

Plausibility in Chinese concession and causality: Evidence from self-paced reading and eye-tracking

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Introduction. Concession has been considered as a negative counterpart of causality (König 1991). Whereas a causal relation like (1) establishes the natural causal link between events, concessive sentences like (2) violates it. While it is more costly to interpret a concessive relation than a causal relation (e.g. Caron et al. 1988), it remains unclear how the plausibility of the invoked event knowledge may interact with concession and causation. Previously, Xu et al. (2018) found the effect only in the causal relation, not in the concessive relation. The current study aims at further examining the plausibility effect in Chinese concession and causality.

Experiment 1. Two self-paced reading experiments were conducted to compare the processing of concession (Experiment 1a, $N = 24$) and causality (Experiment 1b, $N = 24$) while using the most natural expressions in each relation (i.e. negative forms in concession and positive forms in causality; see Morera et al. 2017). We manipulated the plausibility of the conditional relation underlying concession and causality (plausible vs. less-plausible vs. implausible) in three-clause structures (C1, C2 and C3 in (3) and (4)), which was rated by 36 native speakers in the pre-test. In each experiment, two contrasts (linear mixed models) were defined by 1) comparing plausible conditions with the less plausible conditions and 2) comparing the plausible conditions with the implausible conditions. Results (Figure 1) showed that for the first contrast, no significant difference was found at either the critical or post-critical region in both experiments. For the second contrast, we found the plausibility effect in causality ($\beta = -0.07$, $t = -1.97$, $p \leq .05$) but not in concession at the critical region (longer time in causal-implausible than causal-plausible conditions), whereas at the post-critical region, we found the effect of plausibility in both causal ($\beta = -0.12$, $t = -2.85$, $p < .01$) and concessive ($\beta = -0.09$, $t = -2.50$, $p < .05$) relations, with implausible sentences being read longer than plausible ones.

Experiment 2. An eye-tracking study ($N = 40$) was conducted where we counter-balanced the negative and positive forms in the two relations and adopted a within-subjects design (Table 1). We found significant interactions between the main effect of plausibility and the effect of connective (concessive vs. causal) in a few regions: at Region 2 and 5, the significant effect of plausibility was only observed in concession (total fixation, $\beta = -0.84$, $t = -3.92$, $p < .001$, Region 2; regressions out, $\beta = -0.20$, $t = -3.75$, $p < .001$, Region 5) but not in causality, and at Region 4, despite the plausibility had an effect in both relations, the effect size was significantly larger in concession (total reading time, $\beta = -0.39$, $t = -7.53$, $p < .001$; total fixation, $\beta = -1.20$, $t = -6.80$, $p < .001$) than causality—all showing greater difficulty in processing implausible than plausible sentences. It is worth noting that at the critical region (Region 5), significant plausibility effect was observed on the regressions out in concession but not in causality, which suggested a reprocessing of the previous text in the former. By contrast, a trend of more regressions in and total reading time was observed in causality than concession at the critical region, showing participants' immediate sensitivity to the plausibility effect in a causal relation. The eye-tracking study thus provides more indices for the plausibility effect in concession and causality, revealing greater difficulty and a re-reading process coming with a concessive relation.

Conclusion. In contrast to previous studies where the plausibility effect in concession was not observed (Xu et al. 2018), we provide novel evidence for the existence of plausibility effect in both concession and causality, and revealed a more complicated pattern of plausibility effect in the former. This was attributed to the logical complexity of concession, where comprehenders' may hold both the causal and concessive mental representations while processing a concessive relation. Together, this study suggested more costly processing of concession than causality.

- (1) Because the pupil studied a lot, he passed the exam.
 (2) Although the pupil studied a lot, he failed the exam.

(3) Examples of stimuli in Experiment 1a, with critical regions in bold

C1: 阿辉	虽然	破案	无数,	
Ahui	although	solve cases	a lot	
C2: 但是	不	擅长	发现	疑点 / 漏洞 / 肿瘤
but	not	good at	find	clues / flaws / tumors
C3: 真	奇怪			
very	strange			

“Although Ahui has solved a lot of cases, he is not good at finding **clues / flaws / tumors**. It’s very strange.”

(4) Examples of stimuli in Experiment 1b, with critical regions in bold

C1: 阿辉	因为	破案	无数,	
Ahui	because	solve cases	a lot	
C2: 所以	很	擅长	发现	疑点 / 漏洞 / 肿瘤
so	very	good at	find	clues / flaws / tumors
C3: 真	奇怪			
very	normal			

“Because Ahui has solved a lot of cases, he is very good at finding **clues / flaws / tumors**. It’s very normal.”

Table 1. Examples of stimuli in Experiment 2, with critical regions in bold

Conditions	Examples					
	IA 1	IA 2	IA 3	IA 4	IA 5	IA 6
a Concessive-plausible	虽然	阿辉破案无数,	但是	不擅长	发现疑点,	大家都知道。
	although	Ahui’s solved many cases	but	not good at	find clues	everybody knows
b Concessive-implausible	虽然	阿辉破案无数,	但是	很擅长	发现疑点,	大家都知道。
	although	Ahui’s solved many cases	but	very good at	find clues	everybody knows
c Causal-plausible	因为	阿辉破案无数,	所以	很擅长	发现疑点,	大家都知道。
	because	Ahui’s solved many cases	so	very good at	find clues	everybody knows
d Causal-implausible	因为	阿辉破案无数,	所以	不擅长	发现疑点,	大家都知道。
	because	Ahui’s solved many cases	so	not good at	find clues	everybody knows
Translation:	Although/Because Ahui has solved a lot of cases, he is not/very good at finding clues. Everybody knows.					

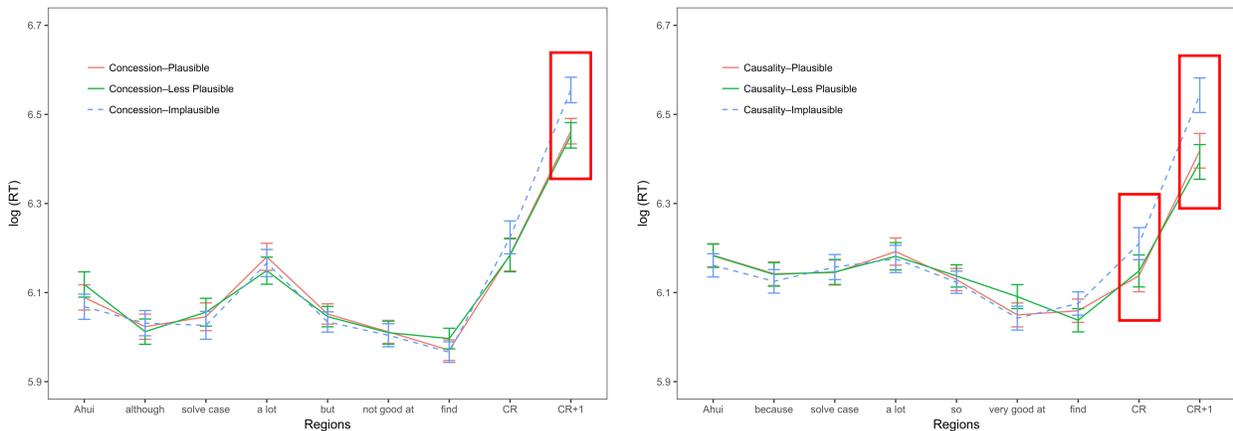


Figure 1. Log-transformed reading times by regions in Experiments 1a (left) and 1b (right)

References: [1] König 1991. In Zaefferer (ed.). [2] Caron, Micko & Thüring. 1988. *JML*. [3] Xu, Chen, Panther & Wu. 2018. *DP*. [4] Morera, León, Escudero & de Vega. 2017. *DP*.