Supplemental Material S1. Ranking within and across structural families

Structure	**Family**	**Complexity of Wh-movement structures**	**Complexity of NP-movement structures**	**Example**	**Overall complexity**
Matrix active	NP & Wh	1	1	[$_{NP}$ The girl [$_{VP}$ chased [$_{NP}$ the boy]]]	1
Passives	NP	-	2	[$_{IP}$ The boy$_i$ was [$_{VP}$ chased t$_i$ [by the girl]]]	2
What questions	Wh	2	-	[$_{CP}$ What$_i$ [$_C$ has [$_{IP}$ the girl [$_{VP}$ chased t$_i$]]]]?	3
Who questions	Wh	3	-	[$_{CP}$ Who$_i$ [has [$_{IP}$ the girl [$_{VP}$ chased t$_i$]]]	4
Where, when questions	Wh	4	-	[$_{CP}$ When$_i$ [$_C$ is [$_{IP}$ the girl [$_{VP}$ [$_{VP}$ chasing the boy] t$_i$]]? [$_{CP}$ Where$_i$ [$_C$ is [$_{IP}$ the girl [$_{VP}$ [$_{VP}$ chasing the boy] t$_i$]]?	5
Subject raising	NP	-	3	[$_{IP}$ The girl$_i$ seems [$_{IP}$ t$_i$ to [$_{VP}$ have chased the boy]]]	6
Object cleft	Wh	5	-	[$_{IP}$ It [$_{VP}$ was [$_{NP}$ the boy$_j$ [$_{CP}$ who$_{j\ i}$ [$_{IP}$ the girl [$_{VP}$ chased t$_i$]]]]]]	7
Object relative	Wh	6	-	[$_{IP}$ The man [$_{VP}$ saw [$_{NP}$ the boy [$_{CP}$ who$_{j\ i}$ [$_{IP}$ the girl [$_{VP}$ chased t$_i$]]]]]]	8

Note. Family = structural family; NP = noun phrase, V = verb, VP = verb phrase, CP = complementizer phrase, i,j = index of movement/coreference, t = trace, IP = inflection phrase, C = complementizer.

Noun phrase- (NP) and wh-movement are the primary movement operations identified by Chomsky (1986, 1995; see Shapiro, 1997, for a tutorial review). Therefore, NP and wh-movement are the only transformation types and structural families addressed in the Treatment of Underlying Forms literature. The phrase structure of more complex NP- and wh-movement sentences can be derived by manipulating the structure of less complex sentences with a canonical word order. To date, the TUF literature has viewed the complexity of NP- and wh-movement structures independently of one another; see table above. However, to better understand the relationship between structural complexity and response to TUF, we created an overall complexity ranking across NP- and wh-movement structures.

Matrix active sentences are the kernel sentence for both NP- and wh-movement and are used as such in the TUF literature. Matrix actives include two noun phrases and a verb in canonical agent-verb-theme word order. This syntactic structure is then transformed to make more complex sentences. For this reason, we defined matrix actives as the least complex structure in our overall ranking for both wh- and NP-movement structural families. Transformation of a matrix active sentence to a passive sentence requires the reversal of the agent and the theme, derived via movement of the theme NP from its underlying post-verbal position to a pre-verbal subject position and insertion of a *by* phrase containing the agent NP following the verb. (See the simplified syntactic structure for the passive example in the table above.) Given that this derivation involves only a single NP movement operation and a simple Inflectional Phrase (IP) clause structure, we assigned passives as the next most complex sentence in our overall ranking.

The derivation of *who*- and *what*-questions also requires the movement of the post-verbal theme NP to a sentence-initial position, in this case a wh-marked theme NP. In contrast to passives and NP movement structures, this position is the Complementizer Phrase (CP) specifier, preceding the agent NP. Given that this derivation involves both a wh-movement operation and an additional layer of CP structure on top of the IP clause structure, we ranked *who*- and *what*-questions as more complex than passives. Of note, *what*-questions were assigned a lower complexity than *who*-questions. This is because *what* questions are non-reversible: the *what* NP is inanimate and therefore can only be a theme, whereas the *who* NP is animate and could be an agent or a theme. Non-reversible sentences have consistently been found to elicit better performance than reversible sentences in aphasia literature (e.g., Saffran et al., 1998; Schwartz et al., 1980, 1987).

When- and *where*-questions were assigned the next level of complexity in our overall ranking. *When* and *where* are adjunct phrases, providing further semantic information in addition to the agent and theme NPs found in simple matrix active sentences. Like *who* and *what*, these adjunct phrases are moved to a sentence-initial CP specifier position from an underlying position following the theme. This position is associated with an additional VP structure layer (see the simplified syntactic structures for where- and when-question examples in table above). Because both these adjunct phrases, they were therefore ranked as having the same level of complexity.

The next most complex sentences in our overall ranking are subject raising sentences. Unlike the complex sentence types presented above, subject raising sentences contain two clauses (IPs): one matrix clause with the raising verb, *seem,* and one infinitival clause with the auxiliary verb *(to) have*. Like passive sentences, they involve NP movement, in this case, movement of the infinitival clause’s agent NP to the matrix clause's pre-verbal subject position. See the simplified syntactic structure for the subject-raising example in the table above.

The two most complex sentence structures included in this analysis and in our overall ranking are object clefts and object relatives. Like subject raising sentences, object cleft and object relative sentences involve two clauses. However, they also contain an additional CP structure layer, whereas subject-raising sentences only involve simple IP clause structure. (See simplified syntactic structures for object cleft and object relative examples in table above.) Although these two sentence types have the same number of words and are of a similar syntactic structure, object relatives are more complex than object clefts because they contain both an agent NP and a semantically heavy verb in their first clause (the animate NP *the boy* and the verb *saw* in the example in table above). In contrast, object clefts have semantically empty elements in their first clause: the pleonastic pronoun *it* and the copula *was*.