0.921	0.871
CE2	0.130	(0.936)	<0.001		
CE3	-0.274	(0.866)	<0.001		

Notes:
- AMB = communication ambiguity; CE = cognitive effort.
- Loadings are shown within parentheses; loadings and cross-loadings are oblique-rotated.
- *P* values refer to loadings and were obtained through bootstrapping.
- CR = composite reliability coefficient for latent variable.
- CA = Cronbach alpha coefficient for latent variable.

the indicators assigned to each latent variable according to weights calculated via a partial least-squares algorithm [33], [34].

The correlation between the two latent variables is shown repeated, as the correlation matrix is symmetrical along the diagonal. When we compare the square roots of the average variances extracted with the other values on each column (the repeated correlation values), we see that the square roots of the average variances extracted for each latent variable are greater, in fact, much greater, than any correlation involving each latent variable. Therefore, it can be concluded that the latent variable measurement model employed has acceptable discriminant validity in the context of this study [52].

The measurement model employed in this study includes several variables for which only one indicator exists. That is, these are not technically latent variables [33], [34]. As such, they are outside the scope of classic convergent validity, discriminant validity, and reliability tests. This is often the case in multiple regression analyses, where a collinearity test is recommended as an alternative [55].

Given the existence of several single-indicator variables, a full collinearity test was conducted, including all variables in the structural model [33]. Through this test, variance inflation factors are calculated for each of the variables used in the model so that researchers can check for vertical and lateral collinearity among variables. The resulting variance inflation factors are shown in Table III. The variable indicated as "Country (USA or Mexico)" and those below it have been included as control variables in this study.

TABLE II
CORRELATION BETWEEN LATENT VARIABLES AND SQUARE ROOTS OF AVERAGE VARIANCES EXTRACTED

	AMB	CE
AMB	(.819)	.098
CE	.098	(.892)

Notes:
- *AMB = communication ambiguity; CE = cognitive effort.*
- *Square roots of average variances extracted are shown along diagonal within parentheses.*

A generally accepted threshold for a variance inflation factor as indicative of collinearity is 5, while a more conservative threshold is 3.3 [33]. That is, if the variance inflation factor associated with a variable is lower than the threshold, then it can be concluded that the variable is not significantly collinear with any other variable in the model. If all variance inflation factors are lower than 3.3, it can be concluded that the model is free from multicollinearity. As can be seen, this is the case here.

In summary, the measurement model employed in this study passes a number of fairly stringent tests. It presents acceptable convergent validity, discriminant validity, and reliability. It is also free from multicollinearity. These are preconditions for the validation of the measurement model, and suggest that the results of the structural equation modeling analysis can be generally considered trustworthy.

RESULTS

In this section, we describe the participants of the study, and present the results of our variance-based structural equation modeling analyses with respect

TABLE III
VARIANCE INFLATION FACTORS FOR ALL VARIABLES

Medium (text or video condition)	1.347
Communication ambiguity	1.092
Cognitive effort	1.279
Correct rejections (of deceitful clauses)	1.092
Time to make reject/accept decision	1.246
Country (USA or Mexico)	1.040
Class level (freshman … graduate)	1.511
Priming (alerted to possibility of deceit or not)	1.438
Gender (male or female)	1.144
Age	2.290
Grade point average	1.105
Work experience	2.243

Notes:
- Variance inflation factors obtained through a full collinearity test.
- All variance inflation factors lower than 3.3 suggest no multicollinearity.

TABLE IV
DETAILED BREAKDOWN OF THE DATA USED IN THE STUDY

Variable		Text	Video	Total
Country	United States	116 (68.64%)	117 (68.82%)	233 (68.73%)
	Mexico	53 (31.36%)	53 (31.18%)	106 (31.27%)
Primed	No	68(40.24%)	114 (67.06%)	182 (53.69%)
	Yes	101 (59.76%)	56 (32.94%)	157 (46.31%)
Gender	Female	90 (53.25%)	76 (44.71%)	166 (48.97%)
	Male	79 (46.75%)	94 (55.29)	173 (51.03%)
Classification	Freshman	41 (80.39%)	10 (19.61%)	51 (15.04%)
	Sophomore	41 (67.21%)	20 (32.79%)	61 (17.99%)
	Junior	39 (44.32%)	49 (55.68%)	88 (25.96%)
	Senior	36 (35.29%)	66 (64.71%)	102 (30.09%)
	Graduate	10 (28.57%)	25 (71.43%)	35 (10.32%)

to each of the hypotheses that guided the study. Beta coefficients are provided within parentheses, together with P values. Beta coefficients are standardized partial regression coefficients, and reflect the strengths of the multivariate associations among variables. P values indicate the probabilities that the associations are due to chance.

Who Participated in the Study Data from 339 graduate and undergraduate students was collected in the US and Mexico. In the US, the data were collected from two midsized universities in the southwestern part of the country. In Mexico, the data were collected from a midsized university and one large university located in the northern part of the country. Table I provides a detailed breakdown of the data used in the study.

The participants' ages ranged from 18 to 51 years, with an average of 23.07 years. Fifty-one percent of the participants were males. Work experience ranged from 0 to 40 years, with an average of 4.16 years. Participants had an average GPA of 3.07 and the distribution by class level was as follows: 15% were freshmen, 18% sophomores, 26% juniors, 30% seniors, and 10% graduate students. About 1% did not disclose their classification. Approximately 69% of the participants were from the US and 31% from Mexico.

Results for H1: Viewing Contract Clauses as Video Clips Will be Associated With Less Perceived Cognitive Effort Than Viewing the Clauses as Text Only Viewing contract clauses as video clips was associated with significantly less perceived cognitive effort than viewing the clauses as text only ($\beta = -0.196$, $P < 0.001$). That is, greater media naturalness (video clips) was associated with significantly lower perceived cognitive effort. This provides support for H1.

Results for H2: Viewing Contract Clauses as Video Clips Will be Associated With Less Perceived Communication Ambiguity Than Viewing the Clauses as Text Only Viewing contract clauses as video clips was associated

with significantly less perceived communication ambiguity than viewing the clauses as text only ($\beta = -0.113$, $P < 0.05$). That is, greater media naturalness (video clips) was associated with significantly lower perceived communication ambiguity. This provides support for H2.

Results for H3: Perceived Cognitive Effort Will be Positively Associated With the Degree to Which Correct Rejections of Deceitful Contract Clauses are Made Perceived cognitive effort was significantly and positively associated with the degree to which correct rejections of deceitful contract clauses were made ($\beta = 0.158$, $P < 0.01$). That is, the more perceived cognitive effort, the better the identification of deceit became, with this effect being statistically significant. This provides support for H3.

Results for H4: Perceived Communication Ambiguity Will be Positively Associated With the Degree to Which Correct Rejections of Deceitful Contract Clauses are Made Perceived communication ambiguity was significantly and positively associated with the degree to which correct rejections of deceitful contract clauses were made ($\beta = 0.150$, $P < 0.01$). That is, the more perceived communication ambiguity, the better the identification of deceit became, with this effect being statistically significant. This provides support for H4.

Results for H5: Perceived Cognitive Effort Will be Positively Associated With the Amount of Time Taken to Make Reject/Accept Decisions About Contract Clauses Perceived cognitive effort was significantly and positively associated with the amount of time taken to make reject/accept decisions about contract clauses ($\beta = 0.263$, $P < 0.001$). That is, the greater the perceived cognitive effort, the longer it took for participants to make reject/accept decisions about contract clauses, with this effect being statistically significant. This provides support for H5.

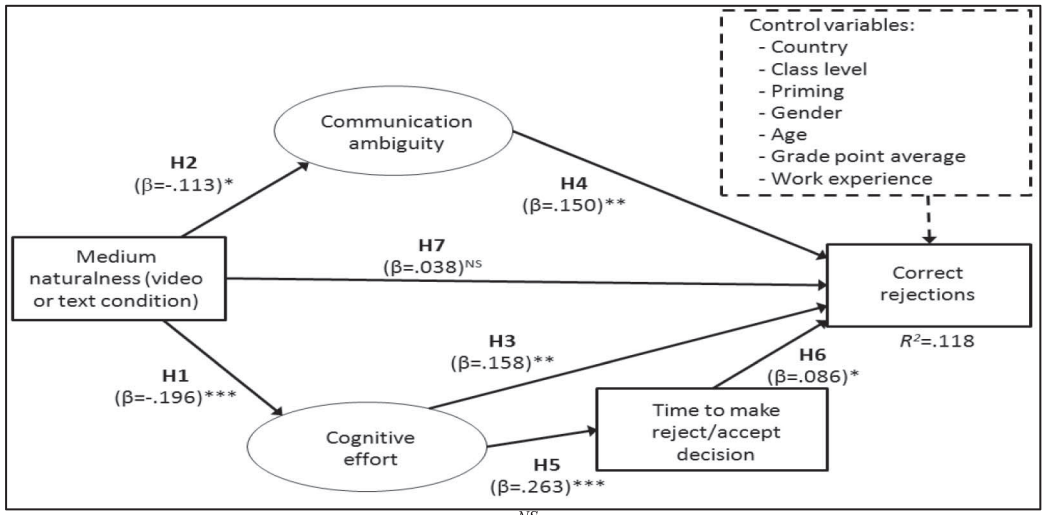
Results for H6: The Amount of Time Taken to Make Reject/Accept Decisions About Contract Clauses Will be Positively Associated With the Degree to Which Correct Rejections of Deceitful Contract Clauses are Made The amount of time taken to make reject/accept decisions about contract clauses was significantly and positively associated with the degree to which correct rejections of deceitful contract clauses were made ($\beta = 0.086$, $P < 0.05$). That is, the longer it took for participants to make reject/accept decisions about contract clauses, the better their decisions became, with this effect being statistically significant. This provides support for H6.

Results for H7: When Compensatory Effects are Controlled for, Viewing Contract Clauses as Video Clips Will Have No Effect on the Degree to Which Correct Rejections of Deceitful Contract Clauses are Made Compared to Viewing the Clauses as Text Only When perceived cognitive effort, perceived communication ambiguity, and the amount of time taken to make reject/accept decisions about contract clauses were controlled for, viewing contract clauses as video clips had no significant effect on the degree to which correct rejections of deceitful contract clauses were made, compared to viewing the clauses as text only ($\beta = -0.038$, $P = 0.42$). That is, when compensatory effects were controlled for, media naturalness was not found to be significantly associated with the degree to which correct rejections of deceitful contract clauses were made. This provides support for H7.

Additional Results Three model fit indices that are relevant in the context of variance-based structural equation modeling were estimated [34], [45]; these were the average path coefficient (APC), main dependent variable R-squared (DRS), and average variance inflation factor (AVIF). The APC was found to be 0.105 ($P < 0.01$). The DRS, which refers to the degree to which correct rejections of deceitful contract clauses were made, the main dependent variable in the model, was 0.118 ($P < 0.001$). The AVIF was 1.158, which is considerably lower than the recommended model threshold of 5. These results suggest a good fit between the model and the data.

The following control variables were included in the analysis, with respect to the degree to which correct rejections of deceitful contract clauses were made: country, class level, priming, gender, age, grade point average, and work experience. This means that the results above in connection with correct rejections occurred regardless of the effects of these control variables. Moreover, none of the control variables were significantly associated with the degree to which correct rejections of deceitful contract clauses were made.

Path Model with Results Fig. 1 shows the hypotheses and the related analysis results. Each hypothesis is represented through a link, or arrow, connecting a pair of variables in the model. Links refer to variable-pair relationships, with the



*Notes: * = P<.05; ** = P<.01; *** = P<.001; NS = not statistically significant.*

Fig. 1. Path model with results.

exception of the link that refers to the various control variables. Latent variables, shown within ovals, were estimated as composite scores, which aggregate indicators.

The symbol "$*$" refers to beta coefficients whose probabilities of being due to chance were lower than 5% (P <0.05); the symbol "$**$" to P <0.01; and the symbol "$***$" to P <0.001. The symbol "NS" refers to a beta coefficient that was not statistically significant at any of these levels. The R-squared coefficient shown under the main endogenous variables is the percentage of the variance explained in that variable by the variables that point at it in the model.

Beta coefficients refer to standardized multivariate associations among variables. Let us consider, for example, the beta coefficient of 0.158 for the link going from cognitive effort to correct rejections. This means that for each standard deviation increase in perceived cognitive effort, there is a corresponding 0.158 standard deviation increase in correct rejections, after controlling for the effects of all other variables pointing at correct rejections.

Conclusions, Limitations, and Suggestions for Future Research

This section begins with a summary of the results as they relate to practice and research, including theoretical considerations. This is followed by a discussion of the study's limitations, and of suggestions for future research.

Conclusions This section summarizes the results of our study with respect to implications for practice, and implications for research and theory. The implications for practice revolve around the lack of overall effect of the medium on the correct rejections of deceitful contract clauses. The implications for research and theory revolve around the different expectations based on the Media Richness and Media Naturalness theories, centered on the notion of compensatory adaptation.

Implications for Practice: The results suggest that using a more natural communication medium, in the form of video clips, is unlikely to improve the performance of software buyers in terms of correct rejections of deceitful contract clauses. In fact, such a practice may even decrease their performance. This may be the case even though the more natural communication medium is likely to be associated with decreased perceived cognitive effort and communication ambiguity. This is a counterintuitive finding—buyers may be annoyed at the mental effort required to read contract clauses, but that effort may pay off in terms of making the right decisions regarding whether to accept or reject clauses. Rendering the experience easier and more pleasant, through the use of a more natural medium, does not necessarily lead to better results.

Implications for Research and Theory: The results support Media Naturalness theory, particularly the theory's compensatory adaptation notion. When compensatory effects are controlled for, viewing contract clauses as video clips had no effect on the degree to which correct rejections of deceitful contract clauses were made compared to viewing

the clauses as text only, contradicting expectations based on Media Richness theory. And the reason for this lack of effect seems to have been primarily rooted in compensatory effects mediated by an increase in cognitive effort. The effect in connection with communication ambiguity was much weaker. That is, the effects of communication media naturalness were fully mediated by compensatory adaptation, which, in turn, seemed to depend more strongly on cognitive effort than on communication ambiguity.

It could be argued that the results of this study are also consistent with Media Synchronicity theory [56]. Media Synchronicity theory differentiates between conveyance and convergence processes. According to this theory, a written communication medium may lead to more effective outcomes in conveyance processes. And it could be argued that determining deceit is a conveyance process.

Even though our study does not specifically address learning outcomes, it is interesting to note that its results are consistent with past research suggesting that communication media typically lead to no significant differences in learning outcomes [57]–[60]. This perspective can be summarized by Clark's [58, p. 21] decisive statement that: "*Media will never influence learning*".

This perspective is also supported by the results of a study by Kock et al. [61, p. 333] who found, as we do here, that the lack of significant differences in learning via online and face-to-face media are due to compensatory adaptation to the less natural medium, leading initially negative perceptions and outcomes to vanish by the end of a full semester: "*At the middle of the semester, students in the online condition perceived communication ambiguity as significantly higher, and also obtained significantly lower grades, than students in the face-to-face condition. At the end of the semester, no significant differences were found.*"

Limitations The use of an experiment with students to draw conclusions about a task carried out by software purchasing professionals may be seen as a limitation of this study. While the use of experiments with students is a common practice [36], [51], one concern may be that the students could have performed the task less mindfully than practitioners would [51]. This concern was mitigated to a certain extent by the positive validity (convergent and discriminant) and reliability test results, which generally suggest that the student participants answered the questions mindfully [62] and, thus, probably performed the task mindfully as well.

Suggestions for Future Research Almost any study leads to findings that point to the need for future research, as no single research study can provide enough evidence to completely prove that a theoretical model is correct [63], [64]. This study is no exception. As noted before in our discussion of limitations, researchers aiming at replicating this study in the future should consider employing software purchasing professionals as participants. Since this may limit the sample available, studies could be conducted primarily through the collection of qualitative data, focusing on the work of a small number of professionals. A carefully conducted interpretive analysis of this qualitative data could then lead to the identification of other factors that likely influence the main dependent variable in this study, correct rejection of deceitful clauses, both complementing this study and providing the basis for another quantitative study with a more complex model. Another dimension that could be explored in future research refers to the use of "plain" language versus legal jargon (a.k.a. "legalese").

APPENDIX A

CONTRACT CLAUSES

Clause 1—Not deceitful These Terms and Conditions apply in preference to and supersede any Terms and Conditions referred to, offered or relied on by the Vendor at any stage in the dealings between the Buyer and the Vendor with reference to the Software and/or Services to which this Agreement relates other than those terms and conditions required efficacy of purchasing are explicitly referenced below. Without prejudice to the generality of the aforementioned, the Buyer will not be bound by any Standard or Printed Terms referred to, or furnished by the Vendor in any of its documents, or its websites whether or not connected with electronic order processing, unless the Vendor specifically states in writing, separately from such Terms, that such Terms are required

to apply, and the parties accept such Terms by including reference to them in an Entire Agreement document covering the Order/Agreement.

Clause 2—Not Deceitful "Buyer" is defined as the individual or organization or any wholly owned or associated subsidiary thereof so named at the address stated on the order/agreement form.

Clause 3—Not Deceitful "Vendor" is defined as the person(s), organization, firm or company to whom the Order is issued.

Clause 4—Not Deceitful "Goods and Services" is defined as all matter, articles, things, or provision of labor to carry out tasks, which are the subject of an Order Agreement, including, but not limited to, the Computer Hardware, Software, Accessories or Peripheral Equipment specified on the Order Agreement; and/or any Appendices and/or Schedules to this Agreement.

Clause 5—Not Deceitful "Order", is defined as the Buyer's authorized Order Agreement Form issued against this Agreement which details the instructions to the Vendor and which shall constitute an offer to purchase Goods and/or Services from the Vendor.

Clause 6—Not Deceitful "Contract" is defined as the instruction of the Buyer contained in the Order Agreement, any terms, or documents referred to in the Order Agreement, and these Standard Conditions accepted by the Vendor.

Clause 7—Not Deceitful "Agreement" is defined as per the Vendor of the Software to which these Standard Conditions refer.

Clause 8—Deceitful "Delivery" is defined as the delivery including off loading and setting at the Buyer's specific address as shown on the Order Agreement of the Goods and/or the provisions of the Services supplied in accordance with this Agreement, and "Delivered" shall be construed accordingly. For the sake of clarification, "Delivery" shall imply Acceptance of the Goods and/or Services.

Clause 9—Deceitful "Implementation" shall mean the installation of the Goods onto the site and into the operating environment specified by the Vendor and certified as acceptable for the installation of the Goods by the Vendor. Where the goods supplied in accordance with this Agreement comprises, or includes Computer Software, implementation shall not include the loading of the operating system software and any other specified application(s) to be supplied under this Agreement.

Clause 10—Deceitful "Completion Date" is defined as the date specified by the Vendor, in the schedule to this Agreement, or whatever date the Vendor deems appropriate, or whenever the Vendor decides when the work can be completed regardless of time limits.

Clause 11—Not Deceitful "Amend" is defined as any variation to the Agreement confined by an Authorized Order Agreement Form carrying the words "Order Agreement Amendment Number…" and/or by the issue of an instruction to vary the Agreement.

Clause 12—Not Deceitful "Authorized" is defined as the signature of the person(s) that is either named or whose status is shown on the Order Agreement Form, and/or on the Entire Agreement signature sheet forming part of this Agreement, or such person as is authorized in Accordance with the agreement.

Clause 13—Not Deceitful "Fixed Price" is defined as meaning that neither variation of price nor reconciliation of costs is permitted.

Clause 14—Deceitful The Buyer shall be liable for any Order, Amendment, letter of intent, or instructions to proceed with orders.

Clause 15—Deceitful With prejudice to these Standard Terms and Conditions, the Buyer agrees to be bound by such terms and conditions as are reasonably required by the Vendor to ensure that appropriately authorized representatives of the Buyer conduct the purchase.

Clause 16—Deceitful In the circumstances specified in this Clause (and in no other circumstances), the Buyer shall not be entitled at its sole and absolute discretion to either; cancel an Order issued against this Agreement forthwith. Nor if the Vendor fails to deliver Goods and/or Services in accordance with the terms of the Order; nor if the Vendor fails to make progress with the Order; nor if the Vendor becomes bankrupt or insolvent, or has a receiving order made against it, or compounds with its creditors; nor if the Vendor is subject to a take-over by or merger with another company. In the event the Buyer elects to cancel an Order for any foregoing reasons the Buyer shall be liable for any unfulfilled commitment.

Clause 17—Not Deceitful The Vendor shall fully indemnify the Buyer against all actions, claims,

demands, proceedings, damages, costs, charges and expenses arising from or incurred by reason of any of the Goods and/or any product which is a tangible output of the Services supplied by the Vendor under the Agreement.

Clause 18—Not Deceitful If at any time any allegation of infringement of any patent, registered design or copyright is made in respect to the Goods and/or Services or in the Vendor's reasonable opinion is likely to be made, the Vendor may, at their own expense, modify or replace the Goods and/or Service or any portion(s) thereof, without detracting from the overall performance of the Goods and/or any product which is a tangible out of the Services, the vendor making good to the Buyer any loss of use during modification or replacement, so as to avoid the infringement.

Clause 19—Not Deceitful The Vendor shall be responsible for providing in accordance with the Agreement, all software and associated documentation.

Clause 20—Not Deceitful The Vendor shall ensure, and undertake to ensure, that the Goods maintain the standard of performance previously specified in documents issued by the Vendor in connection with the Goods.

APPENDIX B

MEASUREMENT INSTRUMENT

The questions below were answered on a Likert-type scale ranging from "1—Very strongly disagree" to "7—Very strongly agree".

Cognitive Effort (CE)

CE1: Accepting or rejecting clauses has required a great deal of mental and perceptual activity (e.g., thinking, deciding, calculating, remembering, looking, searching, etc.).
CE2: Accepting or rejecting clauses has been a demanding and complex task.
CE3: Accepting or rejecting clauses has entailed a lot of time pressure due to the pace at which the task progressed.

Communication ambiguity (AMB)

AMB1: The communication of facts and knowledge about the contract has often been ambiguous.
AMB2: The communication of facts and knowledge about the contract has often been vague and confusing.
AMB3: I have often been unclear as to what was meant.

Additional questions referring to the items below were not answered on Likert-type scales.

- Gender: Male/Female options were provided.
- Age.
- Grade point average (GPA).
- Years of work experience.
- Student Status: Freshmen/Sophomore/Junior/Senior/Graduate options were provided.

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