

Topicalization modulates the processing of a new topic in Chinese concession: An eye-tracking study

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Introduction. As a topic-prominent language (Li & Thompson 1981), Chinese features a special double-subject structure [NP1 NP2 PREDICATE] like (1), where NP1 serves a topic that holds a part-whole relation with NP2. While processing new topics in discourse induces greater difficulty (Hyönä 1995; Hirota & Schumacher, 2011; Hung & Schumacher, 2012), it is less clear whether and how the processing of a new topic interacts with topicalization in discourse. The present study investigates the processing of topic in Chinese concessive sentences, which are expressed by paired connectives like (2), where the NPs in the two clauses (C1 and C2 hereafter) form a contrastive relation (Li 1924). We investigate how the processing of a new topic in C2 of concession is modulated by the topicalization of NP1 in C1.

Method. An eye-tracking experiment (N = 40) was conducted with topic shift (old vs. new) and topic saliency (salient vs. unmarked) being manipulated (Table 1). Topic shift was manipulated by keeping a continuous topic (S2) or switching to a completely new topic (T2) in C2. Saliency was manipulated by placing the NP1 before (condition salient) or after (condition unmarked) the concessive connective *suiran* 'although'. The stimuli consisted of a context sentence and the target sentence, presented consecutively on two pages controlled by the participants themselves.

Results. Linear mixed models with topic shift and topic saliency as fixed effects and subjects and items as random effects were fitted to the eye-movement measures of log-first pass duration, regression-in count, log-total reading time and total fixation count in each of the interest areas (Table 2). Any interactions were followed by further tests on 1) the effect of topic shift in each level of saliency and 2) the effect of topic saliency in each level of topic shifting.

As predicted, we found the main effect of topic shifting in various regions on different measures ($p < .05$). Importantly, however, we found a significant interaction on the total fixation count in Region 1 ($\beta = 0.39$, $t = 1.96$, $p \leq .05$), with further tests showing significantly more fixations on the new topic only in topic-salient sentences ($\beta = -0.30$, $t = -2.01$, $p < .05$) but not in topic-unmarked ones ($\beta = 0.07$, $t = 0.55$, $p > .1$). Marginal significant interactions were observed on the total reading time ($\beta = 0.14$, $t = 1.76$, $p < .1$) and total fixation ($\beta = 0.30$, $t = 1.73$, $p < .1$) at the post-critical regions (Region 3), showing that despite topic shifting had an effect on both salient and unmarked conditions with a new-topic-disadvantage, the effect size in salient conditions (total reading, $\beta = -0.29$, $t = -5.19$, $p < .001$; total fixation, $\beta = -0.57$, $t = -4.51$, $p < .001$) were significantly larger than in unmarked sentences (total reading, $\beta = -0.16$, $t = -2.77$, $p < .01$; total fixation, $\beta = -0.28$, $t = -2.40$, $p < .05$). Further tests on the effect of topic saliency revealed that when encountering a new topic, participants had greater difficulty in processing salient sentences than unmarked ones ($p < .05$), but no such effect was observed in old-topic conditions ($p > .1$).

Discussion. The significant interactions we found clearly showed that participants had greater difficulty in processing new topics when NP1 was topicalized. While building cohesive mental representations, comprehenders use the first words (i.e. the topic in our study) to lay foundations for their mental representations of larger units such as sentences and paragraphs (Gernsbacher, 1995). The topicalized NP1 in C1 of concession lays the foundation for the whole structure and thus it is more cognitively demanding when the upcoming NP in C2 is completely new.

- (1) [那个戒指]_{Topic} [[设计]_{Subject} [很特别]_{Predicate}] Comment^o
nagejiezhi sheji hentebie
that ring design very special
‘(In terms of) that ring, it has a very special design.’
- (2) 虽然 但是
suiran danshi
although but

Table 1. Examples of stimuli

Context:

小美正在店里选购结婚用品，看了戒指、婚纱、耳环和手镯。
‘Xiaomei was shopping for her wedding. She browsed the ring, the wedding dress, the ear ring and the bracelet.’

Target sentences:

	IA_1				IA_2		IA_3		
Salient-old									
她发现 [那个戒指] _{T1} 虽然	[设计] _{S1}	很特别,	但	[做工] _{S2}	不精致,	看着很粗糙,	真是的。		
she finds that ring although	design	very special	but	workmanship	unsophisticated	looks coarse	such a pity		
Salient-new									
她发现 [那个戒指] _{T1} 虽然	[设计] _{S1}	很特别,	但	[婚纱] _{T2}	不精致,	看着很粗糙,	真是的。		
she finds that ring although	design	very special	but	wedding dress	unsophisticated	looks coarse	such a pity		
Unmarked-old									
她发现 虽然[那个戒指] _{T1}	[设计] _{S1}	很特别,	但	[做工] _{S2}	不精致,	看着很粗糙,	真是的。		
she finds although that ring	design	very special	but	workmanship	unsophisticated	looks coarse	such a pity		
Unmarked-new									
她发现 虽然[那个戒指] _{T1}	[设计] _{S1}	很特别,	但	[婚纱] _{T2}	不精致,	看着很粗糙,	真是的。		
she finds although that ring	design	very special	but	wedding dress	unsophisticated	looks coarse	such a pity		

‘She found that although that ring had a very special design, its workmanship / the wedding dress was not exquisite. It looked coarse. It was such a pity.’

Table 2. Linear mixed models results

	IA_1			IA_2			IA_3		
	Coef.	SE	t	Coef.	SE	t	Coef.	SE	t
First pass									
Topic shift	0.05	0.05	1.05	-0.03	0.04	-0.65	-0.08	0.04	-1.96*
Topic saliency	-0.02	0.05	-0.54	0.01	0.04	0.25	-0.06	0.04	-1.65.
shift × saliency	-0.03	0.06	-0.43	0.01	0.05	0.13	0.00	0.06	0.05
Regression in									
Topic shift	-0.05	0.03	-1.65.	-0.02	0.04	-0.46	-	-	-
Topic saliency	-0.06	0.03	-1.76.	-0.01	0.04	-0.32	-	-	-
shift × saliency	0.07	0.05	1.42	-0.02	0.06	-0.42	-	-	-
Total reading									
Topic shift	-0.09	0.05	-1.95.	-0.16	0.05	-3.11**	-0.30	0.06	-5.22***
Topic saliency	-0.15	0.05	-3.25**	-0.02	0.05	-0.42	-0.13	0.06	-2.39*
shift × saliency	0.09	0.06	1.38	0.05	0.07	0.76	0.14	0.08	1.76.
Total fixation									
Topic shift	-0.32	0.14	-2.21*	-0.31	0.10	-3.15**	-0.57	0.12	-4.74***
Topic saliency	-0.53	0.14	-3.72***	-0.03	0.10	-0.31	-0.28	0.12	-2.41*
shift × saliency	0.39	0.20	1.96*	0.13	0.14	0.97	0.30	0.17	1.73.

Note: $p^{***} < .001$, $p^{**} < .01$, $p^* \leq .05$, $p < .1$

References:

- [1] Li & Thompson 1981. Berkeley, University of California Press. [2] Hyönä 1995. *Journal of Experimental Psychology*. [3] Hirotani & Schumacher. 2011. *Journal of Neurolinguistics*. [4] Hung & Schumacher. 2012. *Neuroscience Letters*. [5] Li 1924. Beijing, The Commercial Press. [6] Gernsbacher. 1995. In Britton & Graesser (eds).