What Does THAT Mean?  
Experimental Evidence against the Principle of No Synonymy

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1. The Principle of No Synonymy
1.1 a difference in syntactic form always spells a difference in meaning (Bolinger 1968): that is, there is no true paraphrase in natural language

1.2 Importance of the Principle:
Many grammatical theories and frameworks cite this as an axiom, in particular functionalist frameworks (e.g., Clark 1993; Croft 2001; Goldberg 1995; Langacker 1999).

2. Prima Facie Counterexample: Optional THAT
2.1 Non-Subject Extracted Relative Clauses
(1a) This is the ball that I hit.  
(1b) This is the ball Ø I hit.

2.2 Complementizers
(2a) I think that the sky is blue.  
(2b) I think Ø the sky is blue.

Terminology: We refer to the Ø form without THAT as the “ZERO” form.

N.B. This is considered syntactic, not phonological, reduction: it’s sensitive to syntactic properties—subject-extracted relativizers are not optional:  
(3a) This is the ball that was hit for a home run.  
(3b) *This is the ball Ø was hit for a home run.

3. Meaning-Difference Claims
3.1 Some have claimed that there is a meaning difference in optional THAT (Storms 1966; Bolinger 1972; Yaguchi 2001; Kaltenböck 2006, inter alia). We test some of these claims.

There is a range of meaning-difference claims. We focus on two claims from Yaguchi, chosen because they are:
- explicitly defined
- testable
- representative of claims in the literature

3.2 The Claims (Yaguchi 2001, inspired by Bolinger 1972):
Emotionality: THAT-forms are less emotional than the ZERO-forms.  
(4a) “I always believed that the press would kill her in the end.”  
(4b) “I always believed Ø the press would kill her in the end.”  
CLAIM: More emotional in 4b than 4a. (Also Storms 1966, Kaltenböck 2006)

Time Distance: THAT-form suggests greater temporal distance between the main clause and the embedded clause.  
(5a) He told me that he got divorced.  
(5b) He told me Ø he got divorced.  
CLAIM: Bigger time distance between when he told the speaker this and when the divorce occurred in 5a than 5b.

3.3 Yaguchi’s Explanation (from Jespersen 1933, also cited in Kaltenböck 2006): Residual deictic THAT leads to increased distance.

4. Our Problems with these Meaning-Difference Claims
4.1 Not tested systematically—mostly anecdotal justification  
4.2 Based on delicate, potentially questionable linguistic intuitions
5. Two Experiments: Testing These Claims
Asked native speakers to rate meaning of sentences with/without THAT for:
- emotion with optional complementizer THAT
- time distance with optional complementizer THAT, and with optional relativizer THAT

6 Experiment 1: Emotion with Complementizers

6.1 Format

John and Mary were chatting at lunch about one of their colleagues. “I was surprised {that/Ø} he got in an accident,” John said.

On a scale of 1 to 9, with 1 being the least emotional and 9 being the most emotional, how emotional do you think John was when he said this?

6.2 Adverb “Controls”: 2 + 2 Design

<table>
<thead>
<tr>
<th></th>
<th>THAT</th>
<th>ZERO</th>
</tr>
</thead>
<tbody>
<tr>
<td>No ADV</td>
<td>“I think that this is a bad idea,” he said.</td>
<td>“I think Ø this is a bad idea,” he said.</td>
</tr>
<tr>
<td>ADV 1</td>
<td>(n/a)</td>
<td>“I think Ø this is a bad idea,” he said calmly.</td>
</tr>
<tr>
<td>ADV 2</td>
<td>(n/a)</td>
<td>“I think Ø this is a bad idea,” he said angrily.</td>
</tr>
</tbody>
</table>

6.3 Details
24 items (6 in each of the four conditions), randomly mixed with 72 fillers (48 from experiment 2, and 24 true fillers). 40 subjects, mostly Stanford undergraduates, all native speakers of English.

6.4 Our Prediction:
Clear meaning differences in the adverb conditions, but no clear difference between the sentences with and without THAT.

6.5 Results
Contrary to Yaguchi’s emotion claim, no statistically significant difference between ZERO and THAT; highly significant difference for the ADV controls, showing that the methodology can detect meaning differences.

ANOVA:

<table>
<thead>
<tr>
<th></th>
<th>ZERO vs. THAT</th>
<th>ADV 1 vs. ADV 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1(1,39)</td>
<td>0.8, p &gt; 0.3</td>
<td>115.0, p &lt; 0.0001</td>
</tr>
<tr>
<td>F2(1,23)</td>
<td>0.8, p &gt; 0.3</td>
<td>149.0, p &lt; 0.0001</td>
</tr>
</tbody>
</table>

Chart 1

Average Emotion Ratings in Sentences with Optional Complementizer THAT

40 subjects with 24 items divided into 4 conditions; 95% confidence intervals
7. Experiment 2: Time Distance with Complementizers and Relativizers

7.1 Same Design as Experiment 1

Relativizer Time Example

"Have you ever been to Barcelona?" Melissa asked her colleague Ed at work. "Actually," Ed responded, "I'm planning on visiting Barcelona during the vacation {that/Ø} I'm taking to Spain."

Estimate as precisely as you can the time difference between when Melissa and Ed have this conversation and when Ed intends to go on vacation.

_____Years  _______Days  _____Minutes

Time response was turned into total number of minutes, and then analyzed on a log-scale.

7.2 Controls
Adverbial controls were sometimes short phrases, such as “next week” vs. “this afternoon” instead of one-word adverbs.

7.3 Details
Given in same session as experiment 1: 48 items (24 relativizers, 24 complementizers), randomly mixed with the 24 items from experiment 1 and 24 true fillers.

7.4 Results:
No significant difference for THAT vs. ZERO, but highly significant difference for ADV 1 vs. ADV 2.

Analysis splitting up relativizer and complementizer cases does not differ qualitatively.

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ANOVA:

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<tr>
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<th>THAT vs. ZERO</th>
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</tr>
</thead>
<tbody>
<tr>
<td>F1(1,39) = .6, p &gt; 0.4</td>
<td>F1(1,39) = 27.8, p &lt; 0.0001</td>
<td></td>
</tr>
<tr>
<td>F2(1,47) = 2.2, p &gt; 0.1</td>
<td>F2(1,47) = 87.5, p &lt; 0.0001</td>
<td></td>
</tr>
</tbody>
</table>

Chart 2

Average Time Distance Estimation in Sentences with Optional Complementizer or Relativizer THAT

Note: in log-scale, 10 corresponds to approx. 15 days, 12 to approx. 4 months.

8 Discussion
8.1 What does this mean?
The significant differences in the adverb condition show that the methodology works for these types of meaning differences. And yet we find nothing for THAT vs. ZERO. So the claimed semantic effect of optional THAT for emotion & time-distance is either absent or extremely subtle.

These results suggest that the Principle of No Synonymy is not an inviolable constraint. Why, then, do both forms exist if not to express semantic difference?

8.2 An Alternative Explanation for the Phenomenon: Processing
Sometimes, it’s really hard to understand sentences without the THAT:
(6a) Go find the ball from my brother’s school’s playground that I hit.
(6b) ?Go find the ball from my brother’s school’s playground Ø I hit.

Experimental and corpus research has found significant evidence for processing effects, for both production and comprehension (e.g., Ferreira & Dell 2000; Race & Macdonald 2003; Hawkins 2004; Jaeger 2006)

9. Potential Objections
9.1 Other Types of Meaning Differences
More claims in the literature—we did not test them all. But the burden of proof should be on those making the claims.

9.2 Too Subtle of a Semantic Effect
Cannot prove a null effect. But, again, the burden of proof should be on those making the claim.

10. Conclusion
This study finds no evidence for two of the claimed meaning differences between THAT and ZERO, thus buttressing a counterexample to Bolinger’s principle.

11. References
Kaltenböck, Gunther. 2006. “...That is the question’: complementizer omission in extraposed that-clauses.” English Language and Linguistics. 10(2): 371-396.