

Second Language Processing of Information at the Syntax-Discourse Interface

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Background: This study examines how Turkish speakers of English process focus in English. Processing focus requires integrating syntactic and discourse-related information which second language (L2) learners may fail in due to insufficient resources for processing information at the interface of a sub-module (e.g., syntax) and an external domain (e.g., discourse) (Interface Hypothesis (IH), [1]). Broad focus, associated with sentential stress, [2] is placed mostly on the immediately preverbal constituent in Turkish [3] but on the rightmost constituent in English [4]. Turkish commonly marks narrow focus by moving a constituent to the immediately preverbal position [3]. Focus marking via word-order in English is observed in a very limited context, e.g., ditransitives where the rightmost constituent presents new information [5]. The experimental sentences in the present study include ditransitives in double-object or dative alternation forms. To distinguish narrow and broad focus, changes to the syntactic structure (i.e., word-order) need to be associated with discourse information (i.e., given-before-new principle). L2 speakers' insensitivity to word-order changes to mark narrow focus would indicate failure in using information at the syntax-discourse interface supporting the IH. If L2 speakers mark focus on the subject, the only preverbal constituent in English, that would indicate transferring an L1 constraint to the L2. An eye-tracking experiment and a sentence completion task were conducted with L1 speakers of English ($N = 8, 21$, respectively) and advanced Turkish speakers of English ($N = 47$). (L1 eye-tracking data collection paused due to the Covid-19 pandemic.) **Materials:** The experimental sentences included ditransitive verbs and replacive phrases as in (1). The focus structure of the main clause (broad/narrow) and congruency of the replacive phrase (congruent/incongruent) with the focused (i.e., rightmost) constituent were manipulated. Focus was manipulated via word-order: canonical as in (1a-c) where the rightmost/indirect object, *to the director*, would have broad focus, or non-canonical as in (1d-f) where the rightmost/direct object, *the flowers*, would have narrow focus. Congruency with the focused constituent was manipulated via the replacive phrase, *not*____, which contrasted either with the rightmost object as in (1a,d), and was congruent, or with another constituent, (the (in)direct object as in (1b,e) or the subject as in (1c,f)), and was incongruent. **Procedure:** In the eye-tracking experiment, the participants read the sentences and answered a comprehension question. The phrase following *not* was blank in the sentence completion task. The participants chose an option that could complete it with a phrase contrasting the (in)direct object or subject. **Results:** The eye-tracking data (see Table 1) were analyzed through mixed effects linear/logistic regression models. Processing narrow/broad focus was examined at the rightmost object (region 4) and its spill-over region (region 5). Sensitivity to the rightmost position as default focus position was examined at the replacive phrase (region 6) and its spill-over region (region 7). The L1 results were not reliable. The L2 data did not show any difference between broad and narrow focus conditions in any measure (t 's < 1.34). The analyses at the replacive phrase showed slow-downs for incongruency: contrast with the non-focused object for reading duration (RRD) and total duration (TD), t 's ≥ 2.05 , with the subject for RRD $t = 2.71$, $p < .05$. Both groups of participants preferred to complete the sentences with a phrase that would contrast with the rightmost constituent ($M_{L1} = 63\%$, $M_{L2} = 54\%$; see Table 2). **Discussion:** L2 speakers' sentence completions and sensitivity to the (in)congruity in the eye-tracking experiment show that they have acquired the syntactic information that focus is placed on the rightmost object in English. Their insensitivity to changes to word-order to mark broad/narrow focus indicates failure to use information at the syntax-discourse interface. This is in line with the IH [1]. But it may also be because the participants might have had insufficient input for scrambling as a strategy to mark focus in English. Or, they may, in general, over-rely on "good enough" processing [6] and fail to distinguish broad and narrow focus as the latter would require deeper processing [7].

References: [1] Sorace, A. (2011). *Ling. Appr. to Biling.*, 1, 1-33. [2] Kahnemuyipour, A. (2009). *The syntax of sentential stress*. [3] Göksel & Özsoy (2003). *Lingua*, 113, 1143-1167. [4] Carlson et al. (2009). *Quart. J. of Expt. Psych.*, 62, 114–139. [5] Brown et al. (2012). *JML*, 66, 194–209. [6] Ferreira et al. (2002). *Cur. Dir. in Psych. Sci.*, 11, 11–15. [7] Lowder & Gordon (2015). *Psych. Bullet. & Rev.*, 22(6), 1733–1738.

(1) Experimental Sentences: Conditions distinguish for broad (B) vs. narrow (N) focus and Congruent (C) vs. Incongruent (InC) replacive phrase with the direct object (DO), indirect object (IO) or the subject (SU). Regions are shown via “/” and subscripted numbers.

- a.B-N/C-IO: The presenter/₁ gave/₂ the flowers/₃ to the director/₄ yesterday/₅, not to the actress/₆.
- b.B-N/InC-DO: The presenter/₁ gave/₂ the flowers/₃ to the director/₄ yesterday/₅, not the prizes/₆.
- c.B-N/InC-SU: The presenter/₁ gave/₂ the flowers/₃ to the director/₄ yesterday/₅, not the organizer/₆.
- d.N-N/C-DO: The presenter/₁ gave/₂ the director/₃ the flowers/₄ yesterday/₅, not the prizes/₆.
- e.N-N/InC-IO: The presenter/₁ gave/₂ the director/₃ the flowers/₄ yesterday/₅, not to the actress/₆.
- f.N-N/InC-SU: The presenter/₁ gave/₂ the director/₃ the flowers/₄ yesterday/₅, not the organizer/₆.

*All conditions (1a-f) were followed by a content-neutral phrase (e.g., “It was/₇the procedure/₈”).

Table 1. Mean values (and standard errors in parentheses) for first fixation duration (FFD), gaze duration (GD), regression path duration (RPD), re-reading duration (RRD), total duration (TD) (in milliseconds) and probability of regression out (PRO) for regions 5 and 7. Congruent conditions are in bold face. B-N focus is marked in green, N-N focus is marked in blue.

		<i>FFD</i>	<i>GD</i>	<i>RPD</i>	<i>RRD</i>	<i>TD</i>	<i>PRO</i>
Region 5	B-N/C-IO	242 (7.5)	286 (12.1)	392 (23.4)	150 (17.4)	419 (22.05)	.19 (0.03)
	B-N/InC-DO	244 (8.07)	296 (13.5)	374 (24.2)	144 (19.4)	417 (22.7)	.12 (0.02)
	B-N/InC-SU	240 (9.02)	284 (13.2)	352 (25.8)	182 (21.9)	449 (25.6)	.09 (0.02)
	N-N/C-DO	236 (8.29)	291 (12.5)	434 (29.7)	191 (24.1)	440 (24.8)	.23 (0.03)
	N-N/InC-IO	249 (9.96)	278 (13.4)	379 (24.0)	176 (21.9)	447 (24.4)	.20 (0.03)
	N-N/InC-SU	238 (7.36)	277 (11.5)	409 (26.5)	163 (17.9)	437 (20.6)	.25 (0.03)
		<i>FFD</i>	<i>GD</i>	<i>RPD</i>	<i>RRD</i>	<i>TD</i>	<i>PRO</i>
Region 7	B-N/C-IO	239 (7.31)	308 (13.7)	377 (29.0)	116 (22.4)	317 (20.7)	.11 (0.03)
	B-N/InC-DO	243 (7.15)	297 (13.6)	404 (34.2)	168 (24.7)	362 (22.3)	.08 (0.02)
	B-N/InC-SU	248 (8.37)	308 (14.4)	416 (40.3)	149 (26.2)	341 (24.2)	.08 (0.03)
	N-N/C-DO	250 (7.82)	311 (14.9)	383 (31.6)	95(20.4)	328 (23.8)	.09 (0.03)
	N-N/InC-IO	245 (8.02)	298 (11.9)	379 (34.5)	180 (27.3)	332 (23.0)	.06 (0.02)
	N-N/InC-SU	249 (7.98)	318 (15.7)	455 (35.4)	155 (26.2)	367 (26.7)	.18 (0.03)

Table 2. Percent sentence completion preferences.

Conditions		L1	L2
Canonical Order (Broad Focus)	C-IO	32.7	26.6
	InC-DO	12.6	15.8
	InC-SU	4.5	7.5
Non-Canonical Order (Narrow Focus)	C-DO	30.3	27.39
	InC-IO	14.6	14.47
	InC-SU	4.9	8.1