A meta-analysis and an experiment investigating the effects of speaker disfluency on
persuasion

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Abstract

A meta-analysis of the speech disfluency literature suggested that the relationship between speaker disfluencies and competence judgments may be mediated. The theory of elaborative resistance production (TERP; Turner & Banas, 2007) was then applied to the effects of disfluencies on speaker persuasiveness. An experiment was conducted such that 240 undergraduate students watched a short video in which a speaker was either high or low reward and produced 0, 1, or 2 verbal disfluencies. Evidence was found consistent with a causal chain running from speaker disfluency to attitude-defensive cognitions, then to ratings of speaker credibility, and then to message acceptance.

Key Words: Cognition, Credibility, Nonverbal, Persuasion, Meta-analysis

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A Meta-Analysis and an Experiment Investigating the Effects of Speaker Disfluency on Persuasion

The impact of speaker disfluency on speaker persuasiveness has long been of interest to Communication scholars who initially found that speaker fluency was related to how competent the audience thought the speaker was (Miller & Hewgill, 1963; McCroskey & Mehrley, 1969; Sereno & Hawkins, 1967). More recent investigations have found that speaker fluency is an important variable in understanding contexts such as legal settings (Barge, Schlueter, & Pritchard, 1989), doctor-patient relationships (Duggan & Bradshaw, 2008; Zick, Granieri, & Makoul, 2007), power in romantic relationships (Dunbar & Burgoon, 2005), televised news reports (Engstrom, 1994), and deception detection (Anolli & Ciceri, 1997). Burgoon, Birk, and Pfau (1990) investigated a wide variety of nonverbal behaviors and found that of the nonverbal behaviors investigated, speaker fluency had the strongest effect on speaker competence and speaker persuasiveness. Even though a variety of studies have been conducted examining speaker disfluency, none have attempted to investigate the cognitive mediators between the fluency of the speaker and the audience's responses to those disfluencies.

This investigation will first report the results of a meta-analysis examining the strength of the relationship between the speaker's fluency and the audience's competence ratings of the speaker and the relationship between the speaker's fluency and the degree to which the audience is persuaded by the speaker. Then, the results of an experiment will be reported that was designed to test the application of a new cognitive response model called the theory of elaborative resistance production (TERP) to understanding the impacts of a speaker's disfluency on speaker persuasiveness. This experiment used the

TERP to offer original explanations for both the traditional simple credibility model (Miller & Hewgill, 1963) and a non-verbal expectancy violation theory (NEVT; Burgoon, Stacks, & Burch, 1982) explanation for the effects of speaker disfluencies (verbal stumbles) on speaker persuasiveness.

TERP

Counterarguing has long been considered an important variable in persuasion research (Festinger & Maccoby, 1964; McGuire, 1968). According to these authors, the extent to which the audience is able to produce counterarguments is the key predictor of the audience's ability to resist persuasion. If the target of a persuasive attempt can think of reasons to reject the speaker's message, they will be less likely to accept that message.

Existing measures of counterarguing have been criticized for failing to recognize the complexity of counterarguing by focusing only on cognitions that provide direct refutation to message arguments (Buller, 1986; Miller & Baron, 1973). With this criticism in mind, Turner and Banas (2007) developed an alternative theory of counterarguing that highlights the variety of resistant cognitions and makes predictions about both when these types of cognitions will occur and what their effects will be. Their theory is called the theory of elaborative resistance production (TERP).

The TERP is used to examine the content of the audience's resistant cognitions as reported in thought-listing exercises (Turner & Banas, 2007). Years of cognitive response research in persuasion has demonstrated the validity of thought-listing as a measure of cognition during the persuasive process (Greenwald, 1968; Wegener & Carlston, 2005). The TERP departs from previous thought-listing models, however, by specifying a new

coding system and deriving propositions and hypotheses related to the different types of resistant cognitions they identified.

The first type of resistant cognition Turner and Banas (2007) identified was message-relevant responses. This type of resistant cognition includes counterarguing (the audience thinking of reasons why the message is incorrect), attitude bolstering (the audience noting discrepancies between their reasons for holding their existing attitude and the arguments in the message), and efficacy assessments (considering reasons why the course outlined in the message will fail to produce positive outcomes). The authors argued that these cognitive responses were classed together because they are all cognitively effortful. These cognitions were predicted to be produced by subjects who were both motivated and able to resist the message recommendations by processing deeply.

The second type of resistant cognition that Turner and Banas (2007) described was attitude-defensive responses. These cognitions are generated when the audience is both unmotivated and/ or unable to process the message carefully but are still trying to resist the message. These cognitions include attacking source elements or the audience recalling that their friends reject the speaker's position. Turner and Banas noted that the hallmark of this type of resistant cognitions was the failure to identify actual flaws in the message arguments.

The third type of resistant cognition that Turner and Banas (2007) identified was affective responses. These cognitive responses are merely the expression of negative emotion directed at the message. These include thoughts about how angry or sad the message made the audience. Turner and Banas claimed that reactance is a process that

would produce affective responses. These types of cognitions were also predicted to occur only when the audience is not processing the message carefully but feel motivated to resist the message.

The TERP explained that in general, there are three types of resistant cognitions. Message-relevant responses were predicted to occur when the audience was processing carefully and are focused on the content of the speaker's message. Attitude-defensive responses were predicted to occur when the audience merely rejects the speaker's claims without cognitively elaborating on the specifics of the message. Affective responses are the expression of negative emotion against the speaker and were predicted to occur when the audience was not elaborating the message content extensively. Although the TERP produced hypotheses concerning a variety of persuasive phenomena, its hypotheses concerning source credibility will be examined here.

Credibility Model

The TERP can be applied to offer some insight into the mechanisms of the simple credibility model of the effects of speaker disfluencies on persuasion. Traditionally, the credibility model suggests that the more disfluencies (audible stumbles) a speaker produces during her or his speech, the less credible she or he will appear to the audience and the less persuasive the speaker will be (Miller & Hewgill, 1963). Subsequent research has found data consistent with this position (Burgoon, et al., 1990; Engstrom, 1994; McCroskey & Mehrley, 1969). This research suggests a simple causal string such that a speaker's disfluency causes a decrease in the audience's ratings of their competence, which causes the audience to reject the speaker's message.

The TERP can be applied to speaker disfluencies to offer a more complete model. The TERP specifies that cognitions that resist the message by attacking source credibility rather than the message content would be considered attitude-defensive cognitions (Turner & Banas, 2007). Their model suggests that before the audience concludes that a source is low in credibility, they produce attitude-defensive cognitions. A TERP model of credibility again starts with the extent of the speaker's disfluency, which then positively affects the amount of attitude-defensive cognitions. Increased attitude-defensive cognitions then cause the audience to lower their overall perception of the speaker's competence and that in turn lowers the speaker's persuasiveness (see Figure 1). Although previous credibility research in this area has only focused on credibility ratings, the TERP can extend that research by arguing that ratings of credibility are mediated by the type of cognitions that precede those ratings.

Nonverbal Expectancy Violation Theory

Although applying the TERP to the credibility model could explain how speaker disfluency would affect attitude-defensive responses, an application of a model derived from nonverbal expectancy violation theory (NEVT; Burgoon, Stacks, & Burch, 1982) may provide an alternative explanation of the effect of disfluency on the types of cognitions identified by the TERP. NEVT is a complex model of interpersonal interaction that seeks to predict how people react to nonverbal violations of their expectations when interacting with others (Burgoon & Hale, 1988). In an early application of NEVT, Stacks and Burgoon (1981) argued that violations of nonverbal expectations were distracting to the receiver of a message. They used NEVT to predict that these distracting violations

would be interpreted based on the receiver's perception of the person who performed the distracting nonverbal behavior.

Stacks and Burgoon (1981) predicted that the speaker's reward value might shape the audience's perception of the speaker when the speaker violated nonverbal expectations. According to their work, reward level is indicated by the degree to which the audience expects that interpersonal interaction with the speaker would be enjoyable. High reward value people were predicted to be high-status and attractive. Low reward value people were predicted to be low status and unattractive. Stacks and Burgoon claimed that if the distracting speaker was perceived by the audience as possessing a high reward value, the distraction would increase the speaker's persuasiveness. If the distracting speaker was of low reward value, the distraction would decrease her or his persuasiveness. The authors explained that nonverbal distractions tend to focus the audience on the speaker rather than the message because the audience tries to interpret the ambiguous nonverbal behavior. Once they are focused on the speaker, the message will become less important and they will base their decision on their perceptions of the speaker's reward level. Burgoon, et al. (1982) explained that counterarguing mediates the proposed relationship between nonverbal distractors and persuasion. They predicted that focusing on positive reward violators of expectancies reduces counterarguing while focusing on negative reward violators increases counterarguing. Counterarguing increases were hypothesized to reduce the persuasiveness of the speaker.

Burgoon et al. (1982) predicted that counterarguing that focuses on the message (the TERP's message-relevant responses) and counterarguing that focuses on the speaker (the TERP's attitude-defensive responses) would both be affected by these processes.

Their analysis suggests that the effects of speaker disfluencies on both of these types of resistant cognitions are moderated by the speaker reward value. Specifically, when the speaker is of high reward value, the speaker's nonverbal disfluencies were predicted to decrease both message-relevant responses and attitude-defensive responses. Decreases in both of these were predicted to be positively related to persuasion. On the other hand, when the speaker is of low reward value, speaker stumbling was predicted to be associated with increases in both types of resistant cognitions, which would negatively affect the persuasiveness of the message.

Previous research on this model has found mixed support (Burgoon, et al., 1982; Stacks & Burgoon 1981) using a proximity violation distraction such that the speaker moved closer to the subjects. Stacks and Burgoon's induction checks of the distraction cue detected only mild distraction from the distance violation. A stronger distracting violation like speaker disfluency may produce the predicted NEVT effects. Also, previous research did not measure the counterarguing mediator. This study tested this application of NEVT to speaker disfluency by coding for resistant cognitions to test the proposed moderated and mediated relationship between speaker disfluency and speaker persuasiveness.

Overview of the Current Research

In order to determine the accuracy of the literature suggesting that disfluencies have a stronger effect on competence judgments than persuasion, meta-analyses of the relationship between disfluencies and competence judgments and the relationship between disfluencies and message acceptance were conducted.

Based on the results of the meta-analysis, the experimental study proceeded by presenting the subjects with a video of a speaker who stumbled zero, one, or two times during a brief persuasive message. Speaker reward was induced by the speaker introducing herself using a traditional NEVT speaker reward induction. Thought-listing, competence, message acceptance, and compliance with the speaker's request were measured to test the main hypotheses.

Specifically, the credibility model based on the TERP predicted that speaker disfluency would be positively related to attitude-defensive responses, which would reduce speaker competence ratings, and would then reduce the speaker's persuasiveness. The NEVT model predicted that speaker disfluency would interact with speaker reward level such that speaker disfluencies increased attitude-defensive responses and message-relevant responses when the speaker was low reward and the opposite when the speaker was high reward. Both types of resistant cognitions were predicted to be negatively related to the speaker's persuasiveness. The credibility model predicted that the increase in resistant cognitions' effect on persuasiveness would be mediated by perceptions of speaker expertise whereas the NEVT-based model predicted that resistant cognitions would have direct effects on persuasiveness.

Meta-Analysis

Method

Literature Search. PsycInfo and Communication and Mass Media complete were both searched using the terms "disfluency," "nonfluency," and the plural forms of those terms. The references sections of the obtained articles were combed for additional studies.

Study Selection. To be included in the meta-analysis of the relationship between speaker disfluency and competence ratings studies were required to both examine the relationship between speaker disfluency and speaker competence ratings and contain enough information to derive an effect size estimate. Six studies meeting these criteria were found with a combined sample size of $N = 733$. Three studies were found that both examined the relationship between speaker disfluency and the audience's post message attitudes and reported sufficient information to calculate an estimate of the effect of disfluencies on persuasiveness. Their combined sample size was $N = 264$. The Barge et al. (1989) study of disfluencies in the courtroom by lawyers did not measure attitudes, but given that it measured the guilt of the person the speaker was defending, it was included.

Coding. In order to derive an accurate meta-analytic estimate, several pieces of information were coded from each study. The sample size, an estimate of the reliability of the measures, and the information required to calculate an effect size estimate were recorded from each study. When a range of amounts of disfluency were tested in an individual study, the effect size estimate was based on the largest amount of speaker disfluency compared to none at all.

Data Analysis. Hunter & Schmidt's (2004) variance centered meta-analysis method was used to calculate estimates of the correlations. For the estimate of the relationship between disfluency and competence ratings, only Burgoon et al. (1990) reported an estimate of the reliability of the competence measure ($\alpha = .93$). The estimate from that study was used to correct all of the correlations between disfluency and competence ratings for attenuation due to measurement error. Burgoon et al. was also the only study to report a reliability estimate for the persuasion measure. Correction using

this estimate was not performed because the measure of persuasion was nearly perfectly reliable ($\alpha = .98$) and therefore correction for attenuation based on this estimate would have only trivially impacted the overall effect size and sampling error estimates. The correlation coefficient was not transformed to Fisher's z because simulation studies have shown that the transformation tends to reduce accuracy more than the small bias produced by the untransformed correlation coefficient (Schulze, 2007).

Results

An estimate of the population correlation between speaker disfluency and speaker competence ratings was calculated first. The weighted mean effect size was $r = -.39$ with an 80% credibility interval of $-.62 < \rho < -.16$. This finding indicates that as speakers produced more disfluencies, they were judged to be substantially less competent. The credibility interval indicates that there are moderators of this effect size that might reduce the effect of speaker disfluency on competence, but none are likely to reverse the direction of the effect.

An estimate of the population correlation between speaker disfluency and the audience's acceptance of the speaker's message was calculated next. The weighted mean effect size was $r = -.17$. This estimate is consistent with the prediction that the direct effect of disfluency on persuasiveness is negative, but small. A credibility interval was not calculated because the variance expected from sampling error alone exceeded the obtained variance. This finding is consistent with a fixed effects or homogeneous estimate of the effect size.

Discussion

As predicted by the simple credibility model, the relationship between disfluency and competence was moderate in size such that more disfluency had a consistently negative impact on competence ratings. The moderate size of the relationship suggests the possibility that an additional mediator between speaker disfluency and ratings of speaker competence exists. The small relationship between disfluency and persuasiveness suggests this relationship is also mediated. The experiment reported next is an attempt to determine if cognitive responses mediate those relationships.

The finding that the effect of disfluencies on persuasion is consistently negative is consistent with the credibility model prediction that disfluency always produces negative effects. This homogenous finding of a small negative effect is inconsistent with the NEVT prediction that the effects of disfluency on message acceptance are moderated by initial speaker reward level and might be reversed if the speaker is of high enough reward level. On the other hand, it is possible that none of the studies included used a speaker with a high enough reward level to obtain the effects predicted by the application of NEVT to disfluency. The study reported next will attempt to test that possibility.

Experimental Study

Method

Participants. The participants were 240 students (108 females, 132 males) from a large Midwestern University taking introductory and advanced Communication courses. Their ages ranged from 18 to 24 with a mean of 19.44. Ten participants indicated on the though-listing measure that they could not hear the video. Their scores were dropped from all analysis.

Procedures. Participants logged on to an online data collection website that displayed the stimulus materials and allowed them to indicate their responses on the measures. The first page of the survey asked participants their age and gender. The following page presented the cover story stating that a nearby community college was offering a night course on public speaking in which the students had been videotaped introducing themselves and offering a short message. The participants were then informed that they would be randomly assigned to one of many videos after which they would answer some questions. Then website then randomly assigned them to watch one of 6 videos in a 2 (high versus low reward speaker) X 3 (number of speaker disfluencies: 0, 1, or 2) factorial design. The dependent measures followed the video. These included measures of thought listing, credibility, message acceptance, and compliance with the speaker's request. They were thanked and debriefed at the end.

Materials. A video-taped message was used in order to keep the precise level of disfluency constant within each condition. Reward level was induced by the speaker beginning her message by stating her name followed by the high reward induction or the low reward induction (See Appendix A for the reward induction scripts). Stacks and Burgoon (1981) found that a respected academic major produced high reward but they felt that their low reward induction (undecided major) was not low enough. This study used a similar high reward induction as Stacks and Burgoon's such that the speaker claimed to be a law student. This study also used a new low reward induction by specifying that the low reward speaker wrote parking tickets on campus. This induction was predicted to produce enough antipathy toward the speaker for her to have been perceived as low reward. The speaker was also dressed professionally and carefully

groomed in the high reward condition and shabbily in the low reward condition. The grooming induction was thought to add to the strength of the induction by including attractiveness elements that are thought to alter the reward level of the speaker (Burgoon et al., 1982). These types of reward inductions are typical of NEVT studies.

The speaker in the video explained that she cared about the environment. The speaker then asked the viewer to go to a particular website to send a letter to his or her representatives in Congress stating a desire to protect the Arctic National Wildlife Refuge. The three levels of non-verbal disruption were induced by the speaker using zero, one, or two disfluencies in a fashion similar to Miller and Hewgill's (1963) vocalized pauses with repetition. (See Appendix B for the scripts.) The same speaker was used for all six conditions and was blind to the hypotheses of the experiment. Each video was about 35 seconds long.

Measures. After the video presentation, the participants were asked to list the thoughts they had while they were viewing the video. The thoughts they listed were coded by three trained coders based on the TERP model specified by Turner and Banas (2007). These include message-relevant, attitude-defensive, affective, and other thoughts (non-resistant and irrelevant thoughts). Inter-coder reliability was estimated with Ebel's Coefficient (E.C.; 1951). The reliability for each of the measures was satisfactory (message-relevant responses, $E. C. = .71$, $M = .11$, $SD = .34$; attitude-defensive responses, $E. C. = .82$, $M = 1.53$, $SD = 1.34$; affective responses $E. C. = .64$, $M = .14$, $SD = .3$)

Message acceptance was measured by asking participants to rate the organization to save the wildlife refuge that the speaker advocated on 5-point semantic differential

scales. They included items anchored at important/ unimportant, good/bad, significant/ insignificant, useful/ useless, and necessary/ unnecessary. This scale had adequate reliability $\alpha = .86$ and approximated the normal distribution ($M = 3.18$, $SD = .84$).

Speaker credibility was measured using the competence subscale of McCroskey and Teven's (1999) credibility scales. The scale was adequately reliable, $\alpha = .84$ and approximated the normal distribution ($M = 2.81$, $SD = .73$).

Compliance with the speaker's request was measured by asking the participant's if they had gone to the website the speaker asked them to go to. Ten participants claimed they had gone to the website during the study.

Results

The primary hypotheses were tested by using ANOVA to detect the presence of the predicted interactions and by using path modeling to test the predicted causal models (Hunter & Gerbing, 1982). For the path modeling tests, the parameters were estimated and examined. If they were ample, the fit of the model was assessed by comparing the predicted correlations to the obtained. If the estimated and obtained correlations were equal or nearly equal, the data are consistent with the hypothesis of model fit ($r_{12} * r_{23} = r_{13}$). All correlations were corrected for unreliability (r') before model testing (see Table 2 for the corrected and uncorrected correlation matrix).

Unfortunately, there was a floor effect for compliance such that 2 or less participants complied with the request to go to the website in each condition. Given that there was little variance in this dependent variable, no analyses were performed on the compliance measure for any of the hypotheses.

Credibility Model. The credibility model predicted that speaker disfluency would increase attitude-defensive responses. Attitude-defensive responses would then lower perceptions of speaker competence, which would then lower the speaker's persuasiveness. Figure 2 shows the proposed model with the path coefficients. The path between the number of disfluencies and the number of attitude-defensive responses is modest, but it's confidence interval does not include the null, $r' = .22$, $P(.09 < \rho < .36) = .95$. The path between attitude-defensive responses and competence ratings was ample, $r' = -.49$, $P(-.63 < \rho < -.37) = .95$ as was the path between competence ratings and message acceptance, $r' = .52$, $P(.41 < \rho < .65) = .95$. The model as a whole was consistent with the data, $RMSE = .01$, $\chi^2(3, N = 230) = .11$, $p = .99$. The data were consistent with the credibility model predictions.

NEVT Model. The EVT model proposed that speaker disfluency would violate expectations. The audience would then focus on the speaker and if the speaker was highly rewarding, the relationship between the number of verbal disfluencies and resistant cognitive responses would be negative whereas if the speaker was not rewarding it would be positive. An interaction between speaker reward level and the number of disfluencies on resistant cognitive responses would be consistent with this model.

In order to test these predictions, 2 (speaker reward: high vs. low) X 3 (number of stumbles: 0, 1, or 3) factorial ANOVAs were conducted with each of the TERP measures as the dependent measure. With message-relevant responses as the dependent variable, the interaction between reward level of the speaker and the number of disfluencies was substantial and statistically significant $F(2, 224) = 3.02$, $p = .05$, $\eta^2 = .03$ (See Table 3 for the means and standard deviations). Neither of the main effects was substantial or

statistically significant. Examination of the means shows that the data were consistent with the predictions of the NEVT model such that increasing disfluencies were associated with less message-relevant responses when the speaker was high reward and were associated with more when the speaker was low reward.

Application of the NEVT perspective to disfluency resulted in a proposed causal model such that disfluencies cause a change in the amount of message-relevant resistant cognitions, which then negatively affect the persuasiveness of the message. This model was tested next. When the participants viewed the high reward speaker, the number of disfluencies was negatively correlated with the number of message-relevant cognitions they produced, $r' = -.20$, $P(-.41 < \rho < .02) = .95$ (see Table 4 for the correlation matrix of all continuous variables for the participants who heard the high reward speaker). This finding was consistent with the NEVT hypothesis that increases in disfluencies would decrease message-relevant responses for high reward communicators. For the high reward communicator condition, the relationship between message-relevant responses and message acceptance was negative and ample as expected, $r' = -.33$, $P(-.55 < \rho < -.1) = .95$. However, the predicted correlation between disfluency and message acceptance ($r = .06$) was discrepant from the obtained ($r = -.11$) producing an unacceptably large error of .17. Although the negative correlation with message-relevant responses was consistent with the NEVT predictions, the failure of message-relevant responses to mediate the relationship between speaker disfluencies and message acceptance was inconsistent with the model. Although increased disfluencies were associated with a reduction in the amount of message-relevant resistant cognitions, the overall effect of disfluency on message acceptance was still negative.

The proposed causal model for the low reward communicator condition predicted that disfluencies would increase message-relevant cognitions, which would be negatively related to the audience's message acceptance. The correlation between disfluencies and message-relevant was insubstantial, but in the predicted direction, $r' = .15$, $P(-.37 < \rho < .06) = .95$ (see Table 5 for the correlation matrix of all continuous variables for the participants who heard the low reward speaker). Given the small size of the correlation and because the confidence interval included zero, the proposed model was not tested due to the paths being too weak.

Next, the effect of speaker reward and disfluencies on attitude-defensive responses was tested. Only the main effect for the number of disfluencies was statistically significant, $F(2, 222) = 4.98$, $p = .008$, $\eta^2 = .04$ (See Table 6 for means and standard deviations). Examination of the means shows that the more the speaker produced disfluencies, the more attitude-defensive responses the participants produced. This finding was inconsistent with the NEVT model because reward level did not interact with the number of disfluencies to predict message acceptance.

Affective Resistant Cognitions. Although the affective responses of the participants were not proposed to be a mediator in either model, the effects of the inductions on these responses were tested with a 2 (speaker reward: high vs. low) X 3 (number of disfluencies: 0, 1, or 3) factorial ANOVA. Only the effect of the reward induction produced a statistically significant, though modest sized effect, $F(1, 224) = 11.60$, $p = .001$, $r' = .28$ such that the participants who heard a high reward communicator produced slightly more resistant affective responses ($M = .2$, $SD = .33$) than those who heard the low reward communicator ($M = .07$, $SD = .25$).

Discussion

The data were consistent with the credibility model. Speaker disfluencies increased attitude-defensive cognitions, which decreased perceptions of speaker competence. Decreases in perceptions of speaker competence were then associated with decreases in the speaker's persuasiveness. This study was the first to demonstrate that attitude-defensive cognitions mediate the relationship between speaker disfluencies and credibility judgments. This finding was consistent with the TERP (Turner & Banas, 2007) prediction that reductions in credibility will be the result of low elaboration processes. When the audience used the number of stumbles the speaker made to make their judgment, it was the result of shallow processing rather than deep processing of the message arguments. Future work on credibility judgments need to examine the resistant cognitions that precede such judgments to replicate the TERP predictions.

The NEVT (Burgoon et al., 1982) model received mixed support. For participants who heard the high reward speaker the relationship between disfluencies and message-relevant resistant cognitions was negative and for the participants who heard a low reward speaker the relationship was positive. These findings were consistent with the NEVT model. This study was the first in the disfluency literature to find that the speaker's high reward level caused the audience to produce less negative thoughts about her message when she produced more disfluencies. This finding was consistent with the NEVT prediction that the nonverbal distraction focused the audience on the speaker and reduced their resistant cognitions to her message. In general, this finding also demonstrates the utility of the NEVT to understanding nonverbal processes in persuasion

because no other model would have predicted an occasion where speaker disfluency would *reduce* the number of negative cognitions concerning the speaker's message.

On the other hand, the decrease in message-relevant cognitions in the high reward condition did not prevent speaker disfluencies from being negatively associated with message acceptance overall, which is inconsistent with the NEVT model's predictions. The TERP (Turner and Banas, 2007) may be able to explain this discrepancy. According to the TERP, the audience in this sample was not processing deeply because the average number of attitude-defensive responses was four and a half times larger than the average number of message-relevant responses. In such a situation the TERP predicts that the primary predictor of persuasion would be the attitude-defensive resistant cognitions. If the audience had been processing more deeply, the increase in disfluencies from the high reward speaker would be predicted to increase the speaker's persuasiveness. Turner and Banas argued that using a highly involving topic might make message-relevant cognitions more frequent and a stronger predictor of attitude change. Future work should examine this possibility.

Conclusion

The meta-analysis suggested that disfluency has a consistently negative impact on speaker credibility and a weaker, possibly more distal negative impact on persuasiveness. Overall, when an experiment was conducted to determine if TERP coding of resistant cognitions could model these relationships, the credibility model received the best support. The data were consistent with a model such that reductions in credibility caused by speaker disfluencies were mediated by attitude-defensive cognitions. Yet, some of the findings suggest that further research on NEVT models of disfluency and other nonverbal

distraction cues may shed light on these processes due to the unique finding that message-relevant resistant cognitions were reduced when a high-reward speaker was more disfluent. Regardless of the model of persuasion employed, the TERP was able to provide unique insights and warrants further usage in understanding persuasive processes.

Both the meta-analysis and the empirical study found small effects for overall the impact of speaker disfluency on persuasiveness. Despite research suggesting that disfluency may have the strongest impact of any of the nonverbal cues a speaker produces (Burgoon et al., 1990), it may still be overshadowed by message elements. For example, Park, Levine, Kingsley Westerman, Orfgen, and Foregger (2007) found that the average effect of an argument strength induction is $r = .34$. This effect is larger than the meta-analytic estimate of the impact of disfluency on persuasion ($r = -.17$) and the even smaller effect obtained in the empirical study ($r = -.07$). It may be that audience does not consider disfluency to be a particularly relevant cue to the validity of the speaker's arguments. Perhaps audiences negatively react to the disfluency, as evidenced by the thought-listing, but still consider that information to be less relevant than message arguments to the judgment task.

The original study and the meta-analysis showed some areas of discordance. Specifically, the meta-analysis found that the relationship between disfluency and speaker ratings of competence was $r = -.39$ and the relationship found in the empirical study was $r = -.10$. It is possible that the body of studies in the meta-analysis found larger effects because most of those studies used stronger disfluency inductions than the current study. The strongest Miller and Hewgill (1963) induction had 100 disfluencies in a seven

minute speech. The strongest induction in the current study had two disfluencies in a 35 second speech. It is possible that the relationship between speaker disfluency and attitude-defensive cognitions as well as competence ratings would also be stronger if the number of disfluencies were greater. This question awaits future research.

The meta-analysis was unable to test the path model derived from the simple credibility model such that disfluency causes a decrease in competence ratings, which lowers message acceptance. The meta-analysis produced estimates of the relationship between disfluency and competence as well as the relationship between disfluency and persuasiveness. It did not estimate the relationship between competence and message acceptance because none of the studies in the meta-analysis reported that relationship. The estimate of the relationship between competence and message acceptance from the empirical study was $r' = .52$. If that estimate is combined with the meta-analysis estimates, the simple credibility model can be tested¹. The data are consistent with that model as the obtained correlations between disfluency and message acceptance ($r' = -.17$) differs trivially from the model's predicted correlation ($r = -.20$). This finding suggests that the simple credibility model fits well across a variety of contexts. The relationships obtained in the current empirical investigation between disfluency and the other variables may be attenuated by the weaker induction.

Limitations

This research was limited in several ways. First, the meta-analysis contained a small number of studies. Despite the ubiquity of the belief that disfluency reduces persuasiveness, this belief has rarely been subjected to an empirical test. More research is

needed before public speaking teachers can confidently tell their students that empirical research has conclusively demonstrated that disfluency should always be avoided.

Furthermore, the original study reported here had several limitations. First, the choice to show the participants videos did allow increased control over the stimulus such that each participant saw the disfluency in the same way within each condition. On the other hand, the NEVT was originally meant to explain face-to-face interactions (Burgoon & Hale, 1988) and a stronger test of that model's predictions would require a face-to-face interaction. Future research would profit from exploring this possibility by bringing participants into the lab and asking them interact with a well-trained confederate who could deliver the message the same way each time.

Future Research

The finding that disfluency is related to a decrease in message-relevant cognitions in the high reward speaker condition requires further replication. It was a surprising finding given the meta-analytic finding that disfluency has only negative effects on credibility and persuasiveness. If there are occasions in which disfluency has a positive effect on persuasiveness, it would be beneficial to the field of public speaking pedagogy to be able to specify those conditions. Further research might use friends of the participants as rewarding speakers and determine if disfluency causes a decrease in message-relevant cognitions under those conditions.

Conclusion

The primary finding of this research is that disfluency causes an increase in attitude-defensive cognitions, which reduces credibility, which reduces persuasiveness. The great Roman orator Cicero (55 BCE/ 1970) long ago noted that "Delivery, I say, has

the sole and supreme power in oratory; without it, a speaker of the highest mental capacity can be held in no esteem; while one of moderate abilities, with this qualification, may surpass even those of the highest talent.” (p. 255). Although his observation has been passed down through the centuries, this study has expanded upon his observation by specifying the exact cognitive mechanisms by which the fluidity of the speaker may impact the mind of the audience.

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Footnote

¹ Thanks to an anonymous reviewer for suggesting this analysis.

Appendix A

Reward induction

High reward

Hello my name is Jane, I'm a law student at Michigan State.

Low reward

Hello my name is Jane, I dropped out of MSU and now I work on campus giving parking tickets.

Appendix B

*Disfluency Induction**Zero Verbal Stumbles*

I care about the environment. Congress is considering legislation that would protect the Arctic National Wildlife Refuge from destruction. Please stop and go right now to www.savearcticrefuge.org, that's www.savearcticrefuge.org and click the box that says "Take Action Now" to email your representatives in Congress about this important issue. Please help protect our important natural resources. The more people who help, the better.

One Verbal Stumble

I care about the environment. Congress is considering legislation that would protect the Arctic National Wildlife Refuge from destruction. Please stop and go right now to www.savearcticrefuge.org, that's www.savearcticrefuge.org and click the box that says "Take Action Now" to email your representatives in Congress about this important issue. Please help pro-uh protect our important natural resources. The more people who help, the better.

Two Verbal Stumbles

I care about the environment. Congress is considering legislation that would protect the Arctic National Wildlife Refuge from destruction. Please stop and go right now to www.savearcticrefuge.org, that's www.savearcticrefuge.org and click the box that says "Take Action Now" to email your representatives in Congress about this important issue. Please help pro-uh protect our im-uh important natural resources. The more people who help, the better.

Table 1

Effect Size Estimates and Sample Sizes Used in the Meta-analyses

Article	N	Effect of Disfluency on Competence	Effect of Disfluency on Persuasiveness
Barge et al. (1989)	144	0.24	0.18
Burgoon et al (1990)	60	0.26	0.24
Engstrom (1994)	53	0.68	
McCroskey & Merhley (1969)	352	0.29	
Miller & Hewgill (1964)	64	0.63	
Sereno & Hawkins (1967)	60	0.81	0.08

Table 2

Correlation Matrix of Continuous Variables

	1	2	3	4	5	6
1. # of Stumbles		-0.05	0.20	-0.08	-0.09	-0.07
2. Message-relevant	-0.06		-0.06	0.12	-0.03	-0.19
3. Attitude-defensive	0.22	-0.08		0.21	-0.41	-0.20
4. Affective	-0.11	0.18	0.29		-0.04	-0.24
5. Competence	-0.10	-0.04	-0.49	-0.05		0.45
6. Message Acceptance	-0.07	-0.25	-0.23	-0.32	0.52	

Note: Correlations above the diagonal are the raw correlations while correlations below the diagonal are corrected for unreliability.

Table 3

Means and Standard Deviations of Message-Relevant Responses

Number of Stumbles	Speaker Reward Level	
	Low	High
2	.12 (.24)	.06 (.24)
1	.13 (.32)	.11 (.54)
0	.04 (.16)	.24 (.4)

Note: Standard Deviations are in parentheses

Table 4

Correlation Matrix of Continuous Variables (High Reward Condition)

	1	2	3	4	5	6
1. # of Stumbles		-0.17	0.32	-0.13	-0.16	-0.10
2. Message-relevant	-0.20		-0.10	0.04	-0.11	-0.26
3. Attitude-defensive	0.35	-0.13		0.21	-0.46	-0.30
4. Affective	-0.17	0.06	0.28		-0.08	-0.23
5. Competence	-0.18	-0.14	-0.55	-0.11		0.38
6. Message Acceptance	-0.11	-0.33	-0.35	-0.31	0.45	

Note: Correlations above the diagonal are the raw correlations while correlations below the diagonal are corrected for unreliability.

Table 5

Correlation Matrix of Continuous Variables (Low Reward Condition)

	1	2	3	4	5	6
1. # of Stumbles		0.13	0.09	-0.04	-0.03	-0.03
2. Message-relevant	0.15		-0.02	0.27	0.07	-0.10
3. Attitude-defensive	0.10	-0.03		0.23	-0.37	-0.09
4. Affective	-0.05	0.40	0.32		-0.06	-0.26
5. Competence	-0.03	0.09	-0.45	-0.08		0.53
6. Message Acceptance	-0.03	-0.13	-0.11	-0.35	0.62	

Table 6

Means and Standard Deviations of Attitude-Defensive Responses

Number of Stumbles	Speaker Reward Level	
	Low	High
2	1.56 (1.51)	2.1 (1.46)
1	1.72 (1.43)	1.41 (1.15)
0	1.26 (1.03)	1.07 (1.17)

Note: Standard Deviations are in parentheses

Figure Caption

Figure 1. Proposed credibility model.

Figure 2. Proposed Credibility model with path coefficients.