ON THE ACTIVATION OF IDIOMS’ PARTS

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INTRODUCTION: BACKGROUND AND EXPECTATIONS

Extensive work has been done in the past several decades in linguistics regarding the mechanisms by which representations of idiomatic expressions (henceforth, “idioms”) are stored, accessed, and processed. This paper intends to establish a rudimentary, but foundational and important point about the activation-status of parts of idioms when and after they are processed. In developing models to help explain how the human language capacity deals with idioms in a given language all model-makers must, expressly or impliedly, take into consideration the role of parts of idioms.

Idioms, or “string[s] of two or more words for which meaning is not derived from the meanings of the individual words comprising that string,” are present in most, if not all, human languages (Swinney and Cutler 523, Shoebottom). We use idioms to express ourselves more thoroughly, artfully, accurately, and efficiently. Concerning their storage and processing, several linguists have proposed varying theories. One such theory from the 1980s is Swinney and Cutler’s Lexical Representation Hypothesis. This hypothesis suggests that computing the meanings of idioms includes simultaneous computation of both their literal and idiomatic meanings. According to the model, idioms are stored and accessed as items in the lexicon, much like words. However, simultaneously, the literal word-by-word meaning of a given idiom is processed.

Support for Lexical Representation Hypothesis is garnered from several studies, including one which demonstrated that English speakers judged idioms to be meaningful English phrases much more quickly than they judged non-idioms to be the same. Even taken as accurate, this model still begs the question of the strength of activation of an idiom’s parts once the idiomatic meaning is extracted. When recognizing a string of words as an idiom, according to Swinney (1979), the literal meaning of the parts of an idiom, metaphor, or other non-literal phrase should be activated, but “this effect is only momentary, which suggests that people maintain only the meaning appropriate to the context,” (Gibbs 469).

Another theory, called the Hybrid Representation of idioms, suggests “idioms are connected directly to their idiomatic conceptual meaning.” That is, they are paired up between form and meaning in a (roughly) one-to-one correspondence, much like individual words in the lexicon are; also, “access [to idiom’s meanings] is mediated via the literal components of the expression” (Holsinger and Kaiser 1.1). This model is interesting because it places high importance on the “literal components of the expression.”

These two models are just two in the sea of relevant models. In relation to the work carried out for this paper, however, two main questions arise: (1) What role do the parts of an idiom play in its access and processing? and (2) will the parts of idioms be activated strongly enough for them to remain “hot” several minutes after exposure, or will the parts (i.e., words from within the expression) fall out of an excited state because they are not useful, having been eclipsed by the idiomatic meaning of the idiom— because they were simply means to an end.

I suspect that parts of idioms, and subsequently an idiom’s literal meaning, are important during understanding. I will bring to the forefront evidence which serves to refute Raymond W. Gibbs, Jr.’s claim, presented in “On the Process of Understanding Idioms,” that people do not compute the literal interpretations of idioms either before or at the same time as they
comprehend their figurative meanings (465). I hypothesize that parts of idioms will prove to be (substantially) activated by processing idioms in which they are contained.

**METHOD**

**Subjects**
The subjects for this study are twenty-four undergraduate students at Boston College, each whose first language is American English. These subjects were randomly split into two groups of twelve – henceforth referred to as the exposed (E) and unexposed (U) groups. The exposed group consisted of five females and seven males; the unexposed group consisted of three females and nine males.

**Materials**
The materials for this study are:
1. forty slides, each containing a potential literal interpretation and two common American English idioms, in which each idiom from a pool of twenty idioms appeared as the correct answer to this matching task exactly two times, an example of which is below and the full set of which is in appendix 1

   ![Example](image)

   to fib

   to lose your marbles    to tell a white lie

2. four slides each containing a set of items used in an unrelated “distractor task,” the full set of which is in appendix 2
3. twenty slides, each containing a one syllable (two to three character) stem, which stem was previously encountered as the first part of an element of the idiom-options on each slide in materials item #1, an example of which is below and the full set of which is in appendix 3; all sixty four of which slides were in the medium of a Microsoft PowerPoint presentation
4. twelve copies of an answer sheet consisting of forty numbered spaces, corresponding to the forty slides mentioned above, which answer sheet is in appendix 4
5. twelve copies of a two-sided answer sheet for the above-mentioned unrelated “distractor task,” which answer sheet is in appendix 5
6. twenty-four copies of a four-page answer sheet, each with twenty spaces corresponding to the above-mentioned (item #3) stem slides, which answer sheet is in appendix 6
**Procedure**

The procedure for this study consisted of three discrete phases. The exposed group (group E) completed phases one, two, and three; the unexposed group (group U) completed only phase three.

*Phase 1* consisted of showing all twelve participants in group E the forty idiom-containing slides. Members of group E were instructed to select the idiom of the two idiom-options present on a given slide, which best corresponded to the literal meaning provided at the top of the slide. This was a self-timed task, which most participants completed in less than five minutes.

*Phase 2* consisted of showing all twelve participants in group E the four “distractor task” slides and having them complete a simple matching task between sets of words on the slides and on the “distractor task” answer sheet (materials, item #5). This took participants about five minutes each and was also self-timed.

*Phase 3* consisted of showing all twenty-four participants of both groups E and U the twenty stem slides. Participants were instructed to write as many words as they could think of before the next slide took the place of the previous one on the monitor. This switch was accompanied by an alerting “ding” sound. Each slide was displayed for twenty-four seconds. The built-in timer of the program Microsoft Power Point timed this phase automatically. Participants were instructed that proper nouns (e.g., names) and word forms (e.g., “bed” and “beds”) were acceptable responses.

**Results**

In short, it was found that members of group E were much more likely to produce an answer to the stem-completion task that had come from an idiom to which they were previously exposed. Importantly, at debriefing, no participant indicated that he or she had been aware that the stems corresponded to words from within the idioms to which he or she had been previously exposed. For nineteen of the twenty stems (95% of the stems) the corresponding word to which the subjects in group E were exposed appeared as an answer to the stem-completion task. Across all stems, an average of 52% of the participants in group E produced the target word (i.e., the corresponding word to which they had been exposed in phase 1); an average of 30% of participants in group U wrote the word which corresponded to the intra-idiomatic words that participants of group E saw. For ten out of the twenty stems, previous exposure to a corresponding idiom increased production by 25% or more. The below graph presents how often each target word was produced in both the exposed condition (i.e. by group E); and in the unexposed condition (i.e. by group U):
One final result involved the development of an index to measure how activated a given word was for a given participant. On each participant’s answer sheet, if the target word appeared first, then the participant got a score of ten for that stem; if the target word was written second, then the participant got a score of nine for that stem; and so on. If the target word was not written at all for a given stem, then the participant got a score of zero for that stem. The scoring for this is summarized in the below table:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>first</td>
<td>10</td>
</tr>
<tr>
<td>second</td>
<td>9</td>
</tr>
<tr>
<td>third</td>
<td>8</td>
</tr>
<tr>
<td>fourth</td>
<td>7</td>
</tr>
<tr>
<td>fifth</td>
<td>6</td>
</tr>
<tr>
<td>sixth</td>
<td>5</td>
</tr>
<tr>
<td>seventh</td>
<td>4</td>
</tr>
<tr>
<td>eighth</td>
<td>3</td>
</tr>
<tr>
<td>ninth</td>
<td>2</td>
</tr>
<tr>
<td>tenth</td>
<td>1</td>
</tr>
<tr>
<td>after tenth word, or not at all</td>
<td>0</td>
</tr>
</tbody>
</table>

Since there were twenty stems, if a participant wrote each target word down first, his or her score would have been (10*20)=200; if a participant wrote every step down third, his or her score would have been (8*20)=160; and so on. The results for the indices of primed-ness for each subject in both groups are summarized below:

<table>
<thead>
<tr>
<th>Group E</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>avg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>93.50</td>
<td>119.00</td>
<td>77.00</td>
<td>80.00</td>
<td>84.00</td>
<td>58.50</td>
<td>93.00</td>
<td>101.00</td>
<td>134.00</td>
<td>50.00</td>
<td>95.50</td>
<td>98.50</td>
<td>90.33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group U</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
<th>avg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>64.00</td>
<td>43.00</td>
<td>39.00</td>
<td>29.00</td>
<td>65.00</td>
<td>43.50</td>
<td>81.00</td>
<td>46.00</td>
<td>55.00</td>
<td>53.00</td>
<td>60.00</td>
<td>50.88</td>
<td></td>
</tr>
</tbody>
</table>

The average index for group E was 90.33 of 200, or 45%; the average index for group U was 50.88, or 25%.

**DISCUSSION**

The priming effect recorded throughout this experiment demonstrates that parts of idioms are important in the processing of idioms. Prior to, simultaneously to, or after arriving at the idiomatic meaning of an expression, people activate in their language processing system the entries for parts of idioms. This suggests, but does not guarantee, that the literal meaning of a given idiom is considered briefly and unconsciously (unconsciously, because when a speaker hears “he kicked the bucket,” he or she does not think consciously of the notion of kicking or of the notion of a bucket). At least the first steps toward extracting the literal meaning of an idiom are taken, in that the meanings of (or at least, lexical entries for) an idiom’s parts are activated.

If it were the case that the parts of an idiom were not activated, then a priming effect would not be so clearly visible in an experiment such as the proceeding one. Note that these
finding are only significant in that they essentially rule out a model in which an idiom is processed \textit{purely} as a discrete lexical unit with no (or even “with little”) consideration given to that idiom’s parts. It does not, however, rule out a system like the Lexical Representation Hypothesis, in which both literal and idiomatic meanings are simultaneously computed. These findings suggest that the literal meaning is rather significant, in that it can still cause tractable priming effects several minutes after exposure.

A third type of model which these results, taken alone, \textit{could} possibly suggest is a model in which the meanings of idioms are retrieved only from the literal meanings of its parts. Fortunately, linguistics in preceding decades have disproved this as a possibility—perhaps most notably Swinney and Cutler, who showed that idioms are recognized as sensible English phrases quicker than their non-idiomatic grammatical counterparts (like “kick the pail”).

\textbf{Future Considerations}

Three elements I would change about my experimental design if I were to repeat it or a similar experiment would be to: (1) control for gender, (2) stick to a VxN format for my idioms, and (3) engineer a way to prevent “backtracking.” I would consider controlling for gender to see if there is a potential difference between how males’ and females’ brains process idioms (possible connection to theories about differing levels of creativity, linguistic flexibility, etc.). I would refine my idioms to all follow a similar pattern in a general effort to regularize my experiment more thoroughly. Such a VxN format, where V is a verb, x is an article or possessive pronoun, and N is a noun, can be seen in Holsinger and Kaiser’s experiment (2.2). Lastly, by “backtracking,” I mean to find a way to answer the possible objection that those subjects who seemed to be primed to write words they had previously seen in idioms only did so by recalling the idioms, then thinking of their parts. This type of top-down process is unlikely, though, because subjects would have to use a part of the idiom to find it in the catalogue of the idioms they had just seen; moreover, no subject reported realized that the stems corresponded to words within the idioms he or she had just seen.

If I were to revise the procedure, I would include stems in phase 3 which corresponded to the \textit{idiomatic} meaning of the idioms. For example, I might include the stem “ne-,” for the word “neighborhood,” from the idiom “(from) the wrong side of the tracks.” This would allow for greater analysis of the priming effect in general and an evaluation of the comparative “priming power” of literal and idiomatic meanings of idioms. It would be quite striking if words related to the idiomatic meanings of idioms were primed, especially if participants were never directly exposed to their form.

Also, concerning a general linguistic principle that the beginnings of \textit{words} are more important than later sounds or letters, it would be interesting to control for and investigate if words toward the beginning of a given idiom were more likely to prime themselves in a stem completion task later. This would create a parallel to the models for speech processing, which so strongly suggest that the first few letters of a word are significantly more important than later letters, or to typological models regarding word order in various languages (which suggest that elements which are more critical to communication and comprehension tend to be placed toward the beginning of sentences).

\textbf{Conclusion}

The results of this experiment, broadly speaking, demonstrate that parts of idioms— that is, the words that compose idioms— are substantially activated when idioms are mentally
processed. The words that comprise idioms appear as results in a stem-completion task carried out by subjects who were previously exposed to idioms that contained the words whose stems were presented. Those words appear more frequently than when subjects who were not exposed to such idioms with such potential stem-completers carry out the same stem-completion task.
APPENDIX 1
40 slides, idiom exposure (phase 1)

1. die
kick the bucket
be in birthday suit

2. asking too many questions gets you in trouble
curiosity killed the cat
to have deep pockets

3. what are you thinking about
a penny for your thoughts
add insult to injury

4. to be sad
elbow grease
under the weather

5. not everything is as good as it first seems
birthday suit
all that glitters isn’t gold

6. to make matters worse
to bury the hatchet
to add insult to injury

7. to make peace
bury the hatchet
under the weather

8. to have a nice appearance
to tell a white lie
to look like a million bucks

9. to go crazy
to kick the bucket
to lose your marbles

10. to be undecided
on the fence
spam

11. to fib
to tell a white lie
to feel blue

12. to be naked
birthday suit
to lose your marbles

13. a bad neighborhood
add insult to injury
wrong side of tracks

14. junk email
to have deep pockets
spam

15. to be sad
to tell a white lie
to feel blue

16. to work hard
elbow grease
curiosity killed the cat

17. friends with similar interests
look like a million bucks
birds of a feather flock together
18. to postpone coming up with a solution
   a penny for your thoughts
cross that bridge when we get there
19. a close call
   by the skin of your teeth
   all that glitters isn’t gold
20. die
   to bury the hatchet
to kick the bucket
21. to make peace
   spam
   to bury the hatchet
22. postpone thinking of a solution
   all that glitters isn’t gold
cross that bridge when we get to it
23. to go crazy
   to lose your marbles
to be under the weather
24. to be undecided
   to look like a million bucks
to be on the fence
25. hard work
   elbow grease
spam
26. to be rich
   to tell a white lie
to have deep pockets
27. a close call
   by the skin of my teeth
curiosity killed the cat
28. to be sad
   birthday suit
to feel blue
29. junk email
   spam
   birthday suit
30. to fib
   to tell a white lie
to lose your marbles
31. friends with similar interest
   birds of a feather flock together
to be on the fence
32. to have a nice appearance
   to look like a million bucks
to bury the hatchet
33. to be sad
   to kick the bucket
to be under the weather
34. a bad neighborhood
   wrong side of the tracks
to feel blue
35. asking too many questions gets you in trouble
   a penny for your thoughts
   the wrong side of the tracks
36. what are you thinking about
a penny for your thoughts
to tell a white lie

37. not everything is as good as it first seems
all that glitters isn’t gold
to be under the weather

38. to make matters worse
to add insult to injury
curiosity killed the cat

39. to be naked
to be on the fence
birthday suit

40. to be rich
birds of a feather flock together
to have deep pockets
## APPENDIX 2

4 slides, distractor task prompts (phase 2)

<table>
<thead>
<tr>
<th>A. Albany</th>
<th>A. ink</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Boston</td>
<td>B. keyboard</td>
</tr>
<tr>
<td>C. Dallas</td>
<td>C. paper</td>
</tr>
<tr>
<td>D. Honolulu</td>
<td>D. swingset</td>
</tr>
<tr>
<td>E. Los Angeles</td>
<td>E. McDonalds</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A. red</th>
<th>A. Ford</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. orange</td>
<td>B. Listerine</td>
</tr>
<tr>
<td>C. black</td>
<td>C. eyeball</td>
</tr>
<tr>
<td>D. green</td>
<td>D. pillow</td>
</tr>
<tr>
<td>E. yellow</td>
<td>E. professor</td>
</tr>
</tbody>
</table>
APPENDIX 3

20 slides, stem exposure (phase 3)

(each stem displayed alone on a slide for twenty-four seconds)

1. flo-
2. mil-
3. we-
4. tr-
5. cur-
6. pe-
7. gli-
8. ins-
9. bir-
10. buc-
11. hat-
12. bri-
13. mar-
14. fen-
15. el-
16. poc-
17. te-
18. bl-
19. spa-
20. whi-
**APPENDIX 4**
idiom meaning (1)/(2) answer sheet: one page, front only

<table>
<thead>
<tr>
<th>slide #</th>
<th>answer (&quot;1&quot; for left, &quot;2&quot; for right)</th>
<th>slide #</th>
<th>answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>22</td>
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<td>39</td>
<td></td>
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<tr>
<td>20</td>
<td></td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 5

distractor task answer sheet: one page, front and back

Slide 1
1. Texas
2. Hawaii
3. Massachusetts
4. California
5. New York

Slide 2
1. fruit
2. grass
3. cat
4. sun
5. fire

Slide 3
1. pen
2. notebook
3. computer
4. playground
5. hamburger

Slide 4
1. bed
2. college
3. mouth wash
4. car
5. body part
**APPENDIX 6**

word-stem completion answer sheet: four pages; here, an example of the first page only

(stems one through six)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
</table>
| -Please write legibly!  
-Thank you very much for your participation! | |

<table>
<thead>
<tr>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
W O R K S  C I T E D


