

# Lexical, Phrase, and Contrastive Stress: Similarities and Differences

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## BACKGROUND

- Prosodic stress serves many functions:
  - It can be used to distinguish between lexical items
    - e.g., the verb “in**S**ERT” and the noun “**I**Nsert”
- Different types of phrases
  - e.g., the noun “**greenhouse**” and the adjective-noun “**green house**”
- Contrastively to respond to a previous utterance
  - e.g., “Do you want the pumpkin pie? No, I want the **APPLE** pie”
- Previous research has explored lexical, phrase and contrastive stress [1-3]
- However, little work has investigated the extent to which they are related to one another

## METHODS

**Participants:** Sixty-eight native English-speaking undergraduate students (48 female, 20 male)

### Procedure:

- Online Profiling Elements of Prosody in Speech Communication (O-PEPS-C), an online adaptation of the in-person clinical PEPS-C test (Peppé et al., 2003) includes tests of prosodic form and function
- Production accuracy was judged by 4 research assistants
  - Mean accuracy was used
- Tests assess comprehension and production of:
  - form*
  - affect* (like/dislike)
  - question/declarative*
  - phrase boundaries* (e.g., “chicken, fingers and fruit” vs. “chicken fingers and fruit”)
  - 3 types of *stress subtasks*:

**Lexical stress subtest:** participants listen to and produce pairs of words that differ minimally in stress (see Fig.1).

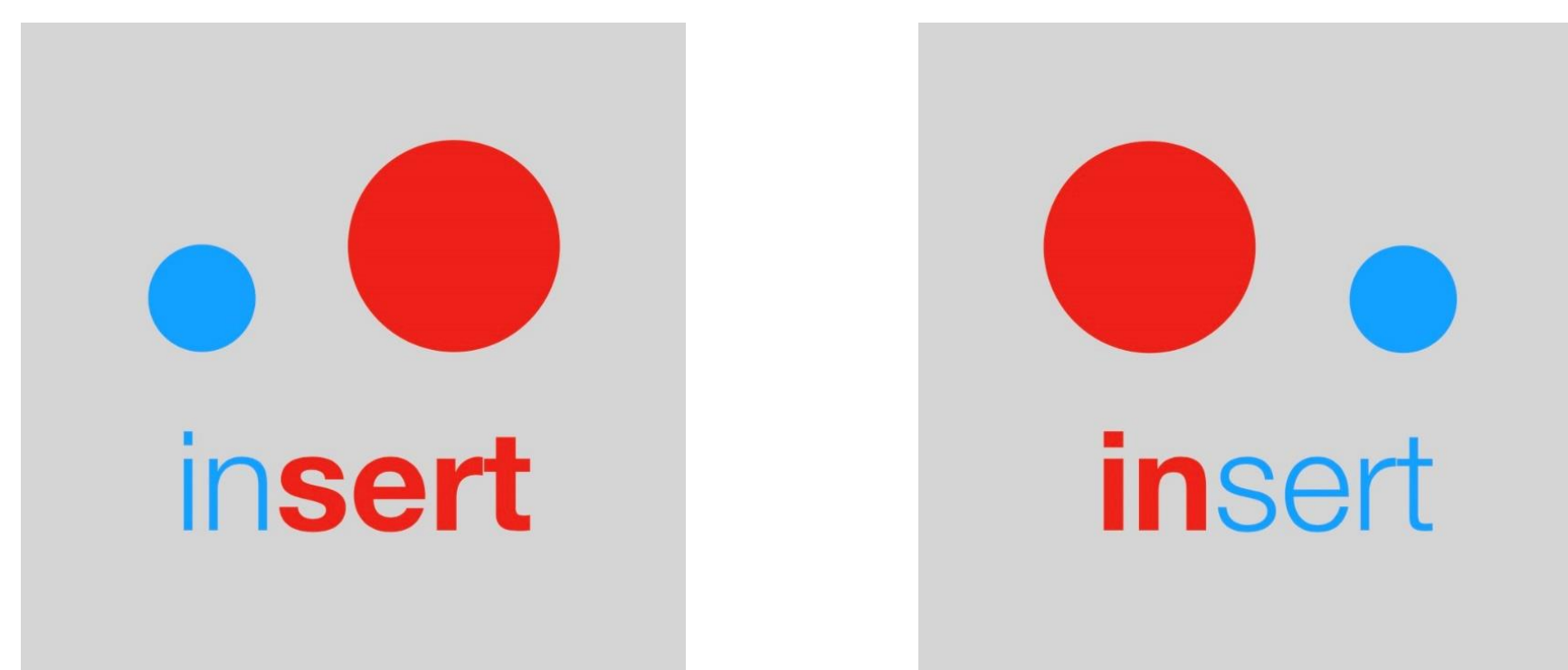


Figure 1. Example of lexical stress comprehension trial stimuli

### Phrase stress subtest:

- Participants listen to and produce minimal pairs of phrases in stress
  - e.g., “The **green house**” vs “The **greenhouse** spoils the view”

## METHODS Cont'd

### Contrastive stress subtest:

- Comprehension:**
  - Story was given for context
    - e.g., “The person on the screen bought some socks. She forgot to buy one color”
  - Participants then listened to shopper say, “I wanted **BLUE** and **black socks**” or “I wanted blue and **BLACK socks**” and indicated which color socks the shopper forgot to buy
- Production:**
  - Participants used contrastive stress to “correct” an utterance
    - e.g., they hear “the green cow has the ball,” but the computer screen displays a green sheep with a ball, they might say “**No the green SHEEP has the ball**” (See Fig. 2)

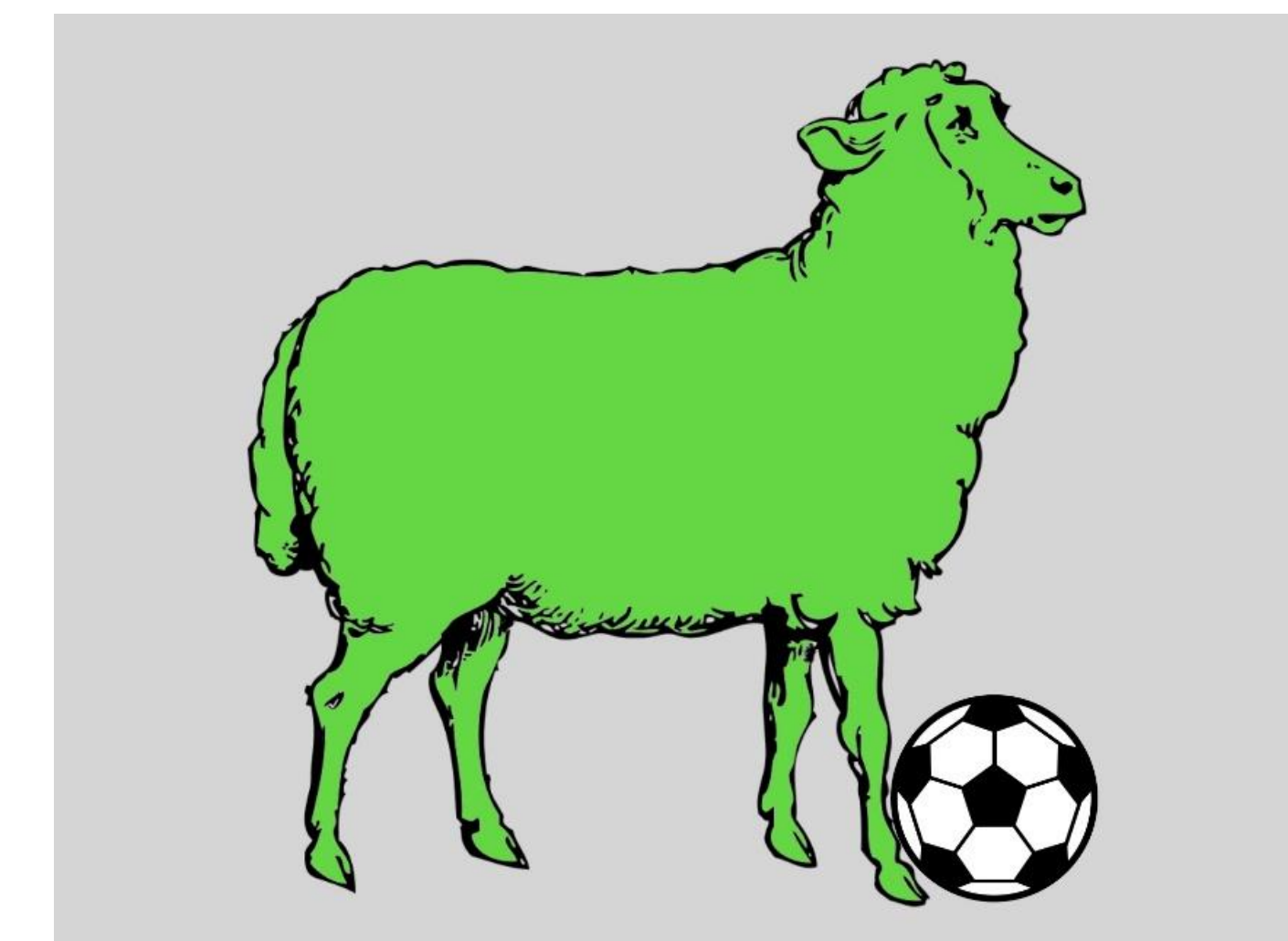


Figure 2. Example of contrastive stress production trial stimuli

## RESULTS

### Correlation of All OPEPS-C Subtests

	lexical stress production	lexical stress comprehension	contrastive stress production	contrastive stress comprehension	phrase stress production	phrase stress comprehension	boundary production	boundary comprehension	form production	form comprehension	affect production	affect comprehension	turn end production	turn end comprehension
lexical stress production		0.435***	0.292*	0.494***	0.437***	0.352**	0.437***	0.26*	0.433***	0.265*	0.233	0.004	0.267*	0.064
lexical stress comprehension	0.435***		0.056	0.479***	0.278*	0.371**	0.14	0.122	0.363**	0.22	0.074	-0.033	-0.066	0.088
contrastive stress production	0.292*	0.056		0.249*	0.306*	0.138	0.517***	0.038	0.056	-0.071	0.077	-0.032	0.274*	0.16
contrastive stress comprehension	0.494***	0.479***	0.249*		0.389***	0.411***	0.396***	0.239*	0.165	0.342**	0.099	0.143	0.277*	0.064
phrase stress production	0.437***	0.278*	0.306*	0.389***		0.38**	0.316**	0.321**	0.159	0.126	0.081	-0.029	0.081	0.07
phrase stress comprehension	0.352**	0.371**	0.138	0.411***	0.38**		0.239*	0.183	0.162	0.289*	0.236	0.184	0.156	0.057
boundary production	0.437***	0.14	0.517***	0.396***	0.316**	0.239*		0.244*	0.209	0.148	0.244*	-0.051	0.257*	0.122
boundary comprehension	0.26*	0.122	0.038	0.239*	0.321**	0.183	0.244*		0.072	0.222	0.084	0.125	0.141	0.094
form production	0.433***	0.363**	0.056	0.165	0.159	0.162	0.209	0.072		0.209	0.145	0.068	0.061	-0.073
form comprehension	0.265*	0.22	-0.071	0.342**	0.126	0.289*	0.148	0.222	0.209		0.089	0.158	-0.006	-0.077
affect production	0.233	0.074	0.077	0.099	0.081	0.236	0.244*	0.084	0.145	0.089		-0.063	0.074	-0.12
affect comprehension	0.004	-0.033	-0.032	0.143	-0.029	0.184	-0.051	0.125	0.068	0.158	-0.063		0.131	-0.034
turn end production	0.267*	-0.066	0.274*	0.277*	0.081	0.156	0.257*	0.141	0.061	-0.006	0.074	0.131		0.023
turn end comprehension	0.064	0.088	0.16	0.064	0.07	0.057	0.122	0.094	-0.073	-0.077	-0.12	-0.034	0.023	

Figure 3. The Spearman's Rho heatmap shows that the **production and comprehension scores were significantly correlated for all three stress subtasks** along with the boundary subtask. **There were no significant correlations** between the production and comprehension of **other subtasks**.

## RESULTS Cont'd

- Our results suggest that:
  - Those successful at producing prosody are better at interpreting it
  - Production/comprehension link is stronger for prosodic stress** than other uses of prosody.
    - However, correlations are **moderate at best**
      - Argues against a motor theory/analysis through synthesis model of prosody
  - People who are proficient in one type of stress tend to be proficient in the other two types of stress** (both production and comprehension)
    - However, the relationships among the different types of stress are not perfect
  - Within linguistics, **lexical stress, phrase stress and contrastive stress** are **different** from one another in terms of their:
    - acoustic realization
    - function
  - The **weak to moderate** stress correlations is consistent with these **differences in acoustic realization and linguistic function being psychologically real**

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