



Acoustic Correlates of Speaker Confidence: Can They Tell I Don't Know?

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Background

- Regulating one's emotional states can be quite a daunting and effortful task^(7 & 8)
- Social interaction requires emotion regulation
- Research shows failure to emotionally regulate has a number of negative consequences^(3, 4, 5, & 6)
- Regulating is even harder when the cognitive system is loaded with external demands (e.g., stress, unpreparedness) -- potential result: lack of confidence^(7 & 8)
- What is the effect of lack of confidence on the production of language during emotion regulation?

Hypothesis

- Even when speakers struggle with confidence, they are likely very good at hiding it, and the listener won't know (larger mismatch in confidence prediction between talker and listener)

Method

Participants: 32 Kent State University student volunteers

dv = x coordinate (pixels) along the x axis of the confidence rating scale.

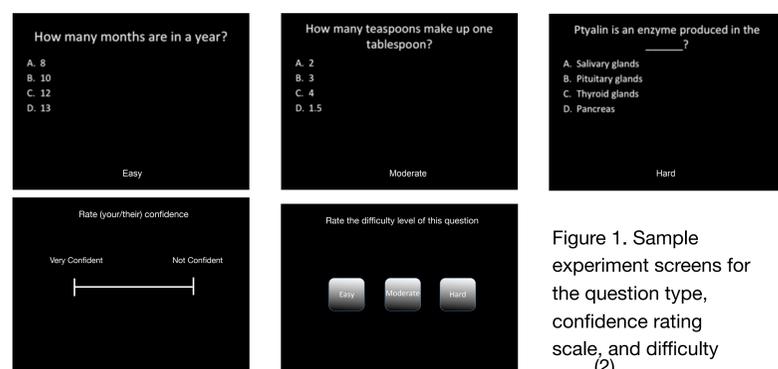
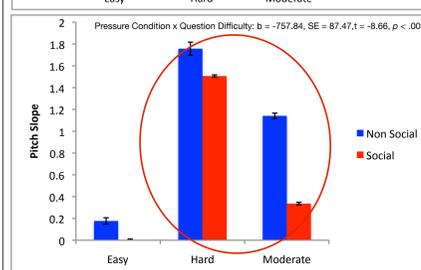
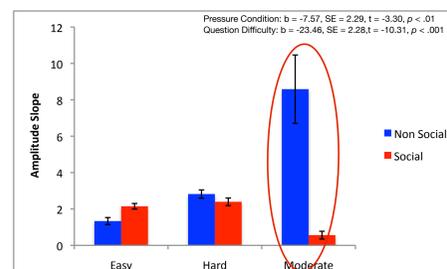
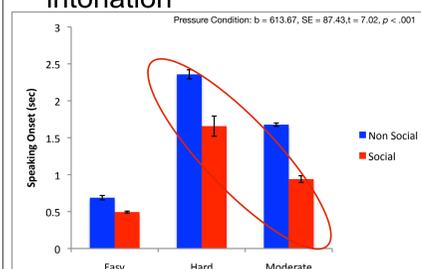


Figure 1. Sample experiment screens for the question type, confidence rating scale, and difficulty level.⁽²⁾

Production Study

- N = 18 (17 females; mean age = 23.89)
- Between Subjects Condition:** Social Pressure vs. No Social Pressure
- Acoustic Measures (12 of 85 questions):** pitch, amplitude, total duration, speech onset, speech duration, intensity slope, rising¹⁾ intonation



Figure(s) 2-4. Mean acoustic correlate as a factor of Talker Condition (Social vs No Social Pressure) by Perceived Question Difficulty

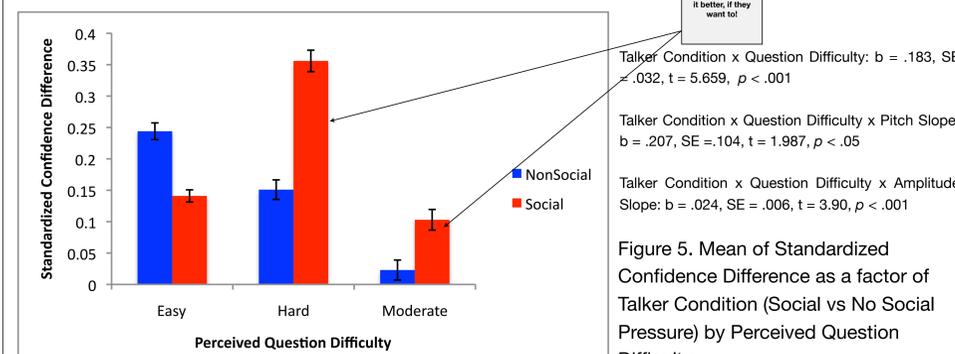
Mixed Fixed/Random Effects Regression
Talker Confidence ~ Pressure Condition * Perceived Difficulty * Acoustics + (Talker as random intercept)

Comprehension Study

- N = 14 (11 females; mean age = 21.5)
- Between Subjects Condition:** Question vs. No Question
- 12 questions x 13 Talkers** (156 trials per participant; 5 Talkers excluded due to experimenter error)
- Standardized Confidence Difference:** Listener x-value - Talker x-value / Mean x-value per question

Mixed Fixed/Random Effects Regression

Standardized Confidence Difference ~ Talker Condition x Listener Condition x Question Difficulty x Speech Onset x Amplitude Slope x Pitch Slope + (Listener as random intercept)



Talker Condition x Question Difficulty: $b = .183, SE = .032, t = 5.659, p < .001$
Talker Condition x Question Difficulty x Pitch Slope: $b = .207, SE = .104, t = 1.987, p < .05$
Talker Condition x Question Difficulty x Amplitude Slope: $b = .024, SE = .006, t = 3.90, p < .001$

Figure 5. Mean of Standardized Confidence Difference as a factor of Talker Condition (Social vs No Social Pressure) by Perceived Question Difficulty

Results & Discussion

Production Study

- Talkers use systematic changes in acoustics to indicated levels of confidence.

Comprehension Study

- Of all the acoustics tested, amplitude slope and pitch slope were the strongest, significant predictors of confidence prediction between and within talker statements
- Listeners were less able to predict the confidence of a talker, if she was placed under a social pressure
- However, this was more true for harder questions than moderate questions

Conclusion

- Talkers are sensitive to social pressures when attempting to hide their confidence, but under some circumstances talkers will provide differentiating acoustic cues to their confidence
- So does the listener know?
 - Only if the talker wants them to

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