The Generation Mechanism of Semantic Prosody in Neologisms: Evidence for the "Double Jujube Tree" Effect

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Date: 2024-01-05T00:00:00+00:00

Abstract

A vocabulary learning experiment was conducted with native Chinese speakers as participants, manipulating both the emotional valence of the context in which novel words appeared (positive, negative, neutral) and the variability of the context (repetition, variation), to examine whether contextual emotion could transfer from the context to novel words through reading exposure and whether such transfer affects the effectiveness of novel word acquisition, thereby exploring the underlying mechanism of semantic prosody in novel words. One hundred ninety-six participants took part in the experiment, reading a total of 45 passages under different conditions of contextual emotion and contextual variability, and then rated the emotional valence of 9 novel words and participated in three different vocabulary knowledge tests. The results showed that only under conditions of repeated reading of identical materials did the emotion of the context successfully transfer to the novel words, demonstrating a clear "Two Jujube Trees" effect. Conversely, only under varied context conditions did the transfer of contextual emotion have a significant predictive effect on the learning of novel word forms and meanings, with better acquisition outcomes for both word form and meaning in more positive emotional contexts. The "Two Jujube Trees" effect effectively explains the underlying mechanism of semantic prosody in novel words and provides important implications for new word learning.

Full Text

The Mechanism of Semantic Prosody Acquisition in Novel Word Learning: The "Double-Jujube Tree" Effect

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Abstract

This study investigates the mechanism underlying the acquisition of semantic prosody in novel word learning through a vocabulary learning experiment with native Chinese speakers. By manipulating both the emotional valence of contexts (positive, negative, neutral) in which novel words appear and the variability of those contexts (repeated vs. varied), we examined whether contextual emotion can transfer to novel words through reading exposure and how this transfer affects vocabulary acquisition outcomes. One hundred ninety-six participants read 45 passages under different combinations of contextual emotion and variability conditions, then completed emotional valence ratings for nine novel words and three vocabulary knowledge tests. Results revealed a clear "Double-Jujube Tree" effect: contextual emotion successfully transferred to novel words only under repeated-context conditions. Conversely, the impact of contextual emotion on word form and meaning acquisition was significant only in varied-context conditions, with more positive emotional contexts yielding better learning outcomes. These findings elucidate the mechanism of semantic prosody acquisition in novel words and offer important implications for vocabulary instruction.

Keywords: context emotionality, semantic prosody, vocabulary, context variability
Classification Number: B842

1.1 Semantic Prosody

Lu Xun begins his essay "Autumn Night" with the famous lines: "In the backyard of my house, I can see two trees beyond the wall. One is a jujube tree, and the other is also a jujube tree." This "double jujube tree" expression has generated extensive scholarly discussion, focusing on why Lu Xun chose this seemingly redundant phrasing rather than simply stating there were two jujube trees.

Academic interpretations suggest that this repetitive expression creates a contextual atmosphere of "dryness, monotony, loneliness, and melancholy" [**?**], and psycholinguistic research indicates that such contextual emotion can transfer to words within that context. Although "jujube tree" itself carries neutral denotative meaning, the "dry, monotonous, lonely, and melancholic" emotional atmosphere created through this repetitive expression transfers to the word, imbuing it with an emotional dimension independent of its literal meaning. We term this transfer of contextual emotion through repetitive linguistic expression the "Double-Jujube Tree" effect.

Numerous studies have demonstrated that words absorb emotional polarity from their natural linguistic contexts, which eventually stabilizes as part of the word's meaning. Consider the English word *utterly*. Its denotative meaning in the

Merriam-Webster dictionary is "to the full extent," with neutral emotional valence [**?**]. However, the word frequently collocates with negative adverbs or verbs, as illustrated in example (1):

(1) Nicholson also vividly portrays Jake's expanding conscience, which the movie utterly demolishes.

As shown in (1), *utterly* regularly appears with negative verbs and adjectives such as "demolish," "ridiculous," "dependent," and "alone," thereby "absorbing" a negative emotional connotation. This negative dimension, independent of its denotative meaning, constitutes the word's semantic prosody [**?**, **?**].

Corpus linguist John Sinclair first observed semantic prosody—the phenomenon where seemingly neutral words carry positive or negative emotional connotations through frequent collocations [**?**]. Since then, the concept has attracted widespread attention, evolving through three theoretical perspectives: "semantic contagion," "connotative meaning," and "functional" views [**?**]. The contagion perspective posits that semantic prosody represents "a consistent aura of meaning with which a form is imbued by its collocates" [**?**, **?**], extending Firth's [**?**] notion of "collocation" to emphasize meaning transmission across word boundaries. The connotative meaning view frames semantic prosody as "the spread of connotative coloring beyond individual word boundaries" [**?**, **?**], transforming traditionally elusive connotations into tangible, observable collocation patterns. The functional perspective, meanwhile, treats semantic prosody as meaning "located on the pragmatic side of the semantic-pragmatic continuum," conveying speaker attitudes and pragmatic functions [**?**]. Crucially, Sinclair incorporated semantic prosody into his model of extended units of meaning, repositioning it not as a sporadic or special linguistic phenomenon but as an essential attribute of the pervasive multi-word units in language.

Despite these conceptual developments, all perspectives emphasize semantic prosody's independence from denotative meaning—as an emotional dimension that words "absorb" from context. Semantic prosody plays a vital role in discourse communication, as this "spread of connotative coloring beyond individual word boundaries" conveys speakers' attitudes and judgments in everyday interaction [**?**]. Consider the Chinese character *lao* (old). It predominantly collocates with positive terms like *laozhe* (elder), *laoren* (old person), *laoxiong* (old brother), and *Lao Wu* (Old Wu), thereby acquiring a positive semantic prosody in Chinese discourse, despite occasional negative collocations (e.g., *lao dongxi*, "old thing"). Addressing an elderly person with "Lao renjia, let me help you with your luggage" or "Lao renjia, please have a seat" feels natural in Chinese. However, the equivalent expression in English-speaking contexts ("Old man, let me help you with your luggage") would cause serious offense, as *old* carries a negative semantic prosody implying "uselessness in old age." Consequently, English speakers typically use *senior citizens* to refer to older adults.

While corpus linguists have extensively studied semantic prosody based on linguistic phenomena [**?**], experimental evidence regarding its acquisition

mechanism and psychological reality remains scarce. Few researchers have explored these questions experimentally, despite theoretical emphasis on semantic prosody's independence from denotative meaning.

1.2 Emotion and Language Learning

The interaction between emotion and language learning has become a hot topic in psychology, psycholinguistics, and cognitive psychology, generating substantial scholarly discussion [**?**, **?**, **?**]. Previous research demonstrates that emotional knowledge is crucial for word learning, recognition, long-term memory, and categorization, influencing abstract concept acquisition. For instance, studies show that abstract concepts with stronger emotional connotations are acquired earlier and more easily by children, as concepts are learned through language rather than sensorimotor experience [**?**].

Recent research has extensively examined the relationship between emotion and lexical processing, consistently finding that emotion significantly affects cognitive processes underlying word recognition, recall, and memory [**?**, **?**, **?**]. Regarding word recognition, Xu et al. [**?**] investigated recognition of Chinese emotional stimuli under semantic and positional encoding conditions, finding better recognition for emotional than neutral stimuli in both conditions. Majerus and D'Argembeau [**?**] used a serial recall task to demonstrate that word emotional valence affects short-term memory, with emotional words recalled significantly better than neutral words. They attributed this to emotional words providing greater semantic relatedness, richer semantic processing strategies, and more concrete representations.

Numerous studies have also found that negatively valenced stimuli trigger "negative responses," manifested in longer reaction times and lower accuracy [**?**]. For example, Kanazawa [**?**] asked participants to evaluate the emotional valence of 390 words before testing their acquisition, finding significantly lower recall accuracy for negative than positive words. Snefjella et al. [**?**] explained this phenomenon using automatic vigilance theory, proposing that negative emotional words express concepts, events, or targets related to survival threats (e.g., epidemics, rifles, tigers), thereby consuming more attentional resources and causing longer reaction times.

These theories and empirical studies provide important perspectives on vocabulary learning mechanisms, yet they overlook the acquisition of semantic prosody—the second semantic component. As discussed above, word meaning encodes not only denotative meaning but also contextual emotional features (semantic prosody). However, how people acquire the emotional connotations engendered by semantic prosody remains unknown. Can contextual emotional information transfer to a word after reading exposure? Or does semantic prosody acquisition require extensive cumulative contact and use? Embodied cognition theory [**?**] may provide an explanatory mechanism for contextual emotion transfer. According to this theory, each time a word appears, the reader's experienced

emotional and bodily states are encoded as aspects of the word's meaning [**?**, **?**]. Moreover, when encountering a word, readers activate not only its literal meaning but also recall its associated emotional and bodily states [**?**]. Embodied theory suggests that if a novel word appears in contexts where numerous words express the same emotional or semantic polarity, and this emotion reaches sufficient intensity, the word will be learned in that specific emotional state regardless of its denotative meaning, with the emotional connotation encoded as part of its meaning.

This embodied hypothesis is supported by research on emotional and concrete/abstract word acquisition and relates to recent work on "affective experience"—a tool developed to study how words elicit emotional states. Research shows that affective experience facilitates recognition and categorization of words, especially abstract ones [**?**]. However, empirical studies examining whether contextual emotion transfers after reading exposure remain rare. A recent exemplary study by Snefjella et al. [**?**] conducted five vocabulary learning experiments with native English speakers to test this question. Across five experiments, they manipulated three contextual emotions using materials like example (2):

(2) a. Some friends were planting flowers in the garden.
They used a (NONWORD) to dig a hole.

b. Some people were working on the outer grounds.
They used a (NONWORD) to dig a hole.

c. Some murderers needed to dispose of a body.
They used a (NONWORD) to dig a hole.

In (2), the target nonwords share neutral denotative meaning (a digging tool), but each context carries different emotional valence: positive, neutral, and negative. Participants encountered each target word five times within the same emotional context. Since the words themselves were semantically neutral, any differences in post-reading emotional judgments could only stem from contextual transfer. In the first two experiments, Snefjella et al. recorded eye movements and reading times to examine the relationship between noticing and vocabulary acquisition, but small sample sizes limited statistical power, yielding inconclusive results. The remaining three experiments shared the same research questions and objectives, with materials modified based on previous results to more clearly demonstrate the three-way emotional manipulation.

Post-experiment vocabulary tests overall confirmed that contextual emotion can transfer to semantically neutral words through reading exposure, significantly affecting acquisition outcomes—specifically, more positive emotions produced more accurate and durable learning.

However, not all five experiments yielded consistent results; two failed to support contextual emotion transfer. Snefjella et al. attributed these null findings

to insufficient emotional distinction in those experiments' materials. We propose an alternative explanation: these experiments overlooked another critical variable in vocabulary acquisition research—context variability itself.

1.3 Context Variability: Multiple Texts vs Multiple Readings

Context variability, also termed the "multiple texts vs multiple readings" question [**?**], concerns which approach better facilitates incidental vocabulary acquisition through reading: encountering a target word in multiple different texts or repeatedly reading the same text containing the target word. This issue has attracted considerable attention. Bolger et al. [**?**] proposed the Context Variability Hypothesis, arguing that multiple texts better promote vocabulary learning because they allow core semantic features to emerge. Their two experiments confirmed this hypothesis, showing that reading four different sentences containing the same target word (multiple texts) produced better learning than reading one sentence four times (multiple readings). However, other researchers found that the "multiple texts vs multiple readings" question depends on material difficulty and participants' reading comprehension ability [**?**]. For instance, when reading more challenging materials or when participants have lower comprehension ability, multiple readings prove more effective than multiple texts.

Snefjella et al. [**?**] examined only multiple texts, having participants encounter target words in five different discourse contexts. While this may facilitate acquisition of denotative meaning, it may not be optimal for acquiring contextual emotion (semantic prosody). Extensive research shows that humans prefer to experience familiar emotions [**?**, **?**]. By analogy, in vocabulary learning within emotional contexts, "multiple readings" may better transform contextual emotion into familiar emotional information encoded in the mental lexicon, making contextual emotion manipulation more salient during emotional judgment tests. Indeed, Snefjella et al. speculated that their two null-result experiments may have provided too much information, causing participants to focus on linguistic processing at the expense of emotional information requiring familiarity. This represents an important unanswered question warranting experimental verification.

Therefore, this study tested native Chinese speakers, manipulating both contextual emotionality (positive, negative, neutral) and context variability (multiple texts vs multiple readings) to examine contextual emotion transfer and test the psychological reality and acquisition mechanism of semantic prosody. We addressed two research questions:

(1) Can contextual emotion transfer to words through reading exposure, enabling readers to acquire semantic prosody? If so, is this transfer affected by context variability?

(2) Does acquired semantic prosody affect word form and meaning acquisition? If so, is this effect modulated by context variability?

Based on the reviewed theories and findings, we propose two hypotheses:

(1) Contextual emotion can transfer to words through reading exposure, enabling semantic prosody acquisition, but this transfer is affected by context variability.

(2) Acquired semantic prosody significantly affects word form and meaning acquisition, but this effect is modulated by context variability.

2.1 Participants

Two hundred seven high school students from a key middle school in Jiangxi participated in the experiment. Eleven participants were excluded due to inconsistent personal information or failure to complete all tests due to technical issues, yielding a final sample of 196 participants (90 males, 106 females) aged 15-17 years. We selected high school rather than university students because this study examined native language vocabulary acquisition, and high schoolers remain in a critical stage of language development warranting close attention. Additionally, research indicates younger learners are more emotionally sensitive [**?**].

We conducted post-hoc power analysis using the mixedpower() function from the mixedpower package in RStudio [**?**]. Results indicated that with our sample of 196 participants, we had over 92% power to detect main effects or interactions of context variability and contextual emotion at $\alpha = 0.05$, using effect sizes from our fitted models reported below.

2.2.1 Reading Materials

The study tested learning of nine novel words, each appearing in three short passages with different emotional contexts (positive, neutral, negative), as shown in example (3):

(3) a. The overjoyed little squirrel climbed onto the beautiful flowers. It grabbed some (NOVEL WORD) to build its nest.

b. The gray-brown little squirrel climbed onto the sprouting tree. It grabbed some (NOVEL WORD) to build its nest.

c. The extremely annoying little squirrel climbed onto the poisonous shrub. It grabbed some (NOVEL WORD) to build its nest.

The contexts ensured readers could accurately infer each novel word's denotative meaning. All nine novel words were nouns corresponding to common broad semantic categories (e.g., "a type of food," "a musical instrument," "a boat"). For instance, example (3) represents a plant that squirrels use for nest-building.

Each passage consisted of two sentences. The first described a scenario, manipulating contextual emotion through emotionally charged adjectives ("overjoyed," "beautiful," "extremely annoying") and collocations. All materials were generated using Snefjella et al.'s [**?**, **?**] template:

Determiner (semantically unrelated negative/neutral/positive adjective) + (semantically related neutral noun) + (semantically related verb) + determiner + (semantically related negative/neutral/positive adjective) + (semantically related noun).

Each novel word appeared in five triplets like (3), yielding 135 short passages (9 words × 5 triplets × 3 emotions). "Semantically related/unrelated" referred to whether a word's meaning was associated with the novel word in the passage. The first sentence varied across triplets, constructing discourse scenarios through emotionally charged adjectives (beautiful, calm, terrifying) and collocations to manipulate contextual emotion. The second sentence was identical within each triplet. By balancing each novel word's contextual emotion (3 levels) and denotative meaning (9 categories), we created nine material sets, ensuring each novel word appeared in every emotional context and expressed every denotative meaning, but within each set, each novel word appeared in only one emotional context expressing one denotative meaning.

Sixty students from the same population who did not participate in the main experiment rated the emotional valence of these passages on a 1-9 scale (1 = sad, 9 = happy). Ratings supported our three-way emotion classification: negative contexts M = 2.39 (SD = 1.47), neutral contexts M = 4.91 (SD = 1.73), and positive contexts M = 6.93 (SD = 2.02). A mixed-effects model with emotional context as predictor and passage and participant as random factors showed a significant main effect of emotional context ($p < 0.001$). Post-hoc tests revealed significant differences between all three contexts (ps < 0.001): positive > neutral > negative.

This study employed a 2 × 3 mixed design. The first factor, context variability, was a between-subjects factor: repeated context versus varied context. In the repeated context condition, the same passages were presented five times; in the varied context condition, five different passages were used. The second factor, contextual emotion (positive vs. neutral vs. negative), was a within-subjects factor, yielding 18 material sets.

2.2.2 Target Words

As described above, nine novel words served as target vocabulary. We selected nine three-character Chinese words that are obscure transliterations from Arabic: 三盛齐, 单马灵, 佛罗安, 兰无里, 苏吉丹, 胡茶辣, 麻啰华, 忽厮离, 卑钵罗. The same 60 students who rated passages were asked to identify these nine words among 18 items (nine fillers) and provide meanings. None recognized these words or provided correct meanings, confirming their novelty.

When embedded in the 135 reading passages, these nine pseudo-words expressed neutral, broad semantic categories of concrete nouns. We selected concrete nouns because previous research found concrete words show stronger sensitivity in valence rating tasks than abstract words, making experimental effects easier to detect [**?**].

2.2.3 Vocabulary Tests

We designed four vocabulary tests: word valence rating, orthographic choice, definition generation, and definition matching. The valence rating task addressed Research Question 1—whether contextual emotion transfers to words after reading exposure. The other three tasks addressed Research Question 2—whether contextual emotion affects word acquisition outcomes.

The valence rating task required participants to rate 18 words on a 9-point Likert scale (1 = sad, 9 = happy) based on their psychological feeling. Nine were target words; nine were fillers (excluded from analysis). The orthographic choice task measured word form knowledge, presenting 18 Chinese words and asking participants whether they had seen each during reading. Nine were targets; nine were orthographically similar fillers (excluded from analysis).

The definition generation task, most commonly used in vocabulary acquisition research, required participants to provide definitions, explanations, or synonyms for 18 Chinese words, testing semantic memory. Nine were targets; nine were fillers. The definition matching task required participants to match 18 Chinese words with 18 definitions. Nine definitions corresponded to target words' denotative meanings; nine came from random words in the reading materials. Fillers were excluded from analysis. Definition generation is considered more difficult and challenging than definition matching because it requires semantic retrieval, assessing more advanced semantic knowledge.

2.3 Procedure

The experiment was conducted in the school computer lab in groups of 10, with participants spaced three seats apart to prevent interference. Participants were randomly assigned to either repeated or varied context conditions. We used the open-source software PsychoPy [**?**] to present reading materials one sentence at a time. At the start of each trial, a string of # symbols appeared at the screen center and disappeared when participants pressed a key. Participants then pressed the spacebar to reveal each subsequent sentence. Unlike traditional moving-window paradigms, previous sentences remained on screen, allowing participants to view complete passages, which facilitates vocabulary acquisition.

Participants were instructed to read at their natural pace without time limits. Half the passages were followed by comprehension questions, though participants were not informed which ones, ensuring they read for understanding while

maintaining attention. Critically, we explicitly instructed participants to attend to unfamiliar words and infer their meanings from context, as vocabulary tests would follow. Thus, this was an intentional rather than incidental vocabulary learning experiment.

Immediately after reading, participants completed vocabulary tests in this order: orthographic choice, valence rating, definition generation, and definition matching. Mean completion time for reading and all tests was 34.84 minutes (SD = 5.23).

2.4 Data Analysis

We conducted statistical analyses using R [**?**]. The significance level for rejecting null hypotheses was set at $\alpha = 0.05$, with exact p-values reported. Results are presented according to the two research questions. For Research Question 1, the dependent variable was valence ratings (integers 1-9), so we fitted Poisson regression mixed-effects models using the glmer() function from the lme4 package [**?**].

For Research Question 2, dependent variables were performance on the three vocabulary tests (orthographic choice, definition generation, definition matching). We coded answers as correct or incorrect, creating binary variables. Therefore, we used logistic regression mixed-effects models via glmer() from lme4.

3.1 Research Question 1

[Figure 1: see original paper] displays mean valence ratings for learned words across three emotional contexts (negative vs. neutral vs. positive) under two context variability conditions (repeated vs. varied).

The fitted Poisson regression mixed-effects model included two fixed-effect predictors: context variability (repeated vs. varied) and contextual emotion (negative vs. neutral vs. positive). Random effects included participants, test materials, and words' denotative meanings. Following the "keep it maximal" principle [**?**], we ensured random effects structures always included random slopes and intercepts for both participants and test materials for fixed factors. If fitting failed, we simplified the random effects structure while maintaining explanatory power. The final fitted model appears in Appendix 1. We used the mixed() function from the afex package to obtain main effects and interactions, and the emmeans() function for post-hoc tests.

Model results confirmed the significant interaction between context variability and contextual emotion shown in [Figure 1: see original paper] ($^2(2) = 7.65$, p = 0.02), indicating that the effect of contextual emotion depends on context variability level. Post-hoc tests revealed that in the repeated context condition, valence ratings for words in positive contexts were significantly higher than in neutral ($\beta = 0.05$, SE = 0.02, z = 3.37, p = 0.002) and negative contexts ($\beta = 0.06$, SE = 0.02, z = 3.89, p = 0.0003), but neutral and negative contexts did

not differ significantly ($\beta = 0.008$, SE = 0.02, z = 0.52, p = 0.86). In the varied context condition, no significant differences emerged among emotional contexts (ps > 0.20). These results demonstrate that contextual emotion transfer occurs only under repeated-context conditions.

3.2 Research Question 2

The logistic regression mixed-effects model also included two predictors: context variability (repeated vs. varied) and contextual emotion (negative vs. neutral vs. positive). To quantify the effect of contextual emotion manipulation, we could treat emotion as a categorical variable (as in Research Question 1) or as a continuous variable using participants' valence ratings from Research Question 1, which more directly reflects how our manipulation affected semantic prosody acquisition [**?**]. We adopted this continuous variable, termed contextual valence, after standardization to facilitate model fitting and interpretation. Random effects structures matched Research Question 1: participants, test materials, and denotative meanings. Model fitting procedures were identical; final models appear in Appendix 1. Results are reported separately for each test.

3.2.1 Orthographic Choice Task

The orthographic choice task tested word form learning by asking participants to identify previously seen words among orthographically similar items. Overall accuracy was high. Model results showed significant main effects of context variability ($^2(1) = 3.69$, p = 0.05) and contextual valence ($^2(1) = 167.51$, p $<$ 0.001), and a significant interaction ($^2(1) = 27.49$, p < 0.001). [Figure 2: see original paper] clearly illustrates this interaction.

[Figure 2: see original paper] shows that overall accuracy increased with contextual valence—words learned in more positive emotional contexts were identified more accurately. However, accuracy in the varied context consistently exceeded that in the repeated context ($\beta = 0.76$, SE = 0.15, z = 5.04, p < 0.001), with the gap narrowing only at very high valence levels.

3.2.2 Definition Generation Task

Model results showed no main effect of context variability ($^2(1) = 1.02$, p = 0.31) but a significant main effect of contextual valence ($^2(1) = 11.93$, p $<$ 0.001) and a significant interaction ($^2(1) = 11.32$, p < 0.001). [Figure 3: see original paper] clearly displays this interaction.

[Figure 3: see original paper] reveals that in the varied context, definition generation accuracy increased significantly with contextual valence—participants showed better semantic memory for words they perceived as more emotionally positive ($\beta = 0.27$, SE = 0.08, z = 3.40, p < 0.001). In contrast, in the repeated context, definition generation accuracy remained virtually unchanged and was unaffected by contextual valence ($\beta = 0.004$, SE = 0.05, z = 0.08, p = 0.94).

3.2.3 Definition Matching Task

The definition matching task tested semantic recognition. Model results showed no main effect of context variability ($^2(1) = 2.38$, $p = 0.12$) but a significant main effect of contextual valence ($^2(1) = 78.54$, $p < 0.001$). No significant interaction emerged ($^2(1) = 0.21$, $p = 0.65$), indicating that contextual valence effects were independent of context variability.

[Figure 4: see original paper] shows that definition matching accuracy increased with contextual valence in both variability conditions—participants were more accurate in recognizing meanings of words they perceived as more emotionally positive ($\beta = 0.34$, SE = 0.04, $z = 8.10$, $p < 0.001$).

4 Discussion

By manipulating contextual emotionality and context variability, this study examined two questions: (1) Can contextual emotion transfer to words through reading exposure, enabling semantic prosody acquisition? If so, is this transfer affected by context variability? (2) Does acquired semantic prosody affect word form and meaning acquisition? If so, is this effect modulated by context variability?

First, the significant interaction between context variability and contextual emotion indicates that contextual emotion transfer depends on context variability. We found that in repeated contexts, novel words in positive emotional contexts received significantly higher valence ratings than those in neutral or negative contexts. However, in varied contexts, no significant differences emerged among emotional contexts. Since the novel words (all nouns) expressed neutral broad semantic categories (e.g., "a type of food," "a musical instrument," "a boat"), any significant differences in their valence ratings could only originate from context—demonstrating contextual emotion transfer.

Thus, contextual emotion can transfer after reading exposure, but this transfer appears more likely only after repeated contact with identical reading materials. In other words, reading the positive-context sentence "The overjoyed little squirrel climbed onto the beautiful flowers. It grabbed some 单马灵 to build its nest" five times (3a) imbues 单马灵 with more positive emotion than reading neutral (3b) or negative (3c) contexts repeatedly. However, reading five different positive-context passages does not produce a similar positive-emotion advantage over other contexts. This aligns with research showing humans prefer experiencing familiar emotions [**?**, **?**]. For instance, studies found strong positive correlations between self-reported pleasure and electrodermal activity (EDA)—an objective indicator of emotional arousal—when participants listened to familiar music. Van Den Bosch et al. [**?**] presented 70 unfamiliar music clips twice and measured EDA, finding no relationship between pleasure and arousal. However, when seven participants listened to 35 unfamiliar clips with 30-minute intervals, repeated exposure significantly increased EDA, demonstrating that prior exposure plays a crucial role in emotional responses to music.

These results confirm the "Double-Jujube Tree" effect mentioned in our introduction—repetitive expression causes contextual emotion to transfer to words. They also provide boundary conditions for embodied theory's [?] predictions about contextual emotion transfer: the consistent emotional or semantic polarity expressed in a novel word's context must be repeated until participants achieve sufficient familiarity before the word can be learned in that specific emotional state, with emotional connotation encoded as part of its meaning. Our findings also support the Lexical Quality Hypothesis [?], which proposes that emotional information from context can be internalized as rich, nuanced semantic representations, though this internalization only occurs when aligned with emotional learning mechanisms.

This conclusion seemingly contradicts the Context Variability Hypothesis [?], which predicts that multiple texts better promote vocabulary learning than multiple readings. To address this, we turn to Research Question 2. Our results show that contextual emotion significantly predicted both word form and meaning acquisition, with better performance in more positive emotional contexts. This aligns with numerous studies [?, ?, ?] showing that positive emotion facilitates vocabulary learning while negative emotion triggers "negative responses" that consume attention and slow reaction times. Our findings demonstrate that facilitative emotion includes not only word-intrinsic emotion but also contextual emotion.

Importantly, results from the three vocabulary tests show significant interactions between contextual valence and context variability, most prominently in the definition generation task—the most challenging semantic test. Results indicate that only in varied contexts did increased contextual valence significantly improve definition generation accuracy. In repeated contexts, definition generation accuracy was unaffected by contextual valence. This supports the Context Variability Hypothesis: multiple texts better promote semantic learning because they allow core semantic features to emerge, and varied contexts help readers create richer word-semantic networks that facilitate mapping from form to meaning [?].

Comparing [Figure 2: see original paper] and [Figure 3: see original paper] reveals that although varied contexts advantage both orthographic and semantic learning, contextual valence affects them differently. Orthographic task differences appear primarily at low valence levels, while definition generation differences emerge more clearly at high valence levels. This suggests differential dependence on context variability for form versus meaning learning. Previous research indicates that word form and meaning learning are partially independent [?]. According to the Context Variability Hypothesis, learners encountering a word in different contexts form memory traces for both meaning and context in their mental lexicon. These traces strengthen across encounters, eventually forming context-independent core semantic representations. However, form learning does not necessarily require multiple contexts—repeated exposure also effectively promotes form learning [?], as evidenced by clear rep-

etition priming effects in psycholinguistic research [**?**]. Additionally, these differences reflect fundamental distinctions between what orthographic choice and definition generation tasks measure. Definition generation involves more lexical retrieval activity and is more susceptible to attentional influences [**?**]. Early research found that varied contexts require greater cognitive resources for processing, including attention, search, retrieval, and evaluation [**?**]. Thus, under multiple-text reading, learners' information retrieval capacity may improve with enhanced attention. According to positive psychology's broaden-and-build theory [**?**], positive emotion expands individuals' attentional, cognitive, and behavioral resources, promoting academic performance. Moreover, human preference for positive information may lead to deeper processing of positive stimuli based on grounded or embodied cognition [**?**]. Consequently, multiple-text reading combined with high emotional valence may produce additive positive effects, significantly enhancing core semantic learning. Orthographic choice tasks, however, may rely primarily on short-term memory without requiring substantial attentional resources. Repeated reading (multiple readings) helps form single, strengthened memory traces for word forms [**?**], which intensify under positive emotion, thereby reducing the advantage of varied contexts (multiple texts).

These results support our two hypotheses. Our introduction detailed the historical evolution of semantic prosody concepts, all theoretically emphasizing its independence from denotative meaning. This study further demonstrates the psychological reality of semantic prosody and its "Double-Jujube Tree" acquisition mechanism through Chinese novel word learning experiments. Synthesizing findings from both research questions, we propose that the Context Variability Hypothesis may best predict learning of denotative meaning, while the "Double-Jujube Tree" effect best predicts acquisition of connotative meaning engendered by semantic prosody. This suggests that optimal denotative learning requires varied-context reading, but such reading may hinder effective semantic prosody acquisition. Must learners choose between them?

We believe these findings do not necessitate an either/or choice. Perhaps combining "repetition within varied contexts" or "variation within repeated contexts" could integrate advantages of both effects for optimal vocabulary acquisition. For example, rather than repeating single sentences (as in our study), multi-sentence or multi-passage repetition could achieve both "repetition" and "variation," combining benefits of both effects. The optimal balance of repetition and variation requires future research.

As noted in the materials section, our target words were concrete nouns. Importantly, emotion affects concrete and abstract noun learning differently. Future research should directly manipulate word abstractness to examine its impact on vocabulary acquisition across different emotional contexts.

5 Conclusion

This study manipulated contextual emotionality (positive, negative, neutral) and context variability (multiple texts vs multiple readings) to examine contextual emotion transfer, test the psychological reality and acquisition mechanism of semantic prosody, and assess whether semantic prosody acquisition affects novel word form and meaning learning. Results demonstrate that contextual emotion can transfer to words after reading exposure, confirming the psychological reality of semantic prosody. However, this transfer appears more likely only after repeated exposure to identical materials. Additionally, contextual emotion significantly predicted novel word form and meaning learning, with better acquisition in more positive emotional contexts. This emotional advantage was significant only in varied contexts; in repeated contexts, semantic acquisition was unaffected by contextual valence. These findings offer important implications for vocabulary instruction, suggesting that manipulating contextual emotionality or material variability can enhance vocabulary learning effectiveness.

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Appendix

Note: We used the summary() function to fit and select models, employing R's default dummy coding. After successful fitting, we used the mixed() function from the afex package to calculate main effects and interactions, which automatically codes predictors as contr.sum.

(1) Word valence rating task (Research Question 1)

```
summary(V_{m0} <- glmer(scores ~ 1 + context * condition + (1|subj) + (1|nonword) + (1|denot
                      data = SP_{rating}, family = poisson(),
                      control = glmerControl(optimizer = "bobyqa", optCtrl = list(maxfun = 2
```

(Note: V_{m0} is the model name, scores is the dependent variable, context and condition represent context variability and contextual emotion, subj, nonword, and denotation are random variables representing participants, test materials, and denotative meanings.)

(2) Orthographic choice task (Research Question 2)

```
summary(M1_{ortho} <- glmer(scores ~ context * valence + (1|subj) + (1+context|nonword) + (1
                          data = SP_{{{choice}}_{{new}}}, family = "binomial",
                          control = glmerControl(optimizer = "bobyqa", optCtrl = list(maxfun
```

(Note: M1_{ortho} is the model name, valence is the numeric contextual valence, other variable names as above.)

(3) Definition generation task (Research Question 2)

```
summary(m1_{prompt} <- glmer(scores ~ context * valence + (1|subj) + (1+context|nonword) + (
                           data = SP_{{{prompting}}_{{new}}}, family = "binomial",
                           control = glmerControl(optimizer = "bobyqa", optCtrl = list(maxfu
```

(Note: m1_{prompt} is the model name, other variable names as above.)

(4) Definition matching task (Research Question 2)

```
summary(m1_{matching} <- glmer(scores ~ context * valence + (1+condition|subj) + (1+context|
                             data = SP_{{{matching}}_{{new}}}, family = "binomial",
                             control = glmerControl(optimizer = "bobyqa", optCtrl = list(max
```

(Note: m1_{matching} is the model name, other variable names as above.)

Note: Figure translations are in progress. See original paper for figures.