Still suspicious: The suspicious coincidence effect revisited

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Abstract

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Intro

What is the suspicious coincidence effect?

(Spencer, Perone, Smith, & Samuelson, 2011; F. Xu & Tenenbaum, 2007; Fei Xu & Tenenbaum, 2007)

Why is it important?

Spencer et al. paper

Methodological differences:

- simultaneous vs. sequential
- 3-1 vs. 1-3
- blocking
- same label vs. different label

other evidence relevant on this replication

Our current paper reports 10 pre-registered experiments. We recover the suspicious coincidence effect with a large effect size in both sequential and simultaneous presentation conditions. The effect only occurs, however, in experiments where the trial with one exemplar is presented *before* the key trial with three subordinate-consistent exemplars (the "suspicious coincidence"). We attribute this difference to participants' awareness of the possibility of subordinate generalizations following the three-exemplar trial; in these conditions, we see a high level of subordinate generalizations even for the one-exemplar trial (leading to the absence of a difference between conditions). In sum, and contra SPSS, the "suspicious coincidence" effect is robust to sequential presentation. The effect is sensitive to some features of the general experimental context, however, suggesting a potential interpretation in terms of the pragmatics of the task.

Methods

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study.

Participants

Material

Procedure

Data analysis

We used R (3.4.1, R Core Team, 2017) and the R-packages *bindrcpp* (0.2, Müller, 2017), *broom* (0.4.2, Robinson, 2017), *compute.es* (0.2.4, Re, 2013), *dplyr* (0.7.2, Wickham, Francois, Henry, & Müller, 2017), *forcats* (0.2.0, Wickham, 2017a), *ggplot2* (2.2.1, Wickham, 2009), *jsonlite* (1.5, Ooms, 2014), *kableExtra* (0.4.0, Zhu, 2017), *knitr* (1.17, Xie, 2015), *langcog* (0.1.9001, Braginsky, Yurovsky, & Frank, n.d.), *Matrix* (1.2.10, Bates & Maechler, 2017), *metafor* (2.0.0, Viechtbauer, 2010), *papaja* (0.1.0.9492, Aust & Barth, 2017), *png* (0.1.7, Urbanek, 2013), *purrr* (0.2.3, Henry & Wickham, 2017), *readr* (1.1.1, Wickham, Hester, & Francois, 2017), *rmarkdown* (1.6, Allaire et al., 2017), *stringr* (1.2.0, Wickham, 2017b), *tibble* (1.3.3, Müller & Wickham, 2017), *tidyr* (0.6.3, Wickham, 2017c), and *tidyverse* (1.1.1, Wickham, 2017d) for all our analyses.

Results

Discussion

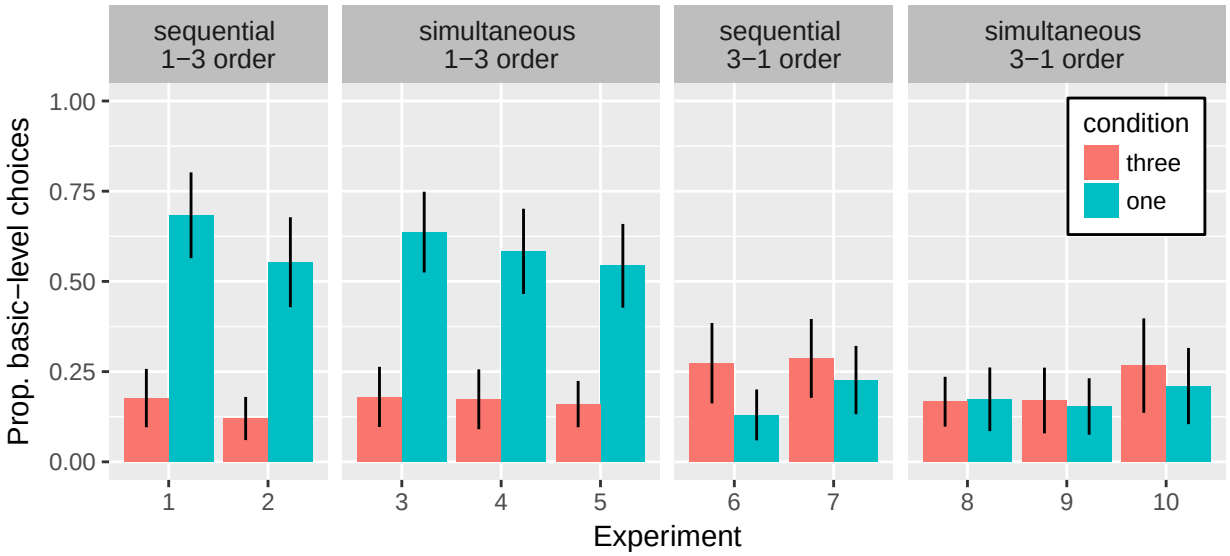

Figure 1. (#fig:plot_means)Mean proportion generalization to basic level exemplars in the one (green) and three (pink) subordinate exemplar conditions for all 10 of our experiments. Each facet corresponds to a pairing of presentation timing (sequential vs. simultaneous) and trial order (1-3 vs. 3-1). Error bars are bootstrapped 95% confidence intervals.

		Manipulations				
Experiment	N	Timing	Order	Blocking	Label	Effect Size
1	50	sequential	1-3	random	same	1.42 [1.32, 1.52]
2	50	sequential	1-3	blocked	different	1.26 [1.18, 1.34]
3	50	simultaneous	1-3	random	same	1.32 [1.24, 1.4]
4	50	simultaneous	1-3	random	same	1.14 [1.06, 1.22]
5	50	simultaneous	1-3	random	different	1.16 [1.08, 1.24]
6	50	sequential	3-1	blocked	different	-0.44 [-0.52, -0.36]
7	50	sequential	3-1	blocked	same	-0.17 [-0.25, -0.09]
8	50	simultaneous	3-1	blocked	different	0.02 [-0.06, 0.1]
9	50	simultaneous	3-1	random	different	-0.06 [-0.14, 0.02]
10	50	simultaneous	3-1	random	same	-0.14 [-0.22, -0.06]

Fixed effect	beta	z-value	p-value
Intercept	1.33 [1, 1.66]	7.90	<.0001
Sequential vs. simultaneous timing	-0.18 [-0.47, 0.11]	-1.24	0.21
3-1 vs. 1-3 condition order	-1.4 [-1.66, -1.15]	-10.77	<.0001
Same vs. different label	0.07 [-0.2, 0.34]	0.51	0.61
Random vs. blocked trial order	-0.09 [-0.44, 0.27]	-0.49	0.63

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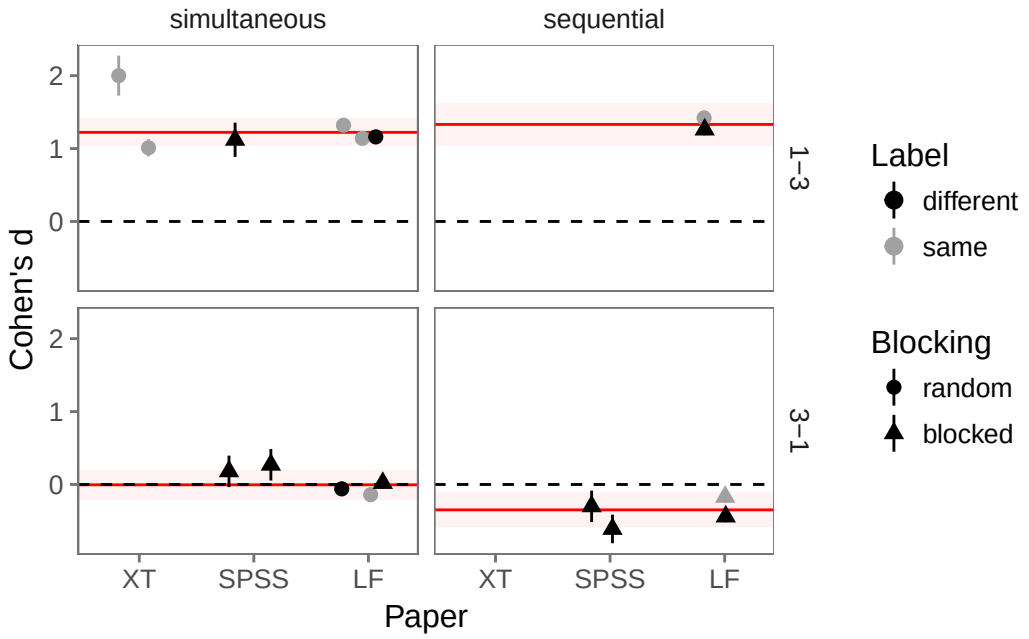

Figure 2. (#fig:plot_es)Cumulative plot of effect sizes for all 17 studies conducted on the suspicious coincidence effect by XT (Xu & Tenenbaum, 2007a), SPSS (Spencer, et al, 2011), and the current authors. Facets along the vertical indicate whether the single exemplar trial occurred first (1-3) or second (3-1). Facets along the horizontal indicate whether the exemplars were presented simulateously as in XT or sequentially as in SPSS. Point color indicates whether the single exemplar and three subordinate exemplars received the same (grey) or different (black) label. Point shape indicates whether trials were blocked by category (circle) or pseudo-random (triangle). Points are jittered along the x-axis for visibility. The red line reflects the meta-analytic estimate of the effect size. All error bars are 95% confidence intervals.