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CONTEXT EFFECTS IN THE COMPREHENSION AND PRODUCTION OF FIGURATIVE LANGUAGE

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Abstract

An experiment was conducted to examine the production of familiar proverbs following either a figurative discourse context or one of two literal contexts. Materials from Ferretti, Schwint and Katz (2007) were adapted for a cloze task. Data were collected for 42 proverbs from 240 participants. Booklets presented a series of context paragraphs each followed by a sentence stem of one to four words, which participants were asked to complete as they thought most appropriate. Item analysis revealed a higher percentage of target completions following a literal context containing content words of the target proverb, and with each succeeding word in the stem. An interaction was also observed whereby figurative completions, which were initially lower relative to literal completions, rose to comparable levels by the third word presented. Completions were correlated with ERP measures of the ease of comprehension reported by Ferretti et al. (2007). Findings are discussed in terms of predictions derived from models of comprehension and a constraint satisfaction approach.

Keywords: Figurative Language Comprehension, Figurative Language Production, Proverbs, Cloze Probability, Context Effects, Constraint Satisfaction

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Figurative language is language in which the intended meaning of the utterance differs from the surface, literal meaning of what is said. Tropes, which are instances of figurative language, include irony, sarcasm, metonymy, idioms, metaphor and proverbs. The current study will examine the production of proverbs in various discourse contexts.

Much research in pursuit of understanding figurative language has focused on the mechanisms and constraints of the comprehension process. Yet a comprehensive theory of figurative language requires understanding not only comprehension but also the production of such language. Research on production has been limited perhaps because of the difficulties in generating a task that is both valid and appropriate for experimental research. In the current study, a cloze technique was employed to examine the effects of different discourse contexts on the probability that a familiar proverb will be produced. There is a growing literature on the online comprehension of proverbs, hence a secondary aim is to relate production probability to indices of the online processing of the same proverbs.

This study focused on the production of proverbs because they are suited to a number of experimental requirements. First, they are well-suited to the study of context effects since they can be equally comprehended in either a literal or a figurative context (unlike, for example, metaphor, which is usually only sensible when employed figuratively). Second, proverbs are phrasal, providing an instance of figurative language of sufficient length to allow sensitivity in measuring the probability of production word by word. This sensitivity is also useful in examining the relationship between the probability of production and the time course of comprehension. Finally, as is reviewed below, there exists a corpus of comprehension studies using proverbs whose materials are

suitable for adaptation to a production task, and which allowed for a more direct comparison to be made between the ease of comprehension and the probability of production of proverbs.

Models of comprehension

A basic question in the study of figurative language processing has been the role of the literal versus the figurative sense of the trope. Studies of literal language processing have concluded that comprehension is non-optional: the listener cannot choose not to process speech or the reader, written text (Miller & Johnson-Laird, 1976). The question then raised in the case of figurative language is what meaning is processed? Is the appropriate figurative interpretation automatically ascribed to the utterance or does recognition of the figurative intent depend on having processed discourse cues?

When reading a literal sentence, comprehension is generally thought to proceed word by word, with the meaning of each word processed as encountered and incorporated into the emergent interpretation, along with syntactic information. This assumption, however, does not sufficiently explain the process of figurative language comprehension, because it fails to provide an account of when or how the figurative interpretation is considered and achieved. Is the literal meaning of the language processed and, if so, how does the literal meaning contribute to or compete with the figurative meaning? A parallel consideration that should be noted is the degree of relatedness between the literal meaning and the figurative meaning. Various tropes differ in the degree to which they are *compositional,* which is to say the degree to which the figurative meaning of the trope is derived from the literal meaning of the constituent words and the syntactic relations

amongst those elements (Gibbs, 1995). For example, an idiom such as *kick the bucket* is generally considered to be noncompositional, because the literal meaning of each word does not clearly relate to the figurative meaning *to die.* Proverbs are more compositional, in that the relation between the literal meaning of the words and the figurative meaning is more apparent, although even amongst proverbs there is variation in the degree of compositionality. For example, a proverb such as, "A rolling stone gathers no moss," is less compositional than a proverb such as, "Where there is smoke, there's fire," given that its meaning is less readily derived from the meaning of the constituent words.

In addressing the question of literal and figurative sense activation during processing, three major theoretical approaches are associated with distinct hypotheses as to the process of figurative language comprehension. These three accounts, namely the standard pragmatic model, the graded salience hypothesis, and the direct access account, are described in turn. These models, although developed primarily as models of comprehension, provide a basis for understanding how figurative language is recognized and represented, and how the listener is able to derive the intended meaning of a figurative utterance. A common set of representations of abstract concepts and meanings is assumed for both comprehension (recognition) and production, according to current models comparing the two (Roelofs, 2003) (although the literature on this comparison is also admittedly less well developed than might be expected given the significance of the issue). Thus, these models of comprehension can be used to understand how figurative language is understood, what may contribute to the disambiguation of the intended meaning, and the factors that may act to constrain and to influence production. The

models' predictions for the time course of comprehension and the empirical support will be reviewed, as well as the implications for proverb production.

According to the standard pragmatic model (Grice, 1975; Searle, 1979), processing occurs in an obligatory sequence. According to this model, the literal sense is always processed first, irrespective of the context of the utterance. If the literal meaning of the trope is not reasonable in the discourse context, then, and only then, does processing progress to a consideration of figurative meaning. According to this theory, figurative language is deviant, and is processed in a way that is qualitatively different from literal language. It is reasoned that the figurative sense is more difficult to grasp because semantic information is not sufficient, and pragmatic-contextual information must also be processed and integrated by some mechanism that differs from that used in "ordinary" literal processing. A variant of the general model can be found in Honeck's (1997) theory of proverb processing, the extended conceptual base theory, which proposes that a literal interpretation of a proverb is generated as a basis for subsequent abstraction of other (figurative) meanings.

The graded salience hypothesis, as proposed by Giora (1997), again includes the claim that processing occurs in an obligatory manner. This account does not give first advantage to the literal sense of a trope but rather to its most conventional sense. This conventional sense, termed the salient sense, is determined by experience and familiarity (Giora, 1997). Thus, an expression commonly used figuratively will have the figurative sense as the preferred salient sense, while the salient sense for an unfamiliar expression would be its literal sense. Since its original inception this model has been updated to allow a greater role for context. Peleg, Giora and Fein (2001) conceptualize

comprehension as dependent on two separate mechanisms, for which salience is crucial to ordered lexical access during bottom-up processing, but is separate from top-down, contextually-driven expectations for meaning. Giora (2003) maintains that salient meanings are obligated to be activated first. However, if the context strongly favours the less salient meaning, then, all else being equal, it will serve to increase the activation of that meaning, although not at a cost to the activation of salient meaning. It should be noted explicitly, then, that the prediction of the graded salience hypothesis (and similarly, of the standard pragmatic model) is that the salient (or, literal) sense of a trope is activated inevitably in the initial moments of processing. In the case of phrasal tropes, such as idioms or proverbs, it would be predicted that the preferred sense is the only one activated in the early regions of the trope, which is to say perhaps the first few words.

A related theory was proposed by Cacciari and Tabossi (1988). In a distinction analogous to the dimension of salience (familiarity, conventionality), they distinguished between predictable and unpredictable idioms. Predictable idioms were defined as those that could be recognized as idiomatic before the final word was presented, even out of context, whereas unpredictable idioms were those that could not be recognized until the final word was presented. They found that predictable idioms primed only the figurative meaning of the idiom, while unpredictable idioms primed the literal meaning. Importantly, however, Cacciari and Tabossi did not find that this priming effect rested on having processed the trope in its totality, as proposed by proponents of the graded salience model. Rather, they found evidence that an idiom could be recognized on the basis of only a portion of the idiom, the so-called "idiom key," which could be a set of words usually containing a content word. They proposed a Configuration Hypothesis:

once an idiom is recognized on the basis of the configuration of words, the relevant meaning is accessed. Hillert and Swinney (2001), in reviewing this model, describe it as stressing the importance of "associative prediction (p. 113)" in comprehension.

Finally, some theorists have rejected any obligatory-first processing view, arguing in favour of a dynamic process of interpretation. In contrast to the standard pragmatic model and the graded salience hypothesis, these theories are context-dependent and predominantly driven by pragmatic and discourse cues. Context-based theorists assert that context invites possible alternative interpretations and does not merely function to help select amongst possible representations of the intended meaning (Martin, 1996). The major model to emerge to challenge the obligatory-first processing views in favour of a context-dependent model was the direct access account (Gibbs, 1994). Direct access argues that the figurative sense of a trope can be retrieved directly, without recourse to the literal interpretation, given that the context is sufficiently strong. It is important to note that the direct access approach predicts equal ease and speed of comprehension given sufficient context. Thus it is supported empirically by a null effect of no significant difference in the time taken to read a sentence supported by an adequately figurative or literal context. Empirical support must thus be sought with care and with particular effort to ensure sensitivity of the measurements.

Gibbs (1994) argues that direct access is possible partly because of continuity between literal and figurative language; he points out that literal meaning is difficult to define, and that people access different senses of a literal meaning depending on what is said and in what context. In brief, Gibbs argues that it is unreasonable to accept the literal meaning as standard given the difficulty in defining the literal meaning of an

utterance at a lexical or phrasal level (as, empirically, listeners or readers do not recruit a single standard literal sense of a given word, but rather the recruited sense varies according to the use of the word). Gibbs argues in favour of an account that places literal and figurative language along a common processing continuum, rather than positing two qualitatively different processes.

Resolution of the theoretical distinction described above has largely depended on measures taken during the act of comprehension, such as those provided by eye-tracking or through ERP or word by word reading times. Language studies have used both on-line and off-line measures to determine what factors are involved in comprehension and its time course. Off-line procedures ask participants to provide ratings on or interpretations of an interchange after having heard it, which are then analyzed to infer the process of comprehension. On-line procedures, by contrast, assess the listener's (or reader's) response during exposure to the interchange.

Time course of comprehension

Models of figurative language comprehension make separable predictions as to the order in which the listener considers possible interpretations of the speaker's intent and the time course of comprehension. Recall that the theories differ on the role played by context in the access of the figurative sense of sentence. In the obligatory-first processing models, a secondary interpretation will perforce take longer. For example, proponents of the standard pragmatic model argue that the literal sense is processed first, and so a figurative sense will take longer because it is processed second, and may not be considered at all if there is a plausible literal interpretation. Similarly, according to the

graded salience hypothesis, Giora predicts that, all else being equal, the non-salient interpretation will take longer to reach than the salient interpretation, since it is processed only after the salient interpretation is deemed implausible. The predictions of the context-dependent approach vary, of course, with the presented context, and so the time taken to disambiguate the intended meaning of the trope depends on the number and strength of available discourse cues.

Resolution of the question of an obligatory processing sequence has been sought by measurements of reading time. Results of these studies have been conflicting, with some studies suggesting that literal statements are read more quickly than figurative statements, while others have found no difference. Early studies in support of the standard pragmatic model presented tropes without context, and so lacked ecological validity. Hence, research since these early studies has sought to study figurative language processing as it might more naturally be encountered, in a given context. Results of these studies have found that familiar figurative statements did not take longer to read than literal statements (see Katz & Ferretti, 2001, 2003). Keysar (1989) found that figurative senses are computed as quickly as literal senses. Gibbs, Bogdanovich, Sykes and Barr (1997) likewise found that metaphors are read no more slowly than literal terms given an appropriate context. Obligatory, modular literal-first processing cannot account for these data; hence the received wisdom rejects the standard pragmatic model.

Yet the debate is not altogether resolved. For instance, literal expressions tend to have more conceptual overlap with the discourse context than does an expression used figuratively (see Ferretti, Schwint and Katz, 2007) and hence the resolution of its meaning is more supported by the context than is the case with nonliteral language.

Given the greater degree of overlap, it may be reasonable to expect that a literal interpretation would be easier to achieve than a figurative interpretation, even if consideration of a figurative interpretation in context is not disadvantaged relative to consideration of a literal interpretation in context.

The Case of Proverbs

From a general consideration of figurative language our attention will now turn to a single specific class, namely, proverbs. Proverbs have historically interested not only linguists and psycholinguists but also a range of researchers and practitioners because the ability to decode proverbs has been seen as a useful metric by which to judge higher-level intellectual function (Gibbs & Beitel, 2003). The interest in proverbs stems from what these sayings may encapsulate about the values of a culture, as well as their utility as materials in the study of normative cognitive development and the achievement of abstract thought and of personality and psychopathology. In the study of language itself, and to continue with the themes explored thus far, proverbs provide a useful set of materials for the study of figurative language because they are statements which can be true and comprehensible in either a literal or a figurative context. For example, the proverb, "There's no use crying over spilled milk," could be placed in a context in which it is logical literally or in another context in which it is logical figuratively.

Despite being a familiar form of figurative language, proverbs are nonetheless resistant to a rigorous definition. They are likely most commonly understood to be a saying which is intended to be instructive or to express some general truth. Honeck (1997) submits more comprehensively that a proverb is, "a discourse deviant, relatively

concrete, present (nonpast) tense statement that uses characteristic linguistic markers to arouse cognitive ideals that serve to categorize topics in order to make a pragmatic point about them (Honeck, 1997, p. 18)." Proverbs are often identified intuitively by characteristic markers. Gibbs and Beitel (1995) observed that many proverbs share one of a few classic structures, such as "Like X, like Y" or "Where there's X, there's Y."

As noted above, proverbs allow for a direct empirical investigation of context effects because the same proverb can be reasonable and comprehensible in either a literal or figurative context. Furthermore, using proverbs allows better control of factors such as the frequency of words in the target item, factors which Frisson and Pickering (2001) noted have not always been well controlled in studies comparing literal and figurative language. By using proverbs, the study of context is less threatened by potential extraneous factors such as variability in the neighbourhood size or frequency of the constituent words or the syntax of the phrase, since the target response is the same in either a literally or figuratively-biased context. All of these factors are held constant by the single form of the target item.

Katz and Ferretti (2001) thus chose proverbs to study the comprehension of figurative language using an online task, with the aim of uncovering whether context affects comprehension during the act of reading an ambiguous sentence. Using proverbs allowed for the construction of two contexts for the same target proverb, one of which supported a figurative use of the proverb and one which supported a literal use. Katz and Ferretti (2001) used a self-paced moving window paradigm to measure reading times through each word region of the proverb and into the following sentence.

The results lent partial support to each of the three classes of models. The literal-first model, which predicted that one is obligated to access the literal sense faster than the nonliteral sense, received support in the case of unfamiliar proverbs, for which reading times were faster when the proverb was used as a literal phrase, however the model was not supported for familiar proverbs. The graded salience hypothesis, which predicted that a familiar proverb would be read more quickly in a figurative context but an unfamiliar proverb would be read more quickly in a literal context, was supported in the early regions of the proverbs, such that reading times were faster in the figurative condition for familiar proverbs for the first two words of the proverbs, but the differences were eliminated by the end of the proverbs and there was no sentence-level (overall) effect of familiarity of the trope. Finally, the direct access view, which predicted that proverbs could be read equally fast in either a literal or figurative context provided sufficient context, was supported for the familiar proverbs, which were read equally fast overall in either context, but was not supported for the unfamiliar proverbs, which were read more quickly in the literal context despite the fact that the figurative context was constructed to be equally supportive. Importantly, context effects were evident early on in the processing of the proverb, emerging by about the second word of the proverb, which is inconsistent with the context-independent approaches.

Given these findings, Katz and Ferretti (2001) provided a more nuanced context-dependent model of figurative language comprehension than found in the original direct access model. Specifically, they proposed that the interpretation of figurative language is a process of constraint satisfaction, in which possible interpretations, including literal and figurative, are compared to judge which interpretation best fits the available linguistic

and non-linguistic cues to the speaker's (or writer's) intended meaning. Lexical, syntactic and conceptual sources of information are all activated at once and compete in parallel. The interpretation that best satisfies the constraints will be most activated, and will then be selected. The duration of processing will be a direct function of the strength of available cues. Katz and Ferretti (2001) note that this approach can incorporate results of other models, without having to postulate an obligatory sequence, by construing factors such as literality, salience, and familiarity (at the level of trope's constituent words as well as at the phrasal level for fixed expressions) as constraints to the interpretation.

Online Data and the Continuing Debate

Recently, research has turned to even more sensitive online measures. Online studies are more frequently using electroencephalography (EEG) to measure event-related potentials (ERPs), electrical activity in the brain that is time-locked to a given input. ERPs are recorded across the scalp and provide a measure of the electrical activity in the brain that is reliably time-tagged to a given stimulus onset. Once processed, results give the electrical activity plotted against the milliseconds elapsed since the presentation of the stimulus, yielding waves that are positive or negative with respect to a baseline. Studies using ERPs benefit from its excellent temporal resolution, as they can measure processing with millisecond precision. Further, because data are collected from many scalp sites, the topography of results allows some insight into the contributions of different brain areas (Ferretti et al., 2007).

ERP studies of figurative language have focused especially on the N400 component, so named because it is a negative-going wave that peaks approximately 400 ms (300-500 ms) following the onset of the stimulus. In early work, Kutas and Hillyard (1980) found that participants who were asked to read sentences showed a reliable negativity in scalp electrical activity in response to words that were semantically incongruous. Importantly, this effect was related specifically to semantic incongruity, and differed from the positive activity seen following a stimulus that was surprising but not semantically incongruous, such as words that appeared in a different font. Hence, the N400 has come to be used as an index of the ease of semantic integration of words in a sentence context. An N400 effect can be observed in response to every word, but the amplitude of the wave is indicative of the ease of integration, with a greater amplitude corresponding to greater perceived semantic incongruity (Kutas & Hillyard, 1980). It has proven to be a useful marker for much research on online sentence processing, and in particular in the study of figurative language because it helps to localize the word of the trope at which incongruity is perceived, by comparing time of presentation to the time of the large amplitude N400 effect.

With respect to the processing of nonliteral language, Coulson and van Petten (2002) measured ERPs to examine the ease with which figurative language is processed relative to literal language. Revisiting the aforementioned possibility that the interpretation of literal language may be easier because of greater overlap with the context, they reasoned that, "equivalent processing times [in literal and figurative language] need not imply equivalent effort (p. 959)." They indeed found evidence that despite the apparent similarity in reading times, figurative statements may require more

effort to understand. Coulson and Van Petten (2002) found that although the ERP profiles were similar for literal and metaphorical statements (suggesting similar processes were engaged), there were greater amplitude N400s for metaphorical statements than literal statements. They took these results to indicate that people process literal and metaphorical statements in a similar manner but that metaphorical statements were somewhat more difficult to understand than literal statements, even when the frequency and probability of words were controlled.

Katz, Blasko and Kazmerski (2004) likewise found ERP evidence that a sarcastic statement takes more effort to comprehend in context than does a literal statement. Importantly, context effects were seen early on in processing, so while the results indicate differences in the ease of processing, they do not support obligatory literal-first models, which would hypothesize that early processing treats a trope as though it were literal, without regard for context (and thus would not predict any evidence of processing differences early in the trope). Katz et al. (2004) argued rather that a constraint-satisfaction account addresses these differences by context, since resolution of an ambiguous statement is a function of the wealth of available cues. Thus, contexts which are heavily constraining should aid the resolution and result in similar reading times, while a poverty of cues will hamper resolution and slow reading times.

Ferretti et al. (2007) extended these findings using proverbs. Proverbs were chosen as the stimulus set for the same reasons they were used in the study by Katz and Ferretti (2001) discussed above, namely that they allow direct comparison of the same target in different contexts. Using a set of proverbs, all seven words in length, Ferretti et al. (2007) replicated earlier findings (Katz & Ferretti, 2001) that familiar proverbs are

read at the same rate whether in a literal or a figurative context. However, for the same set of proverbs, they also examined three ERP measures, namely, the N400 component, the late positivity component (LPC), a positive-going wave at approximately 700 to 1000ms following the stimulus and, finally, the slow cortical waves. While the N400 and LPC are related to individual words, slow cortical waves emerge over a sentence. Slow cortical waves tend to be distributed over the frontal regions of the scalp and are more positive where a sentence is more easily integrated into the discourse context. Ferretti et al. (2007) found that the proverbs were easier to integrate in the literal context than in the figurative context as indexed by all three measures. The effects of context were significant at the third word of the proverbs for the single-word measures, and became significant at the third word and remained so thereafter for the slow wave measure. Ferretti et al. (2007) hypothesized that it was at this point that participants were able to recognize the statement employed as a familiar proverb, and integrate an understanding of the proverbial meaning with the discourse context.

Predicting Production

Given the wealth of research on comprehension, it is perhaps surprising that production has received so little attention as the necessary complement to an understanding of language. A review of the small body of extant literature reveals a motley collection of research questions, such as metaphor production in a sample of Baptist sermons (Corts & Meyers, 2002) and in a sample of college lectures (Corts & Pollio, 1999) and in the communication between students (Hussey & Katz, 2006), or the representation of idioms, whether by whole expressions or by constituent words, as

evidenced by the antecedents of production (Sprenger, Levelt & Kempen, 2006). The dearth of research seems indicative of two issues. First, there is a considerable difficulty inherent in the study of production, given that it is highly flexible and variable, and there has been a considerable variety of methodologies used to approach the study. The challenge is to preserve both experimental control as well as ecological validity so that results have some generalizability. Second, there is a need for basic studies to elucidate the potential factors involved in production. Fortunately, while research on production is yet nascent, research on figurative language is not. The challenge then is to consider how the findings of the comprehension literature might inform the investigation of production.

Present Study

Unlike previous studies in which participants have been asked to read passages containing proverbs, the present study employed a cloze task to study production. Participants were asked to read a short paragraph, or textoid, that provided context for the proverb to be used in its conventional figurative sense or in its literal sense. The final line of the textoid provided the beginning of the proverb as a sentence stem of a varying number of words. Participants were asked to complete the sentence as seemed fitting. The variable of interest was the number of participants who complete the sentence stem *with the target proverb,* which was converted to a percentage of total completions given a discourse context and stem length. This task measures production and yet may also be considered to be a proxy measure for the readers' expectancies of what would next be presented.

From the models of comprehension reviewed above, separable hypotheses were derived. First, the standard pragmatic model describes initial processing as literal, independent of context, so it might then be expected that completion would be high in the literal condition, where the proverb is appropriate to a literal interpretation of the context. However, in the figurative condition, it would be predicted that target completions would be rare, if supplied at all, because a literal, non-target completion would be favoured (perhaps especially so for this production task, since production is less externally directed than is comprehension). The graded salience model, in which early processing is for the salient meaning, requires consideration of the familiarity of the target items. For this study, all proverbs were familiar, meaning that they would be commonly recognized as proverbs (figurative expressions) and so the salient use would be the figurative use of the proverb, independent of whether the context in fact encouraged a literal use of the proverb. Hence, on the basis of the graded salience model, completions would be expected to be equally high in either context, although a context supportive of the salient meaning in the figurative condition might serve to increase the percentage of target completions in that condition relative to the literal condition, as per the updated model. Finally, the direct access model would lead to the prediction that the percentage of target completions would be equal in either context, given that each textoid was constructed to be equally supportive of the literal or figurative completion, as appropriate.

The recent results of Ferretti et al. (2007) using many of the same items as were employed here allows for comparison to comprehension results, as well as testing the constraint satisfaction approach put forth by Katz and Ferretti (2001). Based on this approach, it was expected that target proverbial completions would be few at early

regions of the proverb, that is, that few participants would complete a sentence stem of one or two words with the target. However, it was expected that at these early regions the target completion would be much more likely in a literally-biasing context than following a figuratively-biasing context because there are more available cues and semantic overlap in literal discourse. A third condition, with a literally-biasing textoid containing the content words of the target, should provide the most support for the target completion and would lead to the highest performance in this condition because of having both semantic and lexical overlap.

Following from the findings of Ferretti et al. (2007), however, a change was expected at the third word of the proverb. The comprehension findings indicated a large amplitude N400 at this point in the proverb given a figurative context, which was interpreted as evidence that this was where the semantic incongruity was recognized and hence where the sentence was being integrated with the preceding context. If this is indeed the case, and if the findings can inform the hypotheses for production, then by the third word of the proverb the emerging sentence can be interpreted in context and completions in the figurative context should not be disadvantaged. Once context is understood and integrated, then percentage of target completions produced should be just as likely in either the literally or figuratively biased conditions, since either context provides cues to constrain the interpretation.

Additional information in the proverb stem should serve to constrain further the interpretation. This effect can be described more specifically by analyzing not only the length of the stem, but also the content of the presented stem. Content words add significantly more information than function words, which should serve to increase the

percentage of target completions. This is analogous to the proposal of Cacciari and Tabossi (1988) that a certain amount of information must be presented before an idiom (figurative expression) can be identified. For example, seeing the word "Rome..." following an appropriate context would be predicted to be more likely to cue the proverb "Rome was not built in a day" than seeing the word "The..." is likely to cue the proverb "The early bird always catches the worm." Thus, results were also assessed as a function of the total number of content words presented.

An important question in this investigation is the degree to which the comprehension literature can inform expectations of production. The findings of the present study were thus compared to extant work on comprehension by judging the success of these predictions. In addition, the percentage of target completions produced at each region of the proverb was correlated to the ERP findings of Ferretti et al. (2007), to assess whether there is a relationship between the likelihood of proverb production and a measure of activation during comprehension. Of particular interest were correlations at the region of the third word of the proverb, where semantic integration was indicated in the comprehension data (Ferretti et al., 2007). It was also of interest whether significant correlations would be clustered for the possibility that if clustered scalp sites correlate with the probabilities of production then these may evidence a systematic relationship between comprehension and expectation.

Method

Participants

Two hundred and fifty-three people participated in this study. Of those, the data from 13 participants were discarded because they were not native speakers of English,

leaving a sample of 240 English speakers for analysis. Half of the sample, 120 participants, were recruited via posters from the university community and were compensated $10 for their participation. The second half of the sample were introductory psychology students recruited from the university undergraduate research pool, who participated for the partial fulfillment of the course requirement for research participation.

Materials

The materials for this study consisted of a series of short narrative paragraphs, "textoids," which described an interaction between two people. The key textoids were designed to conclude with a proverb. The 42 target proverbs were all familiar proverbs, seven words in length. Paragraphs were constructed to present a context that would bias the reader toward either the figurative interpretation of the proverb (see example 1a below) or toward a literal interpretation. For the paragraphs that were biased towards a literal interpretation of the proverb, half of the textoids used content words of the proverb in the preceding paragraph, the Literal-Overlap condition, while half of the paragraphs used only synonyms of the content words of the proverbs, the Literal-Synonym condition (see examples 1b and 1c below). While function words, including prepositions, conjunctions and auxiliary verbs, are necessary for the syntax of a phrase, content words, such as nouns, adjectives and verbs, provide more information. Hence, controlling for the presentation of content words allows for the effect of lexical priming to be disentangled from the conceptual priming of the context presented with only synonyms of key words in the target.

The 42 target proverbs were selected and the corresponding textoids designed and written for the previous study conducted by Ferretti et al. (2007). The 42 proverbs were rated as familiar proverbs from a larger pool in a preliminary rating study. Ferretti et al. (2007) also describe how the textoid paragraphs were verified in two separate rating studies as easy to understand and as figurative or literal as intended. On a scale ranging from 1 (difficult to understand) to 7 (easy to understand), participants rated the figurative context as easy to understand (M = 5.50) and the literal context as easy to understand (M = 5.43). In rating the perceived "figurativeness" of the proverb used in the respective contexts from 1 (not at all) to 7 (highly), participants rated the proverbs as strongly figurative in the figurative condition (M = 5.68) and as not figurative in the literal condition (M = 2.15). Hence the contexts were both comprehensible and biasing as intended for the set of 42 proverbs.

The one adjustment made to the paragraphs for the present study was the elimination of the final sentence following the proverb sentence stem. A final sentence following the target proverb was necessary in the Ferretti et al. (2007) study to measure sentence wrap-up effects. It was not necessary for the purposes of this study, and would have interfered with the measurement of production by presenting a response to the completion pre-emptively. In addition to the 42 target passages, 18 literal filler paragraphs were composed for this study (all textoid passages may be found in Appendices B through D). All were similar in length and narrative form to the target paragraphs, with each having a reasonable concluding sentence seven words in length.

Once the paragraphs were constructed, the final sentence was adapted to function as a cloze task in order to gather production data. Words of the proverb were deleted so

that the participant was presented with only a sentence stem, ranging in length from one to four words, followed by a blank line. It was this sentence stem that the participants were asked to complete. Thus, it is crucial to emphasize that the target proverbs were never actually presented to the participants in their totality, although the first words of the proverb were presented as a sentence stem. Each participant saw, in full form, only those proverbs that he or she produced independently. For ease of discussion the textoids will be described according to the associated target proverb. The target proverbs were defined by the study design and were invited by the present context, but were not presented to participants.

Examples of context manipulations for the target proverb, "Don't ever burn your bridges behind you." For expositional purposes, the critical priming words of the target proverb for which synonyms were used in the literal-synonym context are shown in bold in Example 1b. The content words of the target proverb repeated in the literal-overlap context are shown in bold in Example 1c. Of course, these words were never thus emphasized in the booklets presented to participants.

(1a) Figurative context, one word presented:
"Mr. Thomas has been a jerk for so long and now that we are done working for him we can tell him off," said Rick. "I'm not going to," said Terry. "When I got the new job, my dad gave me some advice about keeping job connections," he added. "What did he say?" asked Rick. "He said," replied Terry,
"don't _____."

(1b) Literal-Synonym context, three words presented:
Terry, Rick, and the rest of their army platoon were moving away from their current position to infiltrate the enemy. "We should **detonate the explosives** on the **river crossing** so the enemy platoons can't come after us that way," suggested Rick. "The colonel advised against that tactic," said Terry. "What did he say?" asked Rick. "He said," replied Terry,
"don't ever burn _____."

(1c) Literal-Overlap context, four words presented:
Terry, Rick, and the rest of their army platoon were moving away from their current position to infiltrate the enemy. "We should **burn** the **bridge** so the enemy platoons can't come after us that way," suggested Rick. "The colonel advised against that tactic," said Terry. "What did he say?" asked Rick. "He said," replied Terry,
"don't ever burn your_____."

The 42 proverb and 18 filler textoids were arranged into booklets containing 60 paragraphs and corresponding sentence stems.

Design

The manipulations for context yielded three paragraphs for each proverb, the Figurative, the Literal-Synonym, and the Literal-Overlap. The sentence stems ranged in length from one word presented to four words presented, yielding four levels of the words presented variable. Completely crossed, data were collected in each of these 12 conditions for each of the 42 proverbs.

Test booklets were created by using a standardized order of proverb and filler passages. Each booklet presented a paragraph in one of the three possible levels of the Context condition along with a sentence stem in one of the four possible levels of the Words Presented condition for each of the 42 proverbs. The participants were presented with the textoid and sentence stem for each target proverb in only one of the 12 possible combinations, such that participants would produce a target proverb a maximum of one time. Each booklet presented an equal number of textoids at each level of the context manipulation as well as an equal number of sentence stems of each possible length, arranged in a quasi-random order within each booklet. Thus, while proverbs were a

between-participants factor, data for the item analysis was collected according to a repeated measures design.

Procedure

Participants were given the sentence completion task as a pencil and paper task at a quiet desk. The task instructions asked participants to read through each paragraph in order and, at the end of each, to complete the sentence stem in a way that seemed reasonable given the paragraph context. It was stressed that there was no right or wrong or expected answer, but that we were interested in how they thought the sentence would most sensibly be completed. Participants spent approximately 45 minutes to one hour on the task. Once complete, the booklets were collected and the participants debriefed and compensated for their time either by payment or by course credit, as appropriate.

Results

Participants completed the booklets in a manner consistent with the task instructions. The few exceptions, when the completions were not sensible, were amongst those supplied by those participants whose native language was not English, all of whom were excluded from all analyses. The completions supplied by the 240 English-speaking participants were reasonable in every case, i.e. consistent with the preceding context. From the 240 English-speaking participants, the analyses that follow are based on the percentage of participants who supplied the *target* completion. Alternative, non-target yet reasonable completions supplied by participants to the stem for the target proverb "His bark is worse than his bite" are demonstrated in Examples 2a through 2c.

(2a) Figurative Context

Mr. Greer, the vice Principal, was very angry with Bonnie and Carl who were skipping school. "That's four classes you two have missed this week, any more and you're both in big trouble," he yelled at them. When they got out of his office Carl said to Bonnie "let's go to the mall and skip English class." "I don't know," replied Bonnie "didn't you hear him before? It scared me pretty good." "Don't worry about it," insisted Carl,

"his *words are meaningless, I don't care at least.*

(2b) Literal-Synonym Context

As Bonnie and Carl went into Carl's house his dog began to growl very loudly. "I know he sounds mean but he is very well trained, he'll nibble softly on your hand to give you a kiss, come on, I'll show you" said Carl. He then motioned to Bonnie to go towards the dog. "I don't know," replied Bonnie "didn't you hear him before? It scared me pretty good." "Don't worry about it," insisted Carl,

"his *three legs are missing, it can't come after you even if it wanted to.*

(2c) Literal-Overlap Context

As Bonnie and Carl went into Carl's house his dog began to bark very loudly. "I know he sounds mean but he is very well trained, he'll bite softly on your hand to give you a kiss, come on, I'll show you" said Carl. He then motioned to Bonnie to go towards the dog. "I don't know," replied Bonnie "didn't you hear him before? It scared me pretty good." "Don't worry about it," insisted Carl,

"his bark *does not show how playful he is*.

Scoring and Coding of Completions

The dependent variable of interest was the percentage of the sentence stems that were completed with the target proverb. Thus, each completion was scored according to a simple 'yes' or 'no' criterion for whether the completion supplied was the elicited target proverb. Given 240 participants and 12 conditions, data were supplied by 20 participants

for each proverb in each condition. The number of target completions out of the possible total of 20 was then recorded as a percentage.

All booklets were scored twice. The first scoring was a strict scoring, for which only the exact wording of the target proverb was recorded as a completion. This scoring was conducted for experimental control and to facilitate comparison to the Ferretti et al. (2007) comprehension study that presented the target proverbs in this form. The second scoring was a liberal scoring. This scoring was conducted to reflect better the variability in phrasing that can be expected in production, given that proverbs are not strictly frozen expressions. The liberal scoring accepted elliptical (shortened) completions, gist completions, which had the same meaning as the target proverb but used somewhat different wording than the canonical form of the proverb, as well as strict canonical completions (see Example 4). The liberal scoring was conducted by two independent observers and the results averaged for analysis. The overall inter-rater agreement was 90.9%, with agreement in excess of 85% for each category.

(4) Examples of alternative completions accepted in the liberal coding:

Target proverb:	*Accepted elliptical completion:*
Don't ever burn your bridges behind you.	Don't burn your bridges.
Target proverb:	*Accepted gist completion:*
Don't air your dirty laundry in public.	Don't air your dirty linen in public. Don't air your dirty laundry for everyone to see.

Results of the general item analysis, based both upon the data scored to a strict criterion and to a liberal criterion, will be presented first, followed by the analysis by content words, again with data scored to both criteria.

Item Analyses

Analyses were conducted by item, since the interest of this study was in the production of proverbs and not in individual differences. The means and standard errors of the strict criterion and the liberal criterion completions are presented in Table 1. Results are presented together for comparison. As can be seen, overall completions are lower in the strict scoring than according to the liberal scoring, since the strict criterion responses were a subset of the liberal criterion responses. Both the strict and liberal criterion responses can be seen to be low following a sentence stem of only one word, with the number of target completions increasing through to the presentation of a fourth word in the stem. The completions also appear to be lowest overall in the figurative condition and highest in the lexical-overlap condition.

These observations were supported statistically by analyzing the percentage of completions with the target proverb using a 3 (context conditions: Figurative, Literal-Synonym, Literal-Overlap) x 4 (number of words in sentence stem: One, Two, Three, Four) repeated measures analysis of variance.

The results of the ANOVA based on strict coding revealed a main effect of words presented (F (3, 39) = 31.16, $p < .01$) and a main effect of context (F (2, 40) = 6.49, $p < .01$) but no significant interaction (F (6, 36) = 1.40, *n.s.*), as illustrated in Figure 1. Pairwise comparisons were conducted to clarify the main effects. For the number of words presented, each additional word significantly increased the percentage of completions, from the first word to the second word, (t(41) = -6.12, $p < .01$), and from the second word to the third word, (t(41) = -7.23, $p < .01$) and from the third word to the fourth word, (t(41) = 9.86, $p < .01$). One should note that even with four of the words of

Table 1

Mean completion percentages for item analysis, strict and liberal scoring

	Figurative		Literal-Synonym		Literal-Overlap	
	M	*SE*	*M*	*SE*	*M*	*SE*
			Strict Scoring			
Words						
One	10.71	2.50	15.71	3.23	21.07	3.34
Two	22.86	3.54	26.19	3.69	28.69	3.83
Three	37.62	4.39	35.83	4.16	40.71	4.80
Four	44.40	4.33	47.62	4.72	49.17	4.46
			Liberal Scoring			
Words						
One	26.43	3.79	33.15	4.26	42.02	4.28
Two	44.64	4.57	49.88	4.35	52.50	4.37
Three	62.08	4.44	58.63	4.20	59.82	4.25
Four	71.67	3.20	68.93	3.94	70.42	3.57

All n = 42
Results are recorded as the percentage of completions for which the target was given

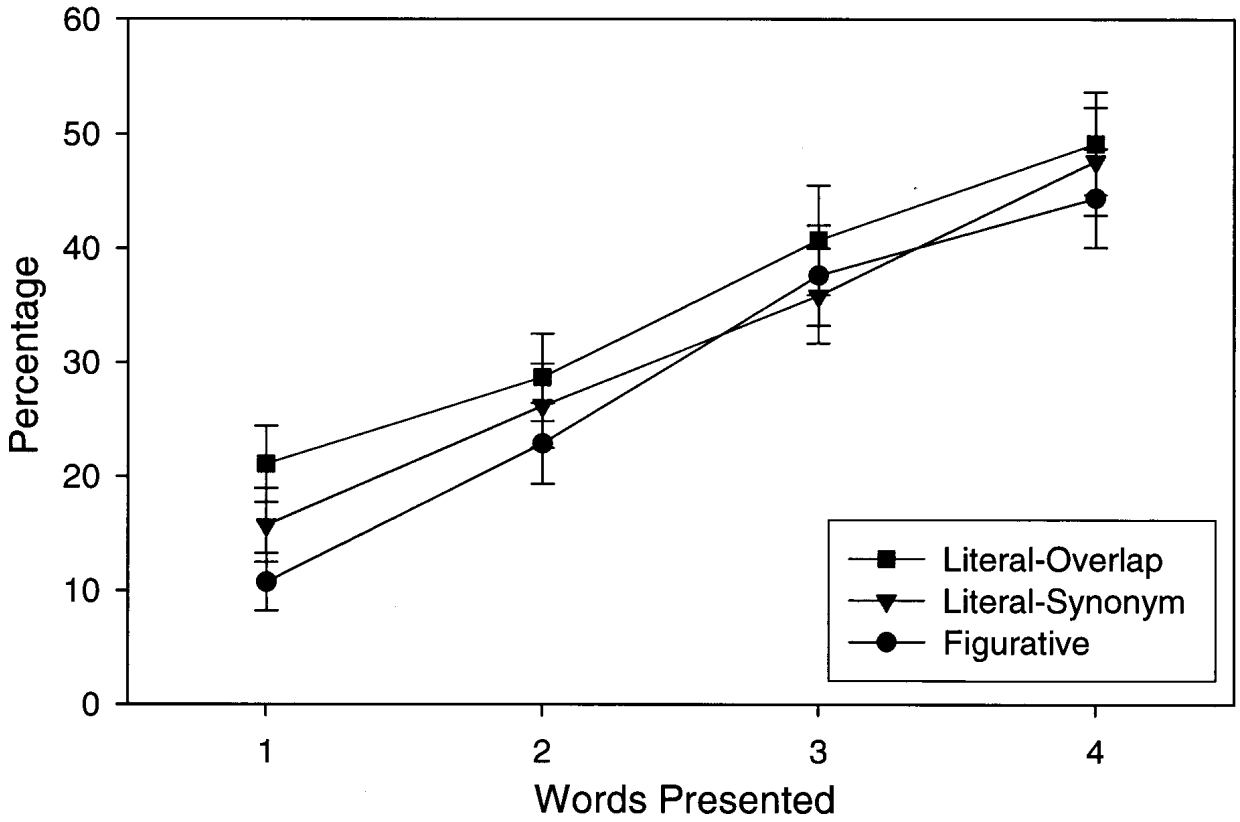

Figure 1: Percentage target proverb production given strict coding

the proverb presented, completions with the target did not exceed 50% in any of the three conditions. The examination of context effects revealed that completion was less probable in the figurative condition than in the literal-overlap condition, ($t(41) = 2.73, p < .05$), but no different than in the literal-synonym condition ($t(41) = 1.16$, *n.s.*). Completions in the literal-synonym condition were also significantly less probable than in the literal-overlap condition ($t(41) = 3.21, p = .01$).

The results of the ANOVA based on the liberal coding revealed a main effect of words presented (F (3, 39) = 47.36, $p < .01$), a main effect of context (F (2, 40) = 4.04, $p < .05$), and a significant interaction (F (6, 36) = 3.38, $p = .01$), as illustrated in Figure 2. Pairwise comparisons were conducted to clarify the locus of these effects. For the number of words presented, each additional word significantly increased the probability of completion, from the first word to the second word, ($t(41) = -6.23, p < .01$), and from the second word to the third word, ($t(41) = -5.16, p < .01$) and from the third word to the fourth word, ($t(41) = 4.90, p < .01$). As can be seen in Table 1, the percentage of completions with the proverbial sense (if not the exact words) was about 70% after four words presented. Examination of the main effect of context revealed that the figurative condition was not significantly different from either the literal-synonym condition ($t(41) = -.16$, *n.s.*) or the literal-overlap condition ($t(41) = -1.89$, *n.s.*). The literal-synonym condition, however, did yield significantly lower percentages than did the literal-overlap condition ($t(41) = -2.69, p < .05$). The main effects were qualified by a significant interaction, driven by the shift in the figurative completions, which were numerically lowest following the first and second words presented, but numerically highest following the third and fourth words presented. Specifically, following the first word presented,

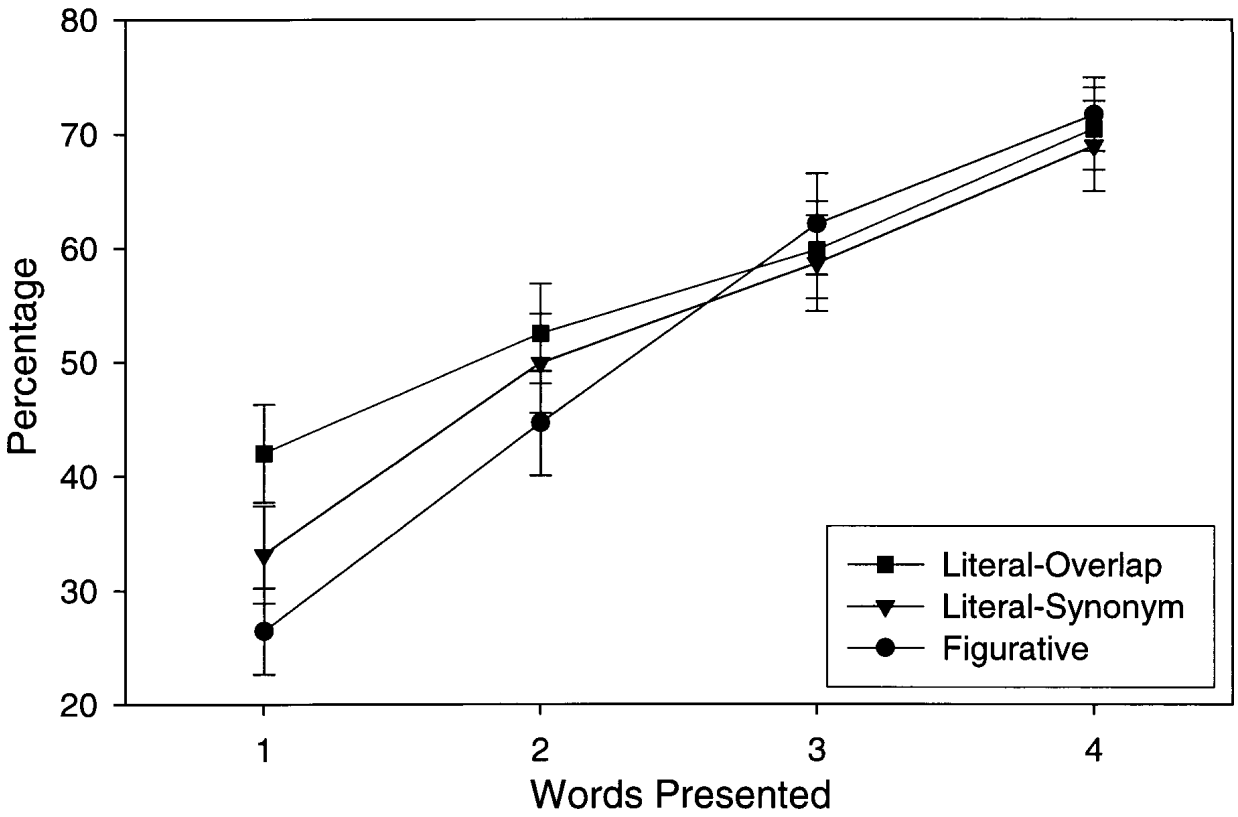

Figure 2: Percentage target proverb production given liberal coding

the percentage of completions with the gist of the target proverb was significantly less in the figurative context than in the literal-synonym condition ($t(41) = -2.06, p = .05$) or the literal-overlap condition ($t(41) = -3.12, p < .01$), and the percentage in the literal-synonym condition was less than in the literal-overlap condition ($t(41) = -4.08, p < .01$). Following the second word, these differences were eliminated, although a trend remained by which the figurative completions were somewhat lower than the literal-overlap condition ($t(41) = -2.00, p = .05$). Following the third and fourth words presented, the percentage of completions in each of the three context conditions did not differ significantly.

Content Words Analyses

A second set of analyses was conducted according to the number of content words in the stem. The sentence stems differed in the amount of information provided, since a content word (ie, "lightning") is more constraining to the completion than is a function word (i.e., "the"). Thus, the data were recoded for the number of content words presented in the stem. This yielded a 3 (context) x 3 (number of content words) design, with the number of content words presented ranging from none to two. Where the first word was a function word, for example, these data were coded as no content words presented. If the first two words were function words, then the percentages across the two regions were collapsed and coded as the percentage given no content words for that item. A total of 24 items from the original set of 42 items were appropriate for this analysis, providing data at each level of the content words variable. Again, two analyses were conducted, using strict and liberal coding of the responses. The descriptive

statistics for the strict and liberal content words analyses are presented in Table 2. These results are again presented together for comparison. As can be seen, target completions following zero content words presented were quite low, particularly given a strict criterion. Completions rise markedly given one content word presented. Completions are quite low in the figurative condition following zero content words but are comparable following two content words presented.

A 3 x 3 repeated measures analysis was conducted on the set of 24 items. The ANOVA conducted based on the strict coding revealed a main effect of the number of content words presented ($F(2, 22) = 23.28, p < .01$) and a trend toward a main effect of context ($F(2, 22) = 2.90, p = .08$). There was no significant interaction, $F(4, 20) = 1.09$, *n.s.*, as illustrated in Figure 3. Pairwise comparisons were conducted to investigate the main effect of the number of words presented. It was found that each additional word added significantly to the likelihood of production. The increase in the probability of production from zero content words to one content word was significant ($t(23) = 5.29, p < .01$), as was the increase from one content word to two content words ($t(23) = 6.16, p < .01$). Again, as in the earlier analysis, even with two content words presented the percentage of completions with the exact proverb was only around 45%.

A 3 x 3 repeated measures ANOVA was again conducted using the liberal coding. The results revealed a main effect of the number of content words presented ($F(2, 22) = 47.39, p < .01$) but no main effect of context ($F(2, 22) = .86$, *n.s.*). There was a significant interaction, $F(4, 20) = 6.62, p < .01$, as illustrated in Figure 4. Pairwise comparisons were conducted to investigate the main effect of the number of words presented. It was found that each additional word added significantly to the likelihood of

Table 2

Mean completion percentages for the item analyses using content words, strict and liberal scoring

	Figurative		Literal-Synonym		Literal-Overlap	
	M	*SE*	*M*	*SE*	*M*	*SE*
			Strict Scoring			
Content Words						
Zero	8.75	2.66	16.77	4.46	19.38	4.58
One	26.46	4.88	27.71	4.70	30.83	5.16
Two	43.23	6.01	44.79	6.28	46.15	6.23
			Liberal Scoring			
Content Words						
Zero	29.06	4.23	38.85	5.46	45.83	6.28
One	56.67	5.85	59.69	5.56	59.17	5.98
Two	79.69	4.01	73.54	5.16	73.75	4.80

All n = 24
Results are recorded as the percentage of completions for which the target was given

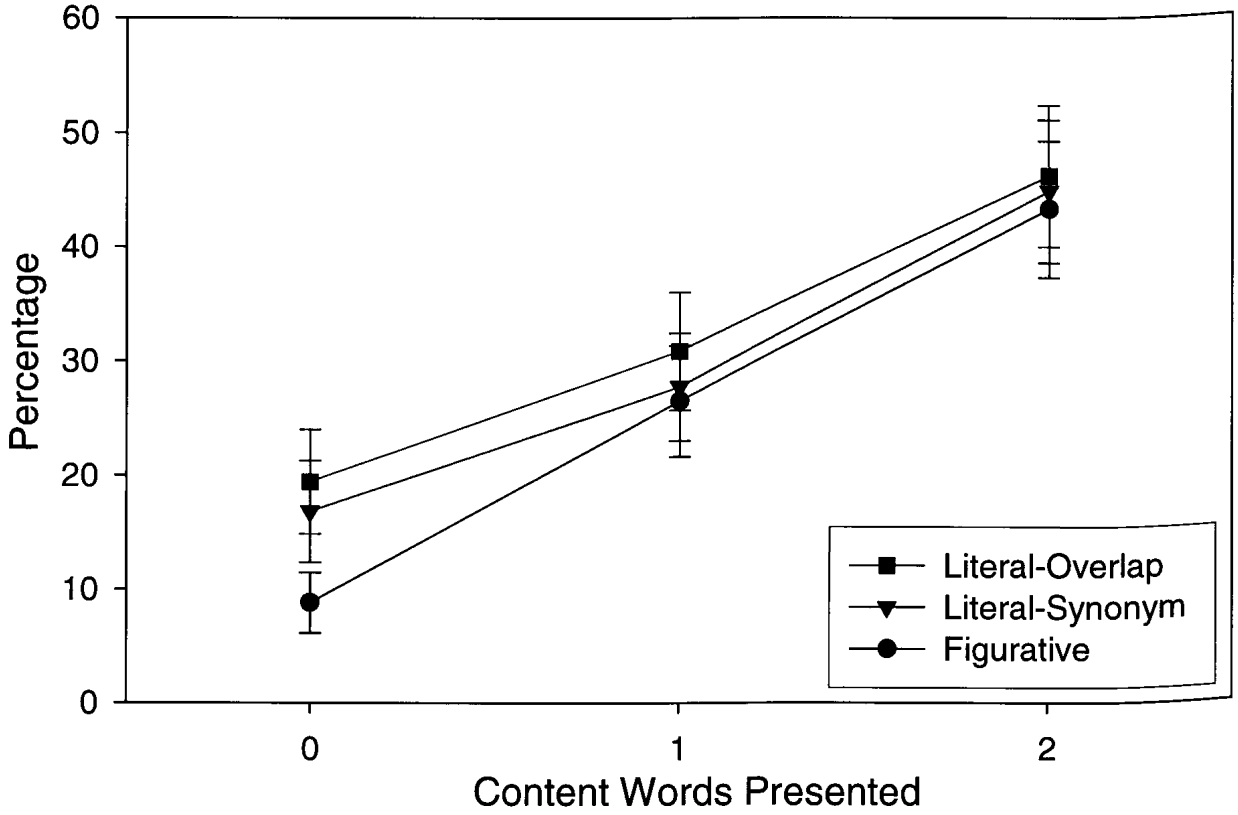

Figure 3: Percentage target proverb production given strict coding by content words presented

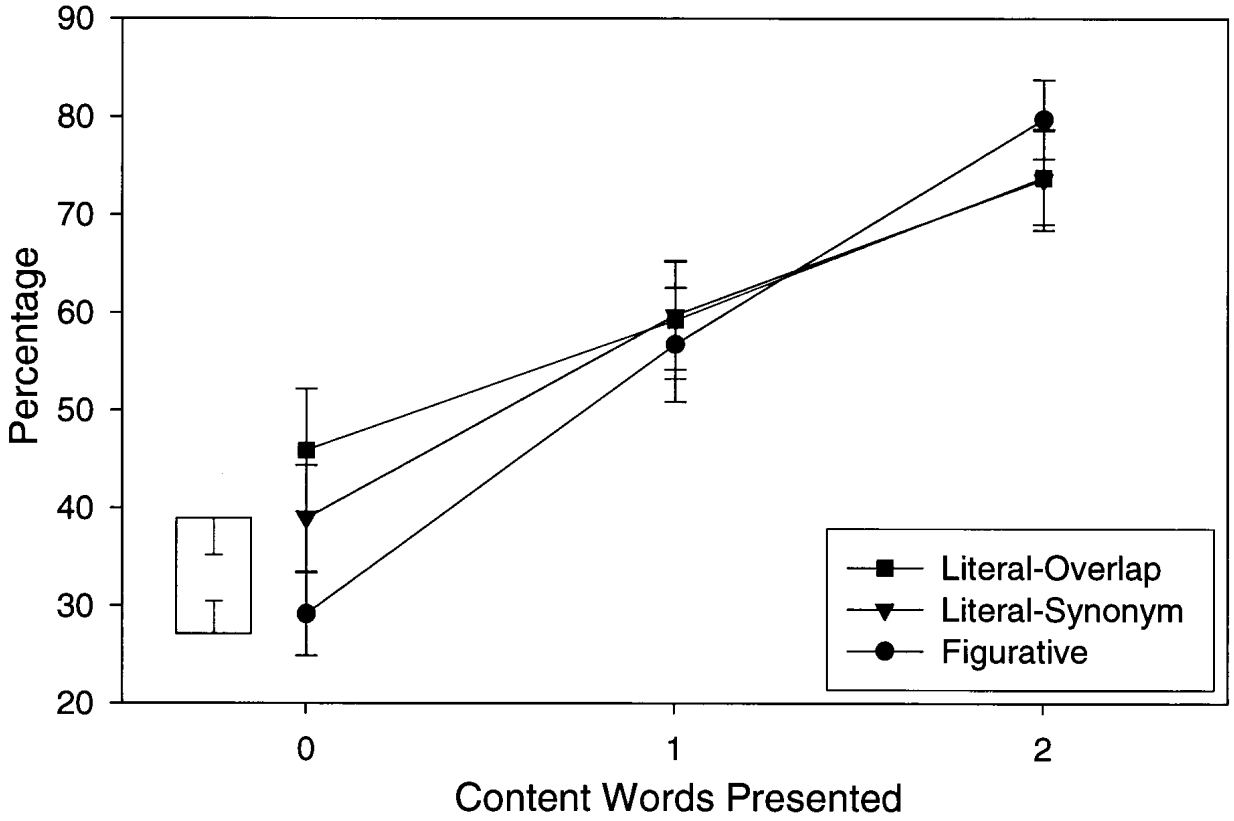

Figure 4: Percentage target proverb production given liberal coding by content words presented

production. The increase in the percentages from zero content words to one content word was significant ($t(23) = 5.67, p < .01$), as was the increase from one content word to two content words ($t(23) = 8.16, p < .01$). A study of the interaction reveals that whereas completion was lowest given zero content words in the figurative context, the percentage of target completions given more content words rose relative to the literal conditions. Specifically, given zero content words, the completion in figurative context is significantly less likely than in literal-overlap context ($t(23) = -3.21, p < .01$), while the completions in the literal-synonyms condition were only marginally higher than in the figurative condition ($t(23) = 2.06, p = .05$) and marginally lower than in the literal-overlap condition ($t(23) = -1.76, p = .09$). Given one content word, however, the percentages in all three conditions equalized, such that completion in the figurative condition was no less probable than in the literal-synonyms condition ($t(23) = -.57$, *n.s.*) or the literal-overlap condition ($t(23) = -.43$, *n.s.*), nor did the percentages in the two literal conditions differ ($t(23) = -.26$, *n.s.*). This remained the case given two content words, when again the percentage of completions was no higher in any one context condition. The maximum observed percentage of completions was near 80% following two content words.

Correlations with Comprehension Measures

To assess possible relationships between the probability of production and the ease of comprehension, the production results reported here were correlated with the ERP measures of brain activity during reading the same set of passages (as collected by Ferretti et al., 2007). There were 28 proverb textoids that were common to the two

studies. For each of those 28 passages, the strictly-scored and liberally-scored completion percentages were correlated with two ERP measures: the N400 and the LPC[1]. Each percentage of target completions was correlated with the ERP measure taken at the same region of the proverb (first word, second word, etc.) and in the same condition (figurative or literal-synonyms). Since data were not collected under the literal-overlap condition in the Ferretti et al. (2007) study, consideration of that condition was not possible.

At each region of the proverb, under both conditions, the percentage of target completions for each of the 28 proverbs was correlated to the amplitude of the ERP wave as measured at each of the 62 scalp electrode sites. The pattern of obtained correlations for which the productions correlated with the index of comprehension was examined for whether the scalp sites were clustered in a non-random way. A rendering of the locations of electrodes on the scalp, as used by Ferretti et al. (2007), is found in Figure 5.

For ease of exposition, the scalp sites for which there was a significant correlation with the productions are highlighted in situ on the scalp diagram in Figures 6 through 9, with positive correlations in blue and negative correlations in red. All significant correlations, whether positive or negative, were moderate in magnitude, $.38 \leq |r| \leq .58$. As can be seen, those sites that were correlated appear to be meaningfully clustered, suggesting some systematicity. The significant correlations in the figurative condition are seen at the first word, and are mostly negative and clustered in the posterior left hemisphere. The correlations with the literal-synonym condition are seen at words two,

[1] The ERP results reported in Ferretti et al. (2007) include the slow wave component. Correlations to that measure are omitted here. Whereas the N400 and LPC components are responses to each specific word of the proverb, the slow wave response develops over the entire length of the proverb. Thus it was deemed inappropriate to correlate the slow wave response to the word by word probability measure.

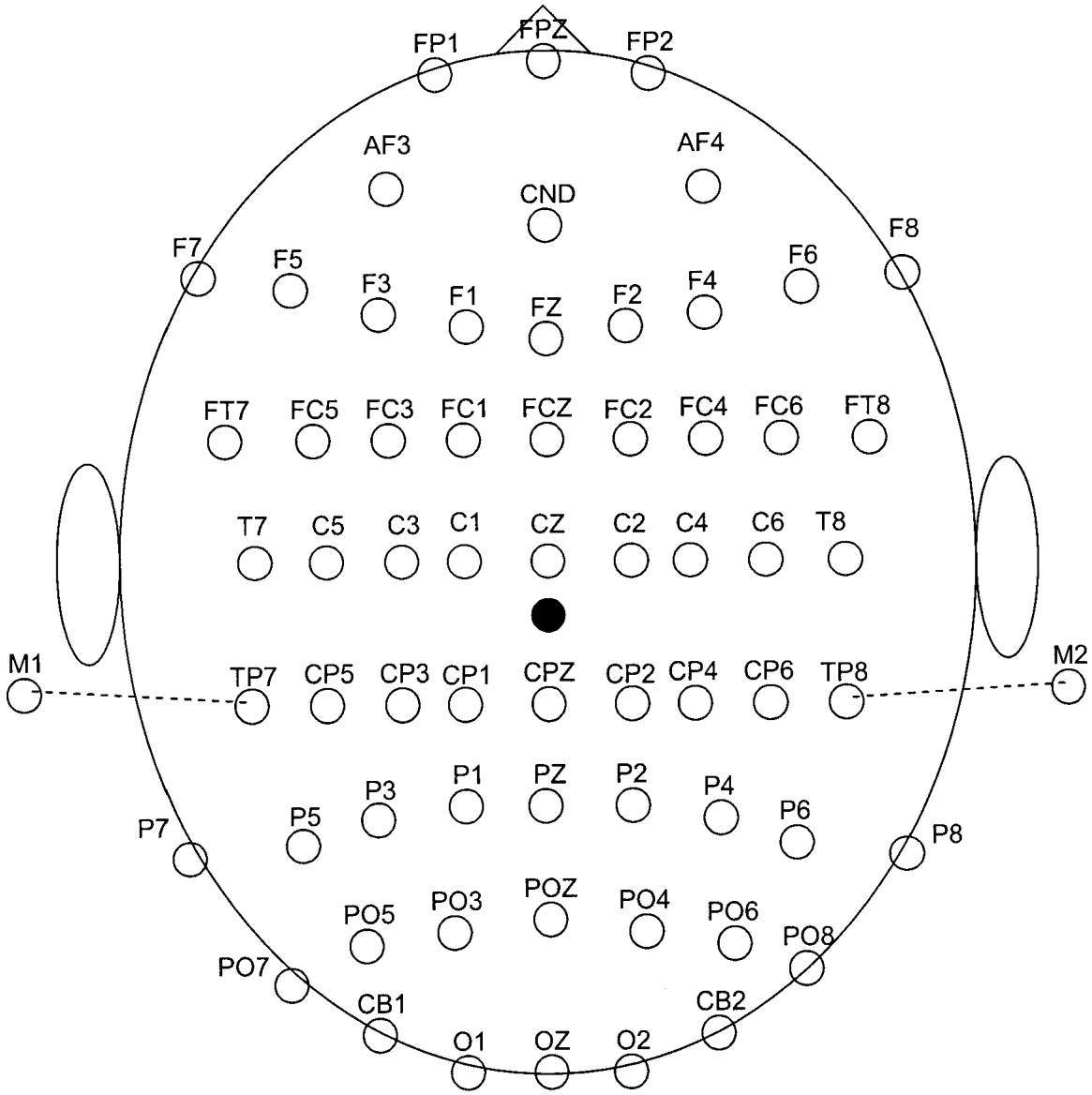

Figure 5: Location of the 62 scalp electrode sites used to gather ERP data in the study conducted by Ferretti et al. (2007)

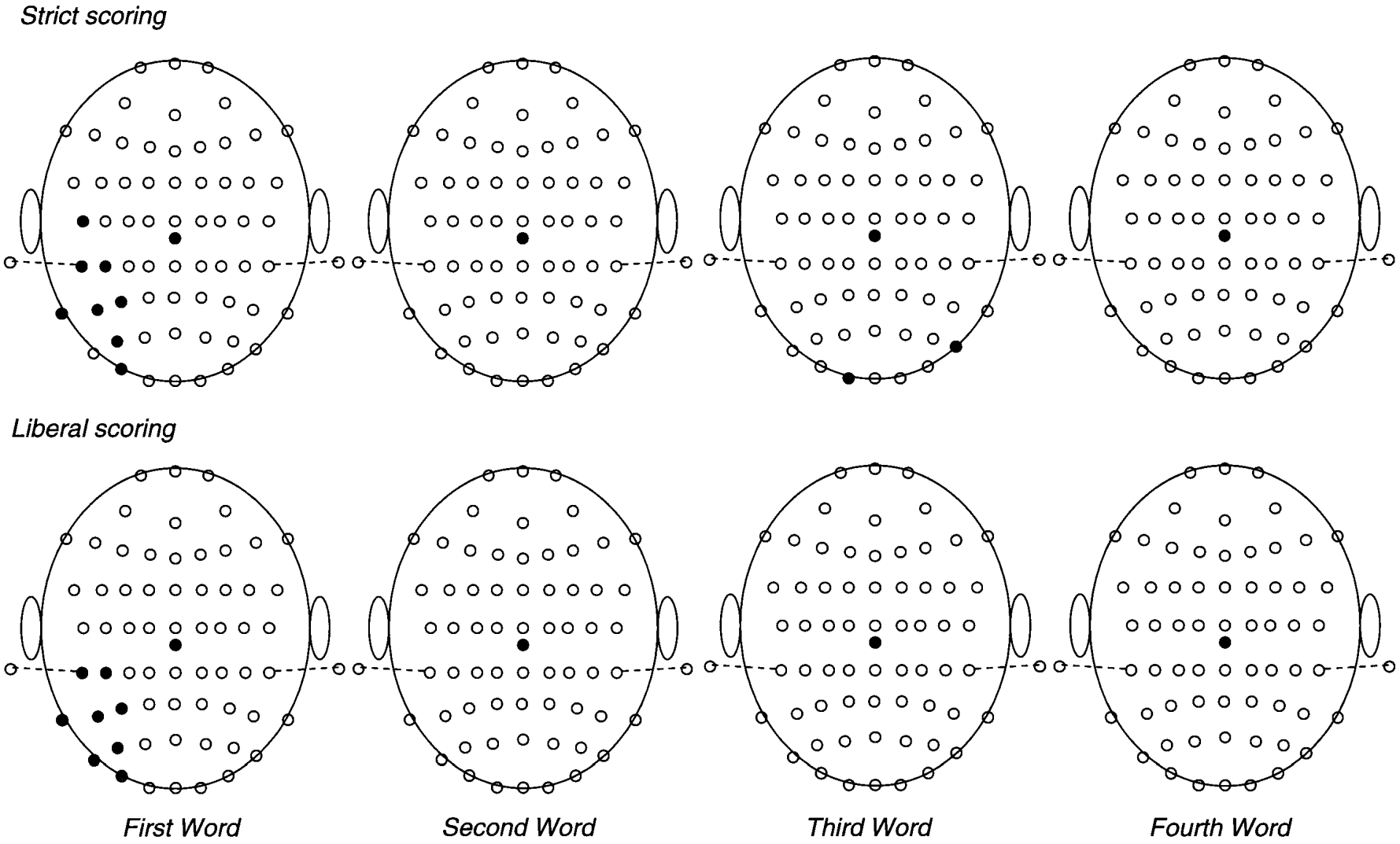

Figure 6: Correlations of the production percentages with the N400 comprehension data in the figurative context at each word

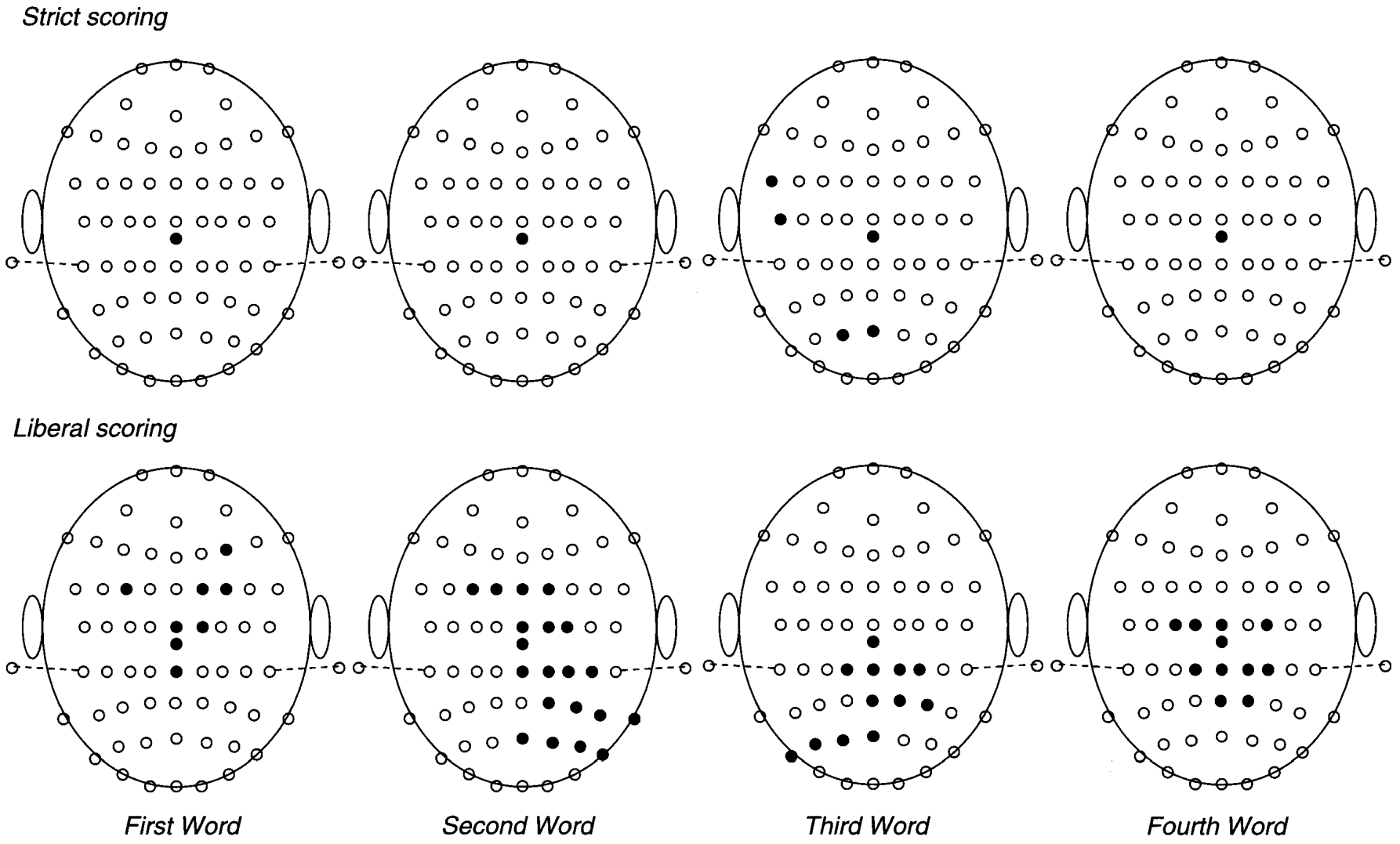

Figure 7: Correlations of the production percentages with the N400 comprehension data in the literal context at each word

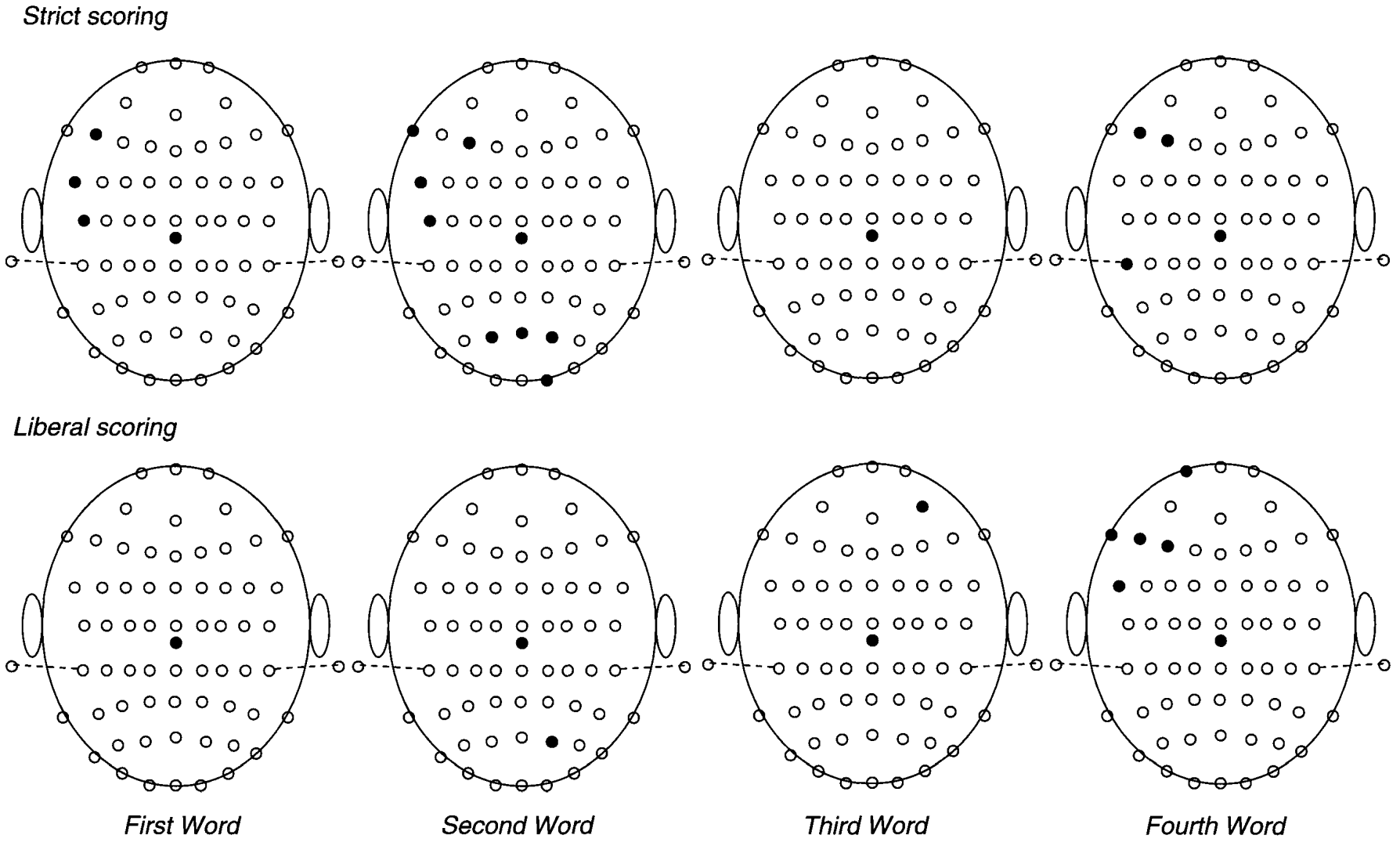

Figure 8: Correlations of the production percentages with the LPC comprehension data in the figurative context at each word

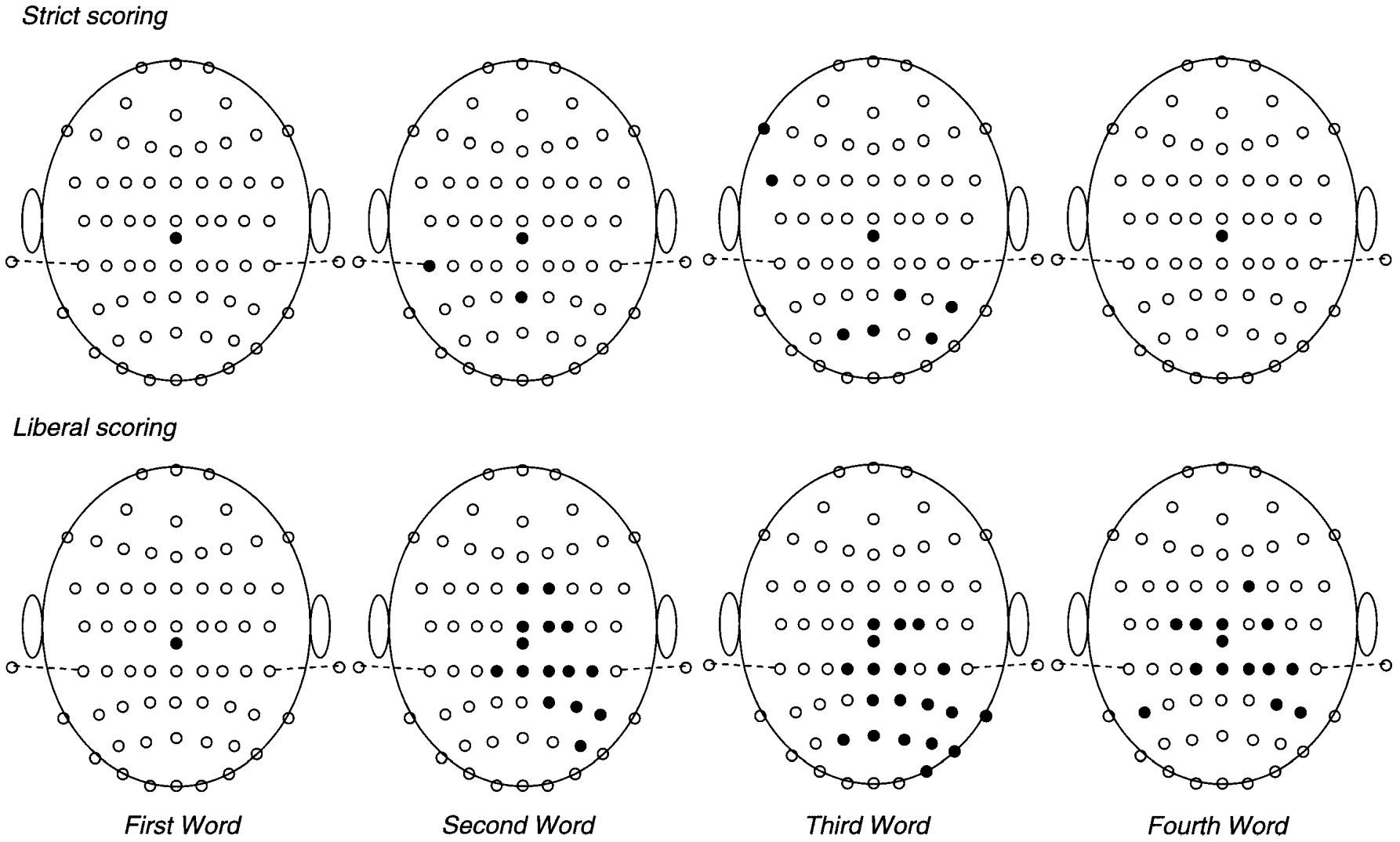

Figure 9: Correlations of the production percentages with the LPC comprehension data in the literal context at each word

three and four. They are mostly positive correlations clustered in the posterior right hemisphere. The complete set of correlations is presented in Appendices E and F.

Discussion

The basic aim of this investigation was to examine the probability of production of proverbs presented in each of three discourse contexts. The context provided either a figurative or one of two literal contexts. The set of materials were adapted from those used in previous research on comprehension to allow a direct comparison between the percentage of target productions and the ease of comprehension as measured by ERP indices. The results of the production data will be reviewed first, followed by a discussion of how these results may corroborate or challenge extant accounts of figurative language comprehension. The results of the direct comparison of production and comprehension data will then be discussed.

Production

Recall that the basic data collected in the present investigation were the percentage of completions which gave the target proverbs, under three different contextual conditions and following a sentence stem of one to four words in length. The booklets were scored for whether each completion was the target proverbial completion according to both a strict and a liberal criterion. The strict criterion was necessary for experimental control as an analysis of the exact phrasing and length of the provided completion. A second analysis was also necessary because proverbs are not fully fixed expressions. The liberal criterion captured slight variations in the length and wording of

the proverb such as are often encountered in natural discourse. Thus its results were arguably the more ecologically valid and better captured the subtle variations in phrasing that is observed in natural spoken language. The results of both the strict and liberal coding will be discussed here; consideration of the purpose served by each system of coding will be useful to the interpretation.

The first and most basic result was that the percentage of sentence stems completed with the target proverb rose linearly according to the number of words given in the stem, as indicated by the main effect of words presented. This effect is not surprising; a longer sentence stem provides more information about the phrase, and reduces the length and potential variability of the completion. It should also be noted that this same pattern was seen in the content words analysis. That analysis was critical to assessing the probability of production as encouraged by the textoid context alone, given the assumption that a sentence stem composed of only a function word provided very little information or constraint beyond what had been provided by the textoid. Thus, by measuring what the probability of proverb use in the ensuing discourse might be without any sentence stem, the percentage following zero content words provides a proxy measure of context effects, the cues provided by the textoid. The percentages following zero content words were fairly high given the variability of production, ranging from a mean completion rate of 8.75% in the figurative condition to 19.38% in the literal-overlap condition based upon strict coding. Given liberal coding, the rate of completion following zero content words was considerably higher, from 29% in the figurative condition to 46% in the literal-overlap. Clearly, context alone can have a measurable effect on production, and these effects are evident at the earliest moments of production.

These results also serve as a manipulation check that the contexts did indeed encourage the use of the target proverb, as they were designed to do.

Second, a main effect of context was observed given either strict or liberal coding in the overall analysis. Given strict coding, the target completions following a literal context with lexical overlap were significantly higher than in the other two conditions. It was expected that this condition would yield the highest rate of completion because it provided the most cues. A literal context presents more features that overlap with the target proverb, so that the concepts expressed by the proverb have been primed by the textoid. Here, the priming was not only conceptual but also lexical, which was to apparent advantage relative to the literal-synonym condition.

The main effect of context was also seen given liberal coding. Here, the literal-synonym condition yielded lower percentages than either the figurative or literal-overlap conditions. Whereas the figurative meaning of the proverb is associated with a semi-fixed form, the proverb used for its literal meaning is not associated with a fixed form (Ferretti et al., 2007; van Lancker Sidtis, 2006) and thus a proverb used literally is not as rehearsed and familiar as the proverb set in figurative context. This may explain why the literal-synonym condition yielded lower percentages, relative to the literal-overlap and figurative conditions. The conceptual priming provided by the literal context did not sufficiently constrain completions. When there was lexical overlap between the context and the target, however, the lexical priming in addition to the conceptual priming resulted in a higher percentage of target completions.

The results are clarified by the interaction observed in the liberal analysis. When the sentence stem provides only one word, then completion with the target proverb is

relatively unlikely following a context biased towards a figurative interpretation. This may reflect the fact that literal language is more prevalent than figurative, and following a paragraph in which every statement is a literal statement (as was the case for all the textoids in the present study) it is likely that the following sentence would also be treated as literal, not as figurative. As more words are presented, the relative probability following a figurative context rises and is equal to that of the literal condition by the presentation of words two to three.

Importantly, this demonstrates that the figurative use is not uniformly disadvantaged in comparison to the literal use. Rather, the figurative use can be just as likely provided that the context gives sufficient cues toward a figurative use. It is possible that this is because the context prepares a mental representation of the situation that is compatible with a finite number of reasonable continuations. The sentence stem acts to further constrain the possible completions, until the figurative proverb is as favoured in appropriate context as the literal.

The content words analysis acted as an important check by providing another way to quantify the amount of information presented in the sentence stem. In the overall item analysis, there was no distinction made as to whether the first word presented a function word or a content word, although all proverbs had presented one content word once three words total had been presented. The content words analysis better quantified the amount of information presented in the stem. Not all proverbs were suitable for this analysis because their stems did not furnish results at each level of the variable, specifically, following zero, one, and two content words; this was true of proverbs that began with a content word or that had only one content word in the maximum length four-word stem.

Of the set that was amenable to analysis, the pattern of results was congruent with the first analysis, particularly given liberal coding of the supplied completions. Initially the percentage of target completions was low, particularly for the figurative condition, then increased significantly following one and then two content words, with a particular increase for the figurative condition. Thus, the results act as a check that variability amongst proverbs in the amount of information provided in the stem did not drive the results.

Models of Comprehension

Recall that, in the absence of a developed literature on the production of figurative language, major claims in the comprehension literature were reviewed above. These approaches provided competing accounts of how figurative language is processed, thereby indirectly reflecting on the possible representations of figurative language that are assumed to be common to both comprehension and production (Roelofs, 2003).

The standard pragmatic model, which stressed obligatory literal-first processing, was not compatible with the present results. Not only were the proverbs produced in response to a figurative context and a short stem, but they were produced at a level comparable to the literal use. Similarly, the graded salience model was inadequate in predicting the present results, as the proverbs were not equally likely to be produced in either a figurative or a literal context, and in fact the advantage was in the literal context, not in the figurative context, where the salient use would have been supported (as per the updated model, Peleg et al., 2001).

In fact, both these models fare poorly when applied toward production. Both state that a trope is initially processed for its literal or salient meaning independent of context. In the present study, however, context supplied much of the information for what might be appropriate as a continuation. The proverbs were only presented to participants as stems, thus, the nonliteral or non-salient meaning of the proverb as a whole would not be accessible unless the proverb was recognized. If the proverb were recognized, then the probability of production ought to have been higher in the literal or the figurative (salient) condition, according to the standard pragmatic or graded salience positions. Nor was the context-dependent direct access view sufficient in predicting the present results, as it would predict equal probability in either the literal or figurative context, provided that the textoid was equally supportive of the corresponding use. What none of these three models could adequately account for is the interaction seen in the liberally-coded data.

For a figurative sentence to be produced, a figurative intent must be present. There must be a point of recognition of a trope, potentially nonconscious, when the preceding discourse context is realized and integrated with the emerging sentence structure as a framework supportive of a figurative utterance. Such was the proposal put forth by Ferretti et al. (2007) in discussing the effects of context on comprehension found at the third word of the proverb. Similarly, the results here indicate that once the sentence stem has taken sufficient form to be recognizable as a familiar proverb, by the third word, then the completion of the proverb with a figurative use is just as likely as with completion with a literal use with lexical overlap, given that both were supported by detailed, appropriate discourse contexts.

This finding is reminiscent of the proposal for a recognition point put forth by Cacciari and Tabossi (1988) in their study of idiom comprehension. Recall that they found that a portion of the idiom, which they termed the idiom key, could be sufficient to prime the meaning associated with idiom as a whole. In the present study, the proverb as used figuratively was recognized and produced by the third word of the seven-word proverbs at a level comparable to the literal use. However, in contrast with Cacciari and Tabossi's proposal, the present results do not show a discontinuity from very low to very high completion. Rather, the results reported here show a gradual, incremental increase with each additional word presented. Even after four words presented the results did not reach ceiling. This gradual increase in the percentage of target completions is better explained through a constraint satisfaction approach as the product of the availability and strength of discourse cues.

Direct Comparison to Comprehension

This study sought not only to investigate production, but to do so in a way that was informed by extant research on comprehension. In particular, the materials for this study were adapted from a study conducted by Ferretti et al. (2007). Our attention will now turn to the success of the hypotheses drawn from that study in predicting the present results, as well as the results of the direct comparison.

To recall the debate in the comprehension literature outlined earlier, reading time data has typically found no difference between the time taken to read a familiar figurative statement or a literal statement, given appropriate context. This finding was replicated by Ferretti et al. (2007) for the collection of proverbs and accompanying textoids used here. This finding has been taken as evidence that the processing of figurative language is not

disadvantaged relative to literal language. Hence, the reading time data would predict similarity in the use of figurative and literal language. However, more recent studies of language processing using measures of ERPs have found that when encountering figurative language in context, participants' brain activity suggests that it is perceived to be more semantically incongruous than literal language, and thus perhaps it is more effortful to process (Coulson & van Petten, 2002). Again, this was also found by Ferretti et al. (2007) for the set of textoids and accompanying proverbs.

The present results showed this inequality between figurative and literal language use, with a proverb less likely to be produced as a figurative use given strict coding and an interaction effect given liberal coding. Most significantly, however, was the locus of context effects as found by both Ferretti et al. (2007) and by the present study. Ferretti et al. found that the distinction between a figurative and a literal context was realized at the third word of the proverb, when ERP results showed that the figurative context was associated with more processing. In the present study, the respective textoids were designed to be equally supportive of either the literal or figurative use of the proverb, on which basis the completion probabilities ought to have been equal throughout, if predicted by reading time data. However, the results indicate that early in the proverb the literal-overlap context was advantaged, due primarily to lexical priming. By the third word the probabilities were equal as they would be on the basis of contextual support. Thus, it seems apparent that it is at the third word of a proverb that the emergent trope is integrated with the discourse context, and the production of the proverb, used figuratively, is supported. The finding of the present study thus corroborate the conclusion of Ferretti et al. (2007) that the emergent trope is integrated with the discourse

context by the third word of the proverb, given proverbs seven words in length. In the case of comprehension, this is associated with a perception of semantic incongruity and more effortful processing, while for production, this is associated with a greater probability of contextually appropriate use.

The results of correlating the probability of production and the ERP indices of comprehension under the same condition at the same point in the proverb revealed that scalp sites significantly correlated with the rate of production were clustered, as illustrated in Figures 6 through 9. In the figurative context, the N400 data were negatively correlated with the percentage of productions at the first word, with correlations clustered in the parietal-occipital scalp sites. Perhaps counterintuitively, greater rates of production were associated with greater perceived semantic incongruity. However, this may again reflect that production of a proverb is critically related to recognizing and processing its figurative use as appropriate in context, an effortful process. In the literal context, the N400 data in the central-parietal areas were positively correlated over all words, given liberal scoring only. This indicates that proverbs that were more likely to be produced in literal context were also processed as more congruous with the context. If considered in terms of expectancy, literal language that is both easy to integrate and likely to be produced can be construed as highly predictable.

Results of the correlations with the LPC, which follows the N400, show negative frontal-temporal correlations with probabilities in the figurative context, indicating that proverbs that are less likely to be produced are also perceived to be more difficult to comprehend. Data from the literal context indicated positive correlations clustered mainly in the central-parietal regions, indicating that higher probabilities of production

are associated with greater ease in integrating the proverb. This result for the figurative context is different than that seen when correlating to the N400. However, the LPC results should be interpreted with more caution. Ferretti et al. (2007) found evidence that while the N400 effect was robust, the LPC result may have been partly artifactual, due to differences in slow-wave amplitudes.

Overall, these findings indicate possible avenues for further exploration. In particular, the topography of correlated scalp sites is of interest. These results seem to indicate that production is associated with activity in parietal-occipital areas given a figurative context, and with central-parietal areas given a literal context.

Limitations

The literal-overlap condition, which was the stronger of the two literal condition manipulations, was not represented in the ERP correlations since ERP data on comprehension in this condition were unfortunately not collected by Ferretti et al. (2007). Given that the primary contrast in the present results was seen between the results of the figurative condition and those of the literal-overlap condition, correlations to the latter condition would be of interest, and perhaps would serve to further clarify the results.

The discussion has so far described this study primarily as one of production. While this is true, it was a heavily controlled study of production. This was in accordance with the aim to align the research with the comprehension literature and with the cited need for basic experimental research on production. Recall that all participants' completions were reasonable and generally appropriate to the preceding context, which is not insignificant across the sample of 240 participants. However, non-target completions

were not further analyzed. Non-target completions could be analyzed for evidence of figurative, albeit non-target, language. Some of the supplied completions, for example, were too dissimilar to the target proverb to be scored as target in the liberal scoring, and yet did bear common elements with the meaning of the target.

Given its construction, the present study was perhaps a hybrid of comprehension and production. Participants were asked to produce a continuation not to their own words, but in response to what they had been asked to comprehend, and to a sentence stem that may have differed from their own preference. As such, the data collected by this methodology might be conceived as measuring expectancies. Having followed a discourse, what did participants expect to hear (or read) next? By this conception, these results are particularly informative for comprehension data. Of course, natural conversation is an ongoing process of both comprehension and production. The content analysis is again useful, in that the percentage of target completions given zero content words gives a proxy measure of a response to a discourse scenario. Further study asking for spoken, rather than written, completions could further our understanding of production in a more naturalistic setting. While the antecedent discourse was presented to participants somewhat artificially through a textoid, the antecedents of natural discourse are equally and uncontrollably presented by a conversational partner, and must be interpreted before a response can be made.

A strength of the presented results is the reliability achieved by the large sample size. Data gathered from 240 participants resulted in a sample size of 20 participants per cell, and data were collected at all levels of both variables for all proverbs. This approach yielded better sensitivity in the measurement of production, providing the necessary

stability for the study of something so variable. Future research might seek to increase the number of filler items in order to limit participant expectancies. However, given 18 (literal) fillers and 28 literally-biased textoids, only 14 of 60 textoids encouraged a figurative expression, thereby maintaining the proportion of figurative expressions typically given in comprehension studies. If the study were to be repeated using more pure filler items, then the number of booklet versions would also have to increase so as not to increase the overall number of items. The current study, with its total of 60 items, took most participants 45 minutes to one hour to complete. As an involved task, the number of items presented to any one participant could not be increased without considerable risk of fatigue and loss of attention.

Conclusions and Directions

Comparison to the findings of Ferretti et al. (2007) supports two conclusions. First, the production results presented here were congruent with the ERP measures of comprehension showing context effects with a particular change evidenced at the third word of the proverbs. Recall that the ERP data showing evidence of more effortful processing in the figurative condition than in the literal condition differed from the reading time data showing no difference between the figurative and literal conditions. Given that differences were found here between the figurative and literal condition, this result reinforces the utility of these more sensitive measures, especially as predictors of production behaviour. Second, a constraint-satisfaction approach best predicted the results reported here. Context was clearly important, supporting a context-based approach. The interaction indicates that the probability of production resulted from

multiple sources of information, both words presented and context, which together acted to constrain the interpretations. In order to better understand the role played by salience, the present study should be extended to include nonsalient items.

Further study ought to be done using idioms. Idioms have been more studied in previous literature than proverbs, and there is a well-formed debate as to whether idioms are stored lexicalized units, with the entire string represented as a single entry in the mental lexicon or whether the idiom is stored according to its constituent words. One extant study of production, conducted by Sprenger et al. (2006), used a priming paradigm to examine exactly this issue, namely what production data implied about the representation of idioms. Results of that study supported a hybrid theory of representation. The question of the representation of proverbs leaves much to be studied. As expressions which serve such a strong pragmatic function in cautioning and instructing (Honeck, 1997), proverbs are an important and unique instance of figurative language. Studies of production, with a particular focus on elucidating the mental representation, will be necessary to expanding the comprehensiveness and accuracy of our understanding of the use of figurative language.

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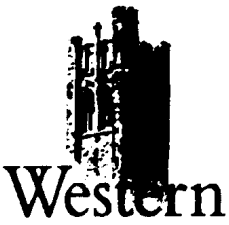
Appendix A

University of Western Ontario Ethics Approval for the current project



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Use of Human Subjects - Ethics Approval Notice

Review Number	**06 06 03**	**Approval Date**	**06 06 14**
Principal Investigator	**Albert Katz/Sarah McCormick**	**End Date**	**06 12 31**
Protocol Title	**Test processing and language production: Measuring completion probabilities**		
Sponsor	**n/a**		

This is to notify you that The University of Western Ontario Department of Psychology Research Ethics Board (PREB) has granted expedited ethics approval to the above named research study on the date noted above.

The PREB is a sub-REB of The University of Western Ontario's Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement and the applicable laws and regulations of Ontario. (See Office of Research Ethics web site: http://www.uwo.ca/research/ethics/)

This approval shall remain valid until end date noted above assuming timely and acceptable responses to the University's periodic requests for surveillance and monitoring information.

During the course of the research, no deviations from, or changes to, the protocol or consent form may be initiated without prior written approval from the PREB except when necessary to eliminate immediate hazards to the subject or when the change(s) involve only logistical or administrative aspects of the study (e.g. change of research assistant, telephone number etc). Subjects must receive a copy of the information/consent documentation.

Investigators must promptly also report to the PREB:
a) changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
b) all adverse and unexpected experiences or events that are both serious and unexpected;
c) new information that may adversely affect the safety of the subjects or the conduct of the study.

If these changes/adverse events require a change to the information/consent documentation, and/or recruitment advertisement, the newly revised information/consent documentation, and/or advertisement, must be submitted to the PREB for approval.

Members of the PREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the PREB.

Clive Seligman Ph.D.

Chair, Psychology Expedited Research Ethics Board (PREB)

The other members of the 2005-2006 PREB are: Bertram Gawronski, Rick Goffin, Marc Joanisse, and Jim Olson

CC: UWO Office of Research Ethics

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Appendix B

Figurative context textoids associated with the target proverbs

1.
There's no use crying over spilled milk
Robyn answered the phone with an exasperated "hello." After listening for a short time she whimpered a disheartened, "thanks" and hung up. "What is the matter?" asked Bill. "I didn't get that promotion" she stated while beginning to sob. When Bill noticed her reaction, he stated "There's no use crying over spilled milk."

2.
The cat is out of the bag
"Why won't you tell me what you're making for my birthday?" said Joseph as he peered into the kitchen. "It's a surprise and you'll find out soon enough," said Katherine as she directed him away. As Katherine was pushing him from the kitchen entrance, a recipe for Beef Wellington, Joseph's favorite food, dropped from the counter and he picked it up. "I guess I'll find out sooner than you thought," said Joseph. Katherine stated "The cat is out of the bag."

3.
Don't bite the hand that feeds you
Rod was miserable living in poverty on the streets when his friend Emma helped him find a place at a homeless shelter where she worked. Despite receiving support from the shelter for two weeks, Rod made it clear to Emma that he hated all the rules at the shelter and her advice was simply to, "get used to it." In a disrespectful manner, Rod swung his hand at her. Angered by Rod's lack of respect, Emma yelled at him "Don't bite the hand that feeds you."

4.
Don't judge a book by its cover
"I am excited to go on my date with Reggie tonight," said Krista. "I don't know him very well but he's good looking and athletic and I know we'll have a good time," she added. "Don't be so sure," added Vince, "I know the guy and I can't see you two getting along very well. Do you know what a date with him is like?" "No but I already know I'd enjoy it," Krista answered. "You never know," replied Vince "don't judge a book by its cover."

5.
His bark is worse than his bite
Mr. Greer, the vice Principal, was very angry with Bonnie and Carl who were skipping school. "That's four classes you two have missed this week, any more and you're both in big trouble," he yelled at them. When they got out of his office Carl said to Bonnie "let's go to the mall and skip English class." "I don't know," replied Bonnie "didn't you hear him before? It scared me pretty good." "Don't worry about it," insisted Carl, "his bark is worse than his bite."

6.
The shoe is on the other foot
Jen was waiting for her friend Brad to find out his mark on a recent paper they had both submitted. Brad really hoped his mark was better than Jen's mark because she always gets higher grades and always brags to him about it after. He looked at his mark and could not believe how well he did. "How did it go?" she asked when he came back. He said, "The shoe is on the other foot."

7.
Don't air your dirty laundry in public
Sandra and her husband Ted were walking together through a crowded park with their daughter Kim when Ted made a snide comment about Sandra's cooking abilities. "I don't know how to cook?" she responded to him, "lets talk about how you never clean or show me affection." Kim was embarrassed about her parent's argument in a busy public place, and stated "that's enough bickering". "Excuse me," responded Sandra, "but I don't think this has anything to do with you." Her daughter responded angrily, "Don't air your dirty laundry in public."

8.
Every bird likes to hear himself sing
"I never realized that the governing bodies and corporations have such control over our way of living," said Robert. He and Deirdre had just attended a seminar about government oppression. "I think the guy running the seminar just talks to satisfy his ego," said Deirdre in response. "Why does he do that?" asked Robert. "Every bird likes to hear himself sing."

9.
Don't put the cart before the horse
Tessa and Ian were trying rigorously to get their two-year-old son to ice skate. They tried lots of different methods to get him to balance but he kept falling. "He can barely walk, he doesn't have to skate yet," said Ian. "I know that I can get him to skate now," said Tessa. Ian replied "Don't put the cart before the horse."

10.
The chickens have come home to roost
"I know the boys like the cupcakes I make for Timmy's birthday, but they might be getting too old for that stuff. Timmy and his friends were saying they would like to go to the school dance instead," said Gail. "Oh they'll be here soon I'm sure," said Frank confidently. Just then Timmy and his friends showed up. "How in the world did you know that would happen?" wondered Gail. Explained Frank, "The chickens have come home to roost."

11.
There's a sucker born every minute
"We already tried to swindle that guy at the bank and he nearly called the cops," said Shannon. "Come on, we should just leave this town and try our scam on someone else"

she added. "I've got a feeling about this place, I know there's going to be someone to swindle," replied an optimistic Kevin. "What do you mean?" wondered Shannon. "There is a sucker born every minute."

12.
Where there is smoke there is fire
"I can't believe, he's drinking beer already," said Pete angrily as his wife Stacey showed him a bottle of beer found in their son's room. "It's just one bottle, don't overreact," said Stacey. "Did you check the whole room?" asked Pete, "I'll bet there is more beer in there." "What makes you think that?" asked Stacy. "Where there is smoke there is fire."

13.
Don't burn your candle at both ends
"I'm thinking of getting a night job at the rubber factory in addition to my day job at the farm. If I do it will give us a lot more money," said George to his wife Leeann. "I don't want you to get another job, we will have enough money, and besides, I don't think you'll have enough energy to do both," said Leeann. "It will be an improvement over having just one," said Elliot. "Don't burn your candle at both ends."

14.
A good offense is the best defense
"I didn't rob anyone, the woman who is accusing me is either lying or crazy," said an exasperated Jim. "You've got to get me acquitted Will," he pleaded to his lawyer. "Don't worry, I'm going to attack your accuser's credibility and I guarantee I'll keep you out of jail," said Will. "That's a little overconfident don't you think?" asked Jim. "No," replied Will, "a good offence is the best defense." "

15.
When in Rome, do as Romans do
"I'm an undercover cop," said Ryan "not an actor, I just don't think I'll fit in with criminals." "I think you'll do fine. You learned everything from that huge file the chief gave you," Jenny reassured. "I just don't think I'll be able to recall everything I need to know once I'm actually there," worried Ryan. "Just remember," said Jenny "when in Rome, do as Romans do."

16.
We're up the creek without a paddle
"Hey Henry, we have an exam tomorrow in that English class we haven't attended yet," said Sue urgently. "We're going to fail, neither of us has the textbook, and there aren't any left at the bookstore," she exclaimed. "I know it seems bad, but there's got to be some way to learn the material," said Henry. "Henry, would you be realistic," said Sue. "We're up the creek without a paddle," she exclaimed.

17.
Birds of a feather will flock together
"I don't like how people socialize at this school," said Megan. "The people who play sports always hang around each other and no one else and the guys who are in the computer club do the same," she stated. "You're right, they isolate themselves into their own little groups," stated Betty. "They don't seem to want to be around each other at all," said Megan. "Birds of a feather will flock together."

18.
The early bird always catches the worm
"Well we thought about it for months but we finally made our decision to get that new car. Jay is going to buy it today at J & K Motors," said Abby. "I hope he can get it, that car has been selling out fast," said Renee. "He got there the first thing in the morning, so I know he'll succeed," said Abby. "The early bird always catches the worm."

19.
The squeaking wheel will get (as opposed to gets) the grease
"I'm getting annoyed with my supervisor. He will always deal with Greg's problems but never mine even though I work twice as hard as he does and never complain like he does," Billy told his dad Alex. "Unfortunately, this type of thing is what usually happens in the working world," Alex told Billy. "I don't understand why dad," said Billy. "That's how it works son," explained Alex, "the squeaking wheel will get the grease."

20.
There is a skeleton in every closet
"Hey Craig, I heard some interesting gossip today," proclaimed Mary. "Apparently Mr. Smith, who's always talking about how important the law is, was a burglar when he was younger." "That's some interesting news but I'm not too surprised," replied Craig. "How can you not be surprised?" wondered Mary. "Because," said Craig "there is a skeleton in every closet."

21.
Rome was not built in a day
"I was hoping to have all the carpeting and tiling done on our new house by now but the workers are not much farther along than the last time we checked," said Naomi. "Be patient dear, it is a big house we are building. They can't just get all the flooring done within a couple of days," said Ben. "Do you think it would take more time than that?" asked Naomi. "Of course," replied Ben, "Rome was not built in a day."

22.
Don't ever burn your bridges behind you
"Mr. Thomas has been a jerk for so long and now that we are done working for him we can tell him off," said Rick. "I'm not going to," said Terry. "When I got the new job, my dad gave me some advice about keeping job connections," he added. "What did he say?" asked Rick. "He said," replied Terry, "don't ever burn your bridges behind you."

23.
After a storm there comes a calm
"George, I am so upset; I just got a call saying I'm fired and then five minutes later I got a call from my landlord saying I'm evicted. It seems like the bad news never stops for me," cried Betty. She was feeling very depressed and pessimistic about the future because of her misfortune. "I feel terrible, what am I going to do?" she shouted. "Don't worry," said George "after a storm there comes a calm."

24.
Every dark cloud has a silver lining
"I can't believe that Andy broke up with me after all these years," cried Betty to her friend George. "Oh stop crying Betty," said George. "You are going to benefit from this," he added. "I'm not sure I understand what you mean," replied Betty. "Look," replied George "every dark cloud has a silver lining." "I think you might be right."

25.
If the shoe fits then wear it
"I finally got accepted to Kappa Fie, the fraternity I have been waiting my whole life to get into. The weird thing is, I kind of liked Sigma Kai better. The girls in that fraternity have more of my same interests and their personalities are similar too," said Betty. "What do you think George?" she asked. "If the shoe fits then wear it."

26.
He who laughs last, laughs the loudest
"Wayne was laughing at us after we lost the game and it made me so angry," complained Lance. "Don't worry, in two weeks we're going to beat them in the playoffs. You will get the better of Wayne" replied Kent. "Are you sure about that?" asked Lance. "He who laughs last laughs the loudest."

27.
It's a game of cat and mouse
"Chief Danton was very busy organizing all the patrol officers when Sergeant Davis came in. He had a long report to show him about trying to catch the West Side Burglar. "The process of monitoring him has been more complicated than we thought, Sir," Joan said. "Just summarize it for me briefly," Danton demanded abruptly. "It's a game of cat and mouse."

28.
Lightening never strikes the same place twice
"What you need is an investment to shelter your profit," said Ann. "But it's been a volatile market since the crash," replied George. "Look, I lost a lot of money last year." "Don't worry, we'll be alright," she assured him. "Lightening never strikes the same place twice."

29.
Don't count your chickens before they've hatched
"Honey, I think this time we'll be successful. Soon we'll have a secure source of income. I've re-read the projected sales figures for this year. We'll make five times the profits I originally thought." "Don't count your chickens before they hatch."

30.
There are plenty of fish in the sea
"I thought I'd found my true love," said a teenage girl. "He was so handsome, and smart too. We had been dating for two whole months. But we broke up, and he's found someone else." "Well don't worry about it;" said a second person, "there are plenty of fish in the sea."

31.
You can't get blood from a stone
"We've asked almost everyone to buy girl guide cookies," said a girl guide. "We still haven't sold enough." "I think we should try the old man who lives in the brick house." "You mean Mr. Harlow, he won't give anything," replied her father. "You can't get blood from a stone."

32.
One man's loss is another man's gain
"Oh look, a hundred dollar bill," yelled Eric as he leaned to pick up the money from the sidewalk. "This must be my lucky day," he said. "I think I saw Mr. Dresner drop that bill; when you know whose money it is you should return it," stated Paul. "No way, it doesn't matter," objected Eric. "One man's loss is another man's gain."

33.
United we stand and divided we fall
"We have got to stand up to Mr. Edwards, he has been totally unfair about grading," said Betty. "I agree," said George, "I'll go in and talk to him tomorrow for both of us." "No we should go in together; don't you want a better grade?" asked Betty. "Yes, but I don't get what you mean," said George. "Just remember," said Betty, "united we stand and divided we fall."

34.
You win some and you lose some
"Things are going great; I got that promotion and won my squash game this week, it seems like everything always goes my way," stated Ollie happily. "Well you're getting lucky now but life doesn't always go that way," said Dharma. "Oh really?" stated Ollie coyly. "How does it usually go anyways?" he asked. "You win some and you lose some."

35.
A dog is a man's best friend
"I don't know why Gary likes Molly. She is such a complainer and she treats him badly," said Simon. "I know that I certainly wouldn't like her." "Well Molly sure likes him and I

think he likes her too," replied Rena. "Gary likes Molly so much because she is loyal to him and does anything for him whereas his friends do nothing," said Rena. "A dog is a man's best friend."

36.
A man's home is considered his castle.
Beth was complaining to Dave about their friend's relationship. "Did you hear when he said 'I'm the king of this relationship' to her?" asked Beth angrily. "You know Mike, he just wants to feel like he's king," said Dave. "That isn't a good explanation for referring to himself in that manner," said Beth. "A man's home is considered his castle," said Dave.

37.
God will help those that help themselves
"I can't get this urge to gamble to go away, it's driving my crazy," complained Nick. "Well you should do something about it, it is your responsibility to get over it. Have you tried to restrain your urges?" asked Cole. "No, it is not my fault I'm feeling this way, someone has to help me," replied Nick. Cole replied, "God will help those that help themselves."

38.
You always hurt the one you love
Nick came home from school angry. "Today the other kids were bugging me saying that I have a crush on some girl," he complained to his father. "It is not true, yesterday I was teasing her at recess, I don't even like her," he stated in his defense. "I don't believe you," his father said in response. He added, "You always hurt the one you love."

39.
A little learning is a dangerous thing
Ashley walked into the computer room to find Sam browsing a website called "How to Hack." "Sam, if you start hacking you will be in trouble," she said. "A friend showed me this web address, I'm just reading it out of interest," said an irritated Sam. He gave Ashley an annoyed look and turned his head. She said, "A little learning is a dangerous thing."

40.
All is fair in love and war
"My friend who trains horses told me that horse number 5 has been taking illegal horse steroids and you and I are going to bet on him," said Miles. "That's cheating and I don't want any part of it," exclaimed Trish. "It's a competitive field and we need advantages to win," said Miles. "But it is using an unethical means to get what we want," accused Trish. "No it's not," insisted Miles, "all is fair in love and war."

41.
Time and tide wait for no man
"You should not get married at this point because you are too young and you need to be free to have fun with me and the boys," said James to his friend Lyle. "I'm getting older and I want to settle down. I don't have forever to get married," said Lyle. "Come on, we

should have some fun, we've got all the time we need," said James. Lyle replied, "Time and tide wait for no man."

42.

One rotten apple spoils the whole barrel

Margaret was talking to her son Jimmy, a new teacher. "You are going to have problems with your grade three class this year because you have one real trouble maker in it," she told him. Jimmy was surprised, "What is the problem? it is only one bad one," he argued back. "That's too many" she said. "One rotten apple spoils the whole barrel."

Appendix C

Literal-synonym context textoids associated with the target proverbs

1.
There's no use crying over spilled milk
Robyn, distraught from a long day of waitressing, was not cleaning up with her usual attentiveness and accidentally knocked over a large container of white liquid. The liquid went everywhere. This caused her stress level to rise. She paused for a moment and then began to sob. When Bill noticed her reaction, he stated "there's no use crying over spilled milk."

2.
The cat is out of the bag
"What could that possibly be?" wondered Joseph as he gazed at a strange looking sack under the Christmas tree that appeared to be moving. "You'll find out tomorrow," said Katherine, as she moved to block his view of the sack. Suddenly, an animal scratched a large tear through a small air hole and climbed out. "I guess I'll find out sooner than you thought," said Joseph. Katherine stated "the cat is out of the bag."

3.
Don't bite the hand that feeds you
Emma, a health care nurse took part of a sandwich prepared for a quadriplegic patient named Rod and moved it up to his mouth. Suddenly, Rod reached out and bit Emma's fingers. Emma started to bleed. Angered by Rod's lack of respect, Emma yelled at him "don't bite the hand that feeds you."

4.
Don't judge a book by its cover
"This story is amazing," said Krista as she and Vince browsed through the store. "Just look at that picture of the sun on the front and the title 'The Way to Inner Freedom', this novel is a good one," she added. "Have you read it?" asked Vince. "No but I already know I'd enjoy it," Krista answered. "You never know," replied Vince "don't judge a book by its cover."

5.
His bark is worse than his bite
As Bonnie and Carl went into Carl's house his dog began to growl very loudly. "I know he sounds mean but he is very well trained, he'll nibble softly on your hand to give you a kiss, come on, I'll show you" said Carl. He then motioned to Bonnie to go towards the dog. "I don't know," replied Bonnie "didn't you hear him before? It scared me pretty good." "Don't worry about it," insisted Carl, "his bark is worse than his bite."

6.
The shoe is on the other foot
"Is this right mommy?" asked Brad while showing his mother his attempt at doing up one of his own sneakers for the first time. "Brad my dear, you have your left sneaker on your right leg," said Brad's mother. Brad then went in the other room to try again, determined

to do it properly himself. "How did it go?" she asked when he came back. Brad said, "The shoe is on the other foot."

7.
Don't air your dirty laundry in public
Sandra washed her clothes with extra detergent but could not get out the stains from the soccer game. After the clothes were washed, she hung them on a railing in front of her apartment building adjacent to the sidewalk. Her mother came home and asked "why are you hanging your stained clothes out for everyone to see?" "Excuse me," responded Sandra "but I don't think this has anything to do with you." Her mother responded angrily, "Don't air your dirty laundry in public."

8.
Every bird likes to hear himself sing
"I'm so glad you decided to come nature watching with me today Robert. What did you think of the lark?" said Deirdre to Robert at the end of their day. "Isn't it neat how he chirps when he's by himself?" "Why does he do that?" asked Robert. Deirdre replied, "Every bird likes to hear himself sing."

9.
Don't put the cart before the horse
Ian had shown his daughter Tessa numerous times how to harness a wagon to their pony. He left her to harness the pony by herself while he milked the cows. When he returned he found the wagon unattached in front of their pony's front legs. "I don't think this is going to work," said Tessa. Ian replied "don't put the cart before the horse."

10.
The chickens have come home to roost
"Oh no, I've lost them, I left the pen open and they're gone, every fowl we have" said an exasperated Gail. "I know it looks bad," said Frank "but they'll come back, it's almost time for them to sleep." Sure enough the birds started to make their way back. "How in the world did you know that would happen?" wondered Gail. Frank explained, "The chickens have come home to roost."

11.
There is a sucker born every minute
Kevin and Shannon were by the riverside where Kevin, a nature enthusiast was teaching Shannon about the riverside environment. "See that fish on the riverbed?" asked Kevin. "It's called a mudslurper, and they are becoming an environmental danger because of their high fertility rate," he explained. "What do you mean?" wondered Shannon. Kevin replied, "There's a sucker born every minute."

12.
Where there is smoke there is fire
"I'm calling the authorities" said Pete as he noticed thick white puffs coming out of a window while he and his wife Stacey were taking a walk. "Hold on," said Stacey as she

tried to stop him from rushing to a phone, "they're probably just cooking." "No, there is something wrong in that house," stated Pete. "What makes you think that?" asked Stacey. Pete replied, "Where there is smoke there is fire."

13.
Don't burn your candle at both ends
Elliot lit the string in the wax statue that he had made during his trip to an Amish Village in order to get some light during a power outage. "This isn't enough light, I'm going to light the other end as well," said Elliot to his mother. "It will be an improvement over having just one," said Elliot. I don't think that is a good idea", said his mother. "Don't burn your candle at both ends".

14.
A good offense is the best defense
"By keeping the puck in their end we will generate more chances for us and keep them away from our goal," said Will, discussing his strategy to beat the other team. "But what about backchecking or keeping two of the guys back?" asked Jim. "No need," replied Will, the best plan is to forecheck and keep buzzing their net. "That's a little overconfident don't you think?" asked Jim. "No," replied Will, "a good offence is the best defense."

15.
When in Rome, do as Romans do
"I hope you remember everything from the etiquette lessons for when we get to Italy," said Jenny. "I remember the lessons, there was a lot to know," said Ryan. "I know there was," replied Jenny. "I just don't think I'll be able to recall everything I need to know once I'm actually there," worried Ryan. "Just remember," said Jenny, "when in Rome, do as Romans do."

16.
We're up the creek without a paddle
Henry and Sue were drifting lazily in their raft up Big Bear Stream when Sue noticed they had no way to steer the raft. "Were going to drift too close to the waterfall up ahead," exclaimed Sue. "Maybe we can use our hands to steer us back," said Henry. "Henry, would you be realistic," said Sue. "we're up the creek without a paddle."

17.
Birds of a feather will flock together
Betty and her daughter Megan were at the park watching ducks and geese swimming in the river. "Which ones are ducks and which are geese?" Megan asked. "The ones with white plumage to your left are geese and the ones with brown plumage to your right are ducks," replied Betty. "They don't seem to want to be around each other at all," said Megan. Betty said, "Birds of a feather will flock together."

18.
The early bird always catches the worm
"Look Jay, that robin is looking around for some food to eat, "said Abby as she and Jay were walking through the woods. Jay chuckled, "doesn't look like it is having any luck." Abby smiled back, "I know he'll eat soon. He got here the first thing in the morning, so I know he'll succeed," said Abby. "The early bird always catches the worm."

19.
The squeaking wheel will get the grease
Alex was teaching his son Billy how he fixed the tire on his bike. "The front tire was rubbing against the bar, that's what was making the noise. I put some lubricant on that tire," Alex told his son. "I don't understand why, Dad," said Billy. "That's how it works son," explained Alex, "the squeaking wheel will get the grease."

20.
There is a skeleton in every closet
Mary was trying to find her way out of the haunted house. "There are bones in there," she screamed to Craig as she opened a door. "Oh, well I'm not surprised," said Craig. "How can you not be surprised?" wondered Mary. "Because," said Craig "there is a skeleton in every closet."

21.
Rome was not built in a day
"This Italian vacation has been amazing so far but I think I'm most excited to go through the Capital city," said Naomi. "It's strange, I hear everything in the city was constructed within twenty four hours," she noted. "No way," replied Ben. "Do you think it would take more time than that?" asked Naomi. "Of course," replied Ben, "Rome was not built in a day."

22.
Don't burn your bridges behind you
Terry, Rick, and the rest of their army platoon were moving away from their current position to infiltrate the enemy. "We should detonate the explosives on the river crossing so the enemy platoons can't come after us that way," suggested Rick. "The colonel advised against that tactic," said Terry. "What did he say?" asked Rick. "He said," replied Terry, "don't ever burn your bridges behind you."

23.
After a storm there comes a calm
Betty was about to set up chairs and tables in her backyard for an afternoon tea party she had planned when it started to rain heavily. "I think I'll have to cancel my dinner party because of this rain. The radio said the rain was supposed to stop by three o'clock but there will probably be some lingering showers," said Betty. "I feel terrible, what am I going to do?" she shouted. "Don't worry," said George, "after a storm there comes a calm."

24.
Every dark cloud has a silver lining
"I love just relaxing like this, even if the skies are overcast," said Betty. She and George were spending a lazy afternoon gazing at the sky. "Do you notice how the edge of the overcast reflects light differently than the center and creates that light tint?" asked George. "I'm not sure I understand what you mean," replied Betty. "Look," replied George "every dark cloud has a silver lining."

25.
If the shoe fits then wear it
"I like these sandals but they're on the small side. These red ones don't look so good but they are comfortable," Betty said, rummaging through her closet unable to decide which pair to wear to the dance. "This one is nice, but I don't know if it goes with the dress," she turned to George to show him. "What do you think George?" she asked. He replied, "If the shoe fits then wear it."

26.
He who laughs last, laughs the loudest
"I just read the most interesting article about humor," said Kent. "What does it say?" asked Lance. "It says that in a group situation, men who take longer to respond to humor were found to chuckle with more volume." "Are you sure about that?" asked Lance. Kent replied, "He who laughs last laughs the loudest."

27.
It's a game of cat and mouse
"Davis, tell me about the new board game you have developed, but remember I don't have a lot of time" said Mr. Danton, the CEO of Kidz Toyz. "Well sir, the player starts off as Blinky the feline. Blinky starts his journey through the house by chasing rodents in the basement," explained Davis. "Just summarize it for me briefly," Danton demanded abruptly. Davis replied, "It's a game of cat and mouse."

28.
Lightening never strikes the same place twice
"Let's take shelter from the rain under this broken tree," said Ann. "But it's dangerous to hide under a tree during a storm," replied George. "Look, the tree has been hit once already." "Don't worry, we'll be alright," she assured him. "Lightening never strikes the same place twice."

29.
Don't count your chickens before they've hatched
"Honey, I think this time we'll be successful. Soon we'll have a large flock. I was just checking on the hens this morning. Five more of the breeding hens have laid eggs." His wife replied, "Don't count your chickens before they hatch."

30.
There are plenty of fish in the sea
"I thought I'd hooked a huge, beautiful salmon" said a fisherman. "I wrestled with it for over an hour. But the line broke and it swam away." "Well, don't worry about it," said a second fisherman, "there are plenty of fish in the sea."

31.
You can't get blood from a stone
"Daddy, last week when I cut my finger, red stuff came out," said a young girl. "I just broke a rock in half. How come the red stuff did not come out?" "Only living things like animals have red stuff," replied her father. "You can't get blood from a stone."

32.
One man's loss is another man's gain
"The American runner ended up getting the gold in the race," said Eric. "That's terrible," said Paul "he only got the lead because the German runner was interfered with by a fan. The German should get first place." "No way, it doesn't matter," objected Eric. He added, "One man's loss is another man's gain."

33.
United we stand and divided we fall
"Explain to me how we play this game again," said George. "It is easy, when we go after the other team's goal on our own, we get knocked quickly to the ground, when we're together we stay on our feet," Betty replied. "Didn't you listen to me when I described the rules?" she asked. "Yes, but I don't get what you mean," said George. "Just remember," said Betty, "United we stand and divided we fall."

34.
You win some and you lose some
"I am going to do well at this card tournament, I guarantee," said Ollie. "Don't be so sure you won't do poorly, I've played this many times and there is always good competition," replied Dharma. "Well I have got a lot of games to play and I like my chances," said Ollie. "How does it usually go anyways?" he asked. Dharma replied, "You win some and you lose some."

35.
A dog is a man's best friend
"In this novel, why do you think Gary prefers the company of his pet Molly to that of his associates?" asked Professor Gregory. Rena and Simon put up their hands. The professor chose Rena. "Gary likes Molly so much because she is loyal to him and does anything for him whereas his associates do nothing," said Rena. Simon stated, "A dog is a man's best friend."

36.
A man's home is considered his castle.
"On your right, you will see mansions, some would say palaces, that belong to wealthy people" said the tour guide. "Those places look a little small," Beth said to Dave. "Well, they are made of stone walls," explained Dave. "That isn't a good explanation for referring to the places in that manner," said Beth. Dave said, "A man's home is considered his castle."

37.
God will help those that help themselves
Nick was feeling depressed and decided to talk to his minister. "I feel as though the lord has abandoned me," cried Nick speaking to reverend Cole. "Have you taken measures to alleviate your suffering?" asked Cole. "No, it is not my fault I'm feeling this way, someone has to support me," replied Nick. Cole replied, "God will help those that help themselves."

38.
You always hurt the one you love
"I like my wife more than anything," Nick pleaded to his marriage counselor. "Then why do you always insult her?" asked the counselor. "I don't mean anything by it, I would never do anything to harm her," Nick replied defensively. "I don't believe you," his counselor stated in response. He added, "You always hurt the one you love."

39.
A little learning is a dangerous thing
"I think I will only study for a short while before I write the exam," said Sam. "Well," said Ashley "I can tell you that there is going to be a lot of new material covered on the exam. If you don't spend enough time studying you will be in a terrible situation," said Ashley. Sam gave her an annoyed look and turned his head. Ashley said, "A little learning is a dangerous thing."

40
All is fair in love and war
"I don't agree with the idea of conflict for freedom. How does freedom come from fighting?" asked Trish regarding the outcome of a recent conflict. "I know that if you care enough about something or someone, you are allowed to use any means necessary to possess it, freedom fits into that category" said Miles. "But it is using an unethical means to get what we want," accused Trish. "No it's not," insisted Miles, "all is fair in love and war."

41.
Time and tide wait for no man
James and Lyle were having fun swimming at the beach. "The water is great, let's not stay here but go out to the next sand bar," said James. "We have to stay here, the water surge will come in and it will be too deep," explained Lyle. "Come on, we should have

some fun, we've got as long as we need," said James. Explained Lyle, "Time and tide wait for no man."

42.

One rotten apple spoils the whole barrel

"You packed the fruit pretty good but I notice that you put one bruised one in with the rest," said Margaret to her son Jimmy. Jimmy was surprised, "what is the problem, it is only one bad one, he argued back." "I really don't see why that should matter. "That's too many" she said. "One rotten apple spoils the whole barrel."

Appendix D

Literal-Overlap context textoids associated with the target proverbs

1.
There's no use crying over spilled milk
Robyn, distraught from a long day of waitressing, was not cleaning up with her usual attentiveness and accidentally knocked over a large container of milk. The milk went everywhere. This caused her stress level to rise. She paused for a moment and then began to cry. When Bill noticed her reaction, he stated "there's no use crying over spilled milk."

2.
The cat is out of the bag
"What could that possibly be?" wondered Joseph as he gazed at a strange looking bag under the Christmas tree that appeared to be moving. "You'll find out tomorrow," said Katherine, as she moved to block his view of the bag. Suddenly, a cat scratched a large tear through a small air hole and climbed out. "I guess I'll find out sooner than you thought," said Joseph. Katherine stated "the cat is out of the bag."

3.
Don't bite the hand that feeds you
Emma, a health care nurse, took part of a sandwich prepared for a quadriplegic patient named Rod and moved it up to his mouth. Suddenly, Rod reached out and bit Emma's hand. Emma started to bleed. Angered by Rod's lack of respect, Emma yelled at him "don't bite the hand that feeds you."

4.
Don't judge a book by its cover
"This book is amazing," said Krista as she and Vince browsed through the store. "Just look at that picture of the sun on the cover, and the title 'The Way to Inner Freedom', this book is a good one," she added. "Have you read it?" asked Vince. "No but I already know I'd enjoy it," Krista answered. "You never know," replied Vince, "don't judge a book by its cover."

5.
His bark is worse than his bite
As Bonnie and Carl went into Carl's house his dog began to bark very loudly. "I know he sounds mean but he is very well trained, he'll bite softly on your hand to give you a kiss, come on, I'll show you" said Carl. He then motioned to Bonnie to go towards the dog. "I don't know," replied Bonnie "didn't you hear him before? It scared me pretty good." "Don't worry about it," insisted Carl, "his bark is worse than his bite."

6.
The shoe is on the other foot
"Is this right mommy?" asked Brad while showing his mother his attempt at doing up one of his own shoes for the first time. "Brad my dear, you have your left shoe on your right foot," said Brad's mother. Brad then went in the other room to try again, determined to do it properly himself. "How did it go?" she asked when he came back. Brad replied, "The shoe is on the other foot."

7.
Don't air your dirty laundry in public
Sandra washed her laundry with extra detergent but could not get out the stains from the soccer game. After the clothes were washed, she hung them on the railing in front of her apartment building adjacent to the sidewalk. Her mother came home and asked "why are you hanging your stained laundry out for everyone to see?" "Excuse me," responded Sandra "but I don't think this has anything to do with you." Her mother responded angrily, "don't air your dirty laundry in public."

8.
Every bird likes to hear himself sing
"I'm so glad you decided to come bird watching with me today Robert. What did you think of the lark?" said Deirdre to Robert at the end of their day. "Isn't it neat how he sings when he's by himself?" "Why does he do that?" asked Robert. Deirdre replied, "Every bird likes to hear himself sing."

9.
Don't put the cart before the horse
Ian had shown his daughter Tessa numerous times how to harness a cart to their horse. He left her to harness the horse by herself while he milked the cows. When he returned he found the cart unattached in front of their horse's front legs. "I don't think this is going to work," said Tessa. Ian replied "Don't put the cart before the horse."

10.
The chickens have come home to roost
"Oh no, I've lost them, I left the pen open and their gone, every chicken we have" said an exasperated Gail. "I know it looks bad," said Frank "but they'll come back, it's almost time for them to perch on their roosts." Sure enough the birds started to make their way back. "How in the world did you know that would happen?" wondered Gail. Frank explained, "The chickens have come home to roost."

11.
There's a sucker born every minute
Kevin and Shannon were by the riverside where Kevin, a nature enthusiast, was teaching Shannon about the riverside environment. "See that fish on the riverbed?" asked Kevin. "It's called a mudsucker, and they are becoming an environmental danger because of how fast they are being born," he explained. "What do you mean?" wondered Shannon. Kevin replied, "There is a sucker born every minute."

12.
Where there is smoke there is fire
"I'm calling the fire department" said Pete as he noticed thick smoke coming out of a window while he and his wife Stacey were taking a walk. "Hold on," said Stacey as she tried to stop him from rushing to a phone, "they're probably just cooking." "No, there is something wrong in that house," stated Pete. "What makes you think that?" asked Stacey. Pete replied, "Where there is smoke there is fire."

13.
Don't burn your candle at both ends
Elliot burned the string in the candle that he had made during his trip to an Amish Village in order to get some light during a power outage. "This isn't enough light, I'm going to light the other end as well," said Elliot to his mother. "It will be an improvement over having just one," said Elliot. "I don't think that is a good idea", said his mother. "Don't burn your candle at both ends."

14.
A good offense is the best defense
"By keeping the puck in their end we will generate more chances for us and keep them away from our goal," said Will, discussing his strategy to beat the other team. "But what about focusing on defense?" asked Jim. "No need," replied Will, the best plan is to focus on offense. "That's a little overconfident don't you think?" asked Jim. "No," replied Will, "a good offence is the best defense."

15.
When in Rome, do as Romans do
"I hope you remember everything from the etiquette lessons for when we get to Rome," said Jenny. "I remember the lessons, there was a lot to know," said Ryan. "I know there was," replied Jenny. "I just don't think I'll be able to recall everything I need to know once I'm actually there," worried Ryan. "Just remember," said Jenny, "when in Rome, do as Romans do."

16.
We're up the creek without a paddle
Henry and Sue were drifting lazily in their raft up Big Bear Creek when Sue noticed they had no paddle to steer the raft. "We're going to drift too close to the waterfall up ahead," exclaimed Sue. "Maybe we can use our hands to steer us back," said Henry. "Henry, would you be realistic," said Sue. "We're up the creek without a paddle."

17.
Birds of a feather will flock together
Betty and her daughter Megan were at the park watching birds swimming in the river. "Which ones are ducks and which are geese?" Megan asked. "The ones with white feathers to your left are geese and the ones with brown feathers to your right are ducks," replied Betty. "They don't seem to want to be around each other at all," said Megan. Betty replied, "Birds of a feather will flock together."

18.
The early bird always catches the worm
"Look Jay that bird is looking around for some worms to eat, "said Abby as she and Jay were walking through the woods. Jay chuckled, "doesn't look like it is having any luck." Abby smiled back, "I know he'll eat soon. He got here the first thing in the morning, so I know he'll succeed," said Abby. "The early bird always catches the worm."

19.
The squeaking wheel will get the grease
Alex was teaching his son Billy how he fixed the wheel on his bike. "The front wheel was rubbing against the bars, that's what was making the squeak. I put some grease on that tire," Alex told his son. "I don't understand why dad," said Billy. "That's how it works son," explained Alex, "the squeaking wheel will get the grease."

20.
There is a skeleton in every closet
Mary was trying to find her way out of the haunted house. "There's a skeleton in there," she screamed to Craig as she opened a closet door. "Oh, well I'm not surprised," said Craig. "How can you not be surprised?" wondered Mary. "Because," said Craig "there is a skeleton in every closet."

21.
Rome was not built in a day
"This Italian vacation has been amazing so far but I think I'm most excited to go through Rome," said Naomi. "It's strange, I hear everything in the city was built within a day," she noted. "No way," replied Ben. "Do you think it would take more time than that?" asked Naomi. "Of course," replied Ben, "Rome was not built in a day."

22.
Don't burn your bridges behind you
Terry, Rick, and the rest of their army platoon were moving away from their current position to infiltrate the enemy. "We should burn the bridge so the enemy platoons can't come after us that way," suggested Rick. "The colonel advised against that tactic," said Terry. "What did he say?" asked Rick. "He said," replied Terry, "don't ever burn your bridges behind you."

23.
After a storm there comes a calm
Betty was about to set up chairs and tables in her backyard for an afternoon tea party she had planned when it started to rain heavily. "I think I'll have to cancel my dinner party because of this storm. The radio said the storm was supposed to stop by three o'clock but there will probably be some lingering showers," said Betty. "I feel terrible, what am I going to do?" she shouted. "Don't worry," said George, "after a storm there comes a calm."

24.
Every dark cloud has a silver lining
"I love just relaxing like this, even if the skies are dark," said Betty. She and George were spending a lazy afternoon gazing at the sky. "Do you notice how the edge of the dark rain cloud reflects light differently than the center and creates that silver lining?" asked George. "I'm not sure I understand what you mean," replied Betty. "Look," replied George "every dark cloud has a silver lining."

25.
If the shoe fits then wear it
"I like these shoes but they don't fit. These red ones don't look so good but they fit nice," Betty said, rummaging through her closet unable to decide which pair to wear to the dance. "This one is nice, but I don't know if it goes with the dress," she turned to George to show him. "What do you think George?" she asked. He replied, "If the shoe fits then wear it."

26.
He who laughs last, laughs the loudest
"I just read the most interesting article about humor," said Kent. "What does it say?" asked Lance. "It says that in a group situation, people who take longer to respond to humor were found to laugh with more volume." "Are you sure about that?" asked Lance. Kent replied, "He who laughs last laughs the loudest."

27.
It's a game of cat and mouse
"Davis, tell me about the new board game you have developed, but remember I don't have a lot of time" said Mr. Danton, the CEO of Kidz Toyz. "Well sir, the player starts off as Blinky the Cat. Blinky starts his journey through the house by chasing mice in the basement," explained Davis. "Just summarize it for me briefly," Danton demanded abruptly. Davis replied, "It's a game of cat and mouse."

28.
Lightening never strikes the same place twice
"Let's take shelter from the rain under this broken tree," said Ann. "But its dangerous to hide under a tree during a storm," replied George. "Look, the tree has been hit by lightening once already." "Don't worry, we'll be alright," she assured him. "Lightening never strikes the same place twice."

29.
Don't count your chickens before they've hatched
"Honey, I think this time we'll be successful. Soon we'll have a large flock. I was just checking on the chickens this morning. Five more of the breeding hens have laid eggs." His wife replied, "Don't count your chickens before they hatch."

30.
There are plenty of fish in the sea
"I thought I'd hooked a huge, beautiful fish" said a fisherman. "I wrestled with it for over an hour. But the line broke and it swam away." "Well, don't worry about it," said a second person, "there are plenty of fish in the sea."

31.
You can't get blood from a stone
"Daddy, last week when I cut my finger, blood came out," said a young girl. "I just broke a rock in half. How come the blood did not come out?" "Only living things like animals, have blood," replied her father. "You can't get blood from a stone."

32.
One man's loss is another man's gain
"The American runner ended up getting the gold in the race," said Eric. "That's terrible," said Paul "he only gained the lead because the German runner was interfered with by a fan and lost. The German should get first place." "No way, it doesn't matter," objected Eric. He added, "One man's loss is another man's gain."

33.
United we stand and divided we fall
"Explain to me how we play this game again," said George. "It is easy, when we go after the other team's goal divided, we fall quickly to the ground, when we're united, we stand on our feet," Betty replied. "Didn't you listen to me when I described the rules?" she asked. "Yes, but I don't get what you mean," said George. "Just remember," said Betty, "united we stand and divided we fall."

34.
You win some and you lose some
"I am going to win this card tournament, I guarantee," said Ollie. "Don't be so sure you won't lose, I've played this many times and there is always good competition," replied Dharma. "Well I have got a lot of games to play and I'm going to win," said Ollie. "How does it usually go anyways?" he asked. Dharma replied, "You win some and you lose some."

35.
A dog is a man's best friend
"In this novel, why do you think Gary prefers the company of his dog Molly to that of his friends?" asked Professor Gregory. Rena and Simon put up their hands. The professor chose Rena. "Gary likes Molly so much because she is loyal to him and does anything for him whereas his friends do nothing," said Rena. Simon stated, "A dog is a man's best friend."

36.
A man's home is considered his castle.
"On your right, you will see mansions, some would say castles, that belong to wealthy men" said the tour guide. "Those homes look a little small," Beth said to Dave. "Well, they are made of stone walls," explained Dave. "That isn't a good explanation for referring to the houses in that manner," said Beth. Dave said, "A man's home is considered his castle."

37.
God will help those that help themselves
Nick was feeling depressed and decided to talk to his minister. "I feel as though God has abandoned me," cried Nick speaking to reverend Cole. "Have you taken measures to help yourself?" asked Cole. "No, it is not my fault I'm feeling this way, someone has to help me," replied Nick. Cole replied, "God will help those that help themselves."

38.
You always hurt the one you love
"I love my wife more than anything," Nick pleaded to his marriage counselor. "Then why do you always hurt her?" asked the counselor. "I don't mean anything by it, I would never do anything to hurt her," Nick replied defensively. "I don't believe you," his counselor stated in response. "You always hurt the one you love."

39.
A little learning is a dangerous thing
"I think I will only study a little before I write the exam," said Sam. "Well," said Ashley "I can tell you that there is going to be a lot of new material covered on the exam. If you don't spend enough time learning you will be in a dangerous situation," said Ashley. Sam gave her an annoyed look and turned his head. Ashley said, "A little learning is a dangerous thing."

40
All is fair in love and war
"I don't agree with the idea of war for freedom. How does freedom come from fighting?" asked Trish regarding the outcome of a recent conflict. "I know that if you love something or someone, you are allowed to use any means necessary to possess it, freedom fits into that category" said Miles. "But it is using an unethical means to get what we want," accused Trish. "No it's not," insisted Miles, "all is fair in love and war."

41.
Time and tide wait for no man
James and Lyle were having fun swimming at the beach. "The water is great, let's not wait to go out to the next sand bar," said James. "We have to wait, the tide will come in and it will be too deep," explained Lyle. "Come on, we should have some fun, we've got all the time we need," said James. Lyle explained, "Time and tide wait for no man."

42
One rotten apple spoils the whole barrel
"You packed the apples pretty good but I notice that you put one rotten apple in the barrel with the rest," said Margaret to her son Jimmy. Jimmy was surprised, "what is the problem, it is only a single defect, he argued back." "I really don't see why that should matter. "That's too many" she said. "One rotten apple spoils the whole barrel."

Appendix E

List of scalp sites for which the N400 measures correlated significantly with cloze percentages

Results based on strict coding criterion

Correlations denoted * are significant at $p < .05$
Correlations denoted ** are significant at $p < .01$

Figurative Condition:

First word:
T7, r = -.38*
TP7, r = -.49**
CP5, r = -.51**
P7, r = -.46*
P5, r = -.49**
P3, r = -.44*
PO5, r = -.40*
CB1, r = -.38*

Second word:
None

Third word:
PO8, r = .39*
O1, r = .42*

Fourth word:
None

Literal-Synonym Condition:

First word:
None

Second word:
None

Third word:
FT7, r = -.43*
T7, r = -.40*
PO3, r = .39*
POZ, r = .40*

Fourth word:
None

Results based on liberal coding criterion

Figurative Condition:

First Word:
TP7, r = -.51**
CP5, r = -.50**
P7, r = -.58**
P5, r = -.51**
P3, r = -.41*
PO7, r = -.51**
PO5, r = -.50**
CB1, r = -.51**

Second Word:
None

Third Word:
None

Fourth Word:
None

Literal-Synonym Condition:

First word:
F4, r = -.38*
FC3, r = .39*
FC2, r = .39*
FC4, r = .39*
CZ, r =.41*
C2, r = .44*
CPZ, r = .43*

Second Word:
FC3, r = .38*
FC1, r = .42*
FCZ, r = .42*
FC2, r = .45*
CZ, r = .42*
C2, r= .46*
C4, r = .38*
CPZ, r = .44*
CP2, r = .43*
CP4, r = .48*
CP6, r = .43*

P2, r = .42*
P4, r = .42*
P6, r = .44*
P8, r = .39*
POZ, r = .39*
PO4, r = .38*
PO6, r = .48*
PO8, r = .39*

Third Word:
CP1, r = .42*
CPZ, r = .40*
CP2, r = .46*
CP4, r = .40*
PZ, r = .41*
P2, r = .41*
P4, r = .39*
PO7, r = .38*
PO5, r = .38*
PO3, r = .44*
POZ, r = .49*

Fourth Word:
C3, r = .40*
C1, r = .42*
CZ, r = .49**
C4, r = .50**
CP1, r = .44*
CPZ, r = .49**
CP2, r = .49**
CP4, r = .41*
PZ, r = .38*
P2, r = .39*

Appendix F

List of scalp sites for which the LPC measures correlated significantly with cloze percentages

Results based on strict coding criterion

Figurative Condition:

First word:
F5, r = -.43*
FT7, r = -.45*
T7, r = -.39*

Second word:
F7, r = -.40*
F3, r = -.38*
FT7, r = -.43*
T7, r = -.42*
PO3, r = -.39*
POZ, r = -.42*
PO4, r = -.47*
O2, r = -.46*

Third word:
None

Fourth word:
F5, r = -.44*
F3, r = -.39*
TP7, r = -.52**

Literal-Synonym Condition:

First word:
None

Second word:
TP7, r = -.40*
PZ, r = .38*

Third word:
F7, r = -.40*
FT7, r = -.46*
P2, r = .40*
P6, r = .39*
PO3, r = .42*
POZ, r = .40*
PO6, r = .41*

Fourth word:
None

Results based on liberal coding criterion

Literal-Synonym Condition:

First Word:
None

Second Word:
PO4, r = -.39*

Third Word:
AF4, r = -.38*

Fourth Word:
FP1, r = -.42*
F7, r = -.43*
F5, r = -.44*
F3, r = -.38*
FT7, r = -.38*

Literal-Synonym:

First Word:
None

Second Word:
FCZ, r = .42*
FC2, r = .45*
CZ, r = .44*
C2, r = .53**
C4, r = .46*
CP1, r = .38*
CPZ, r = .57**
CP2, r = .57**
CP4, r = .52**
CP6, r = .57**
P2, r = .49**
P4, r = .43*
P6, r = .43*
PO6, r = .39*

Third Word:

CZ, r = .44*
C2, r = .39*
C4, r = .42*
CP1, r = .48**
CPZ, r = -58**
CP2, r = .56**
CP6, r = .56**
PZ, r = .44*
P2, r = .55**
P4, r = .50**
P6, r = .52**
P8, r = .50**
PO3, r = .50**
POZ, r = .49**
PO4, r = .48**
PO6, r = .58**
PO8, r = .44*
CB2, r = .41*

Fourth Word:

FC2, r = .41*
C3, r = .40*
C1, r = .40*
CZ, r = .45*
C4, r = .47*
CP1, r = .40*
CPZ, r = .41*
CP2, r = .40*
CP4, r = .38*
CP6, r = .40*
P5, r = .38*
P4, r = .41*
P6, r = .40*