Here, we investigate the real-time implications of the abstractness constraint on referential processing. Anaphoric expressions do not only refer to individuals and objects, but they can also refer to propositionally structured referents (such as facts, states, processes, events). Anaphors that condense propositionally structured antecedents to nominal expressions are called complex anaphors (Schwarz, 2000) or abstract object anaphors (Asher, 1993). Examples of complex anaphors are given in (A-C), where this development or this phenomenon refer to the previously mentioned situation referent (i.e. the destruction of the cichlid species).

Complex anaphors differ in their ontological types, which can be categorized in terms of a linear hierarchy indicating increasing abstractness (cf. e.g. Asher, 1993; Maienborn, 2003). The abstractness scale (Figure 1) is defined with respect to the boundedness of complex referents to space, time, agents and worlds. The less bound a referent, the more abstract it is. For instance, events – representing the least abstract entities – are defined as spatio-temporal entities with certain agents and a focus on the result [+telic]. Processes emphasize the temporal duration [+dynamic]. States are neither telic nor dynamic, but are bound to experiences within a certain time (and partly space) interval.

During referential resolution, a complex anaphor can confirm the ontological type assigned by the antecedent (e.g. a process anaphor refers to a process (A)) or it can shift the ontological type to a more abstract one (e.g. a state anaphor refers to a process (B)). Crucially, however, it cannot shift the ontological type assigned by the antecedent (e.g. a process anaphor refers to a process (A)) or it can shift the ontological type to a more abstract one (e.g. a state anaphor refers to a process (B)). Here, we investigate the real-time implications of the abstractness constraint on referential processing.

**Abstractness scale**

- **proposition** (pp) [unspecified truth value]
- **fact** (f)
- **state** (s) [+dynamic, -telic], dependent
- **process** (p) [+dynamic, -telic], on time
- **event** (e) [+dynamic, -telic], and space

**Abstractness constraint**

\[ x \Leftarrow y \text{ if } x \Rightarrow y \]

\( x \) cannot be higher on the abstractness scale than \( y \), where \( x \) represents the ontological type assigned by the antecedent and \( y \) that of the anaphor.

**References**


Bürkhardt, J. (2006). *Ontological types and reference resolution*. The ontological type assigned to an entity impacts referential interpretation during early processes of dependency formation that activate lexical-semantic networks (e.g. van Berkum et al., 2003; Bürkhardt, 2006).

Ontological features are specified for each referent and missing features cannot be reconstructed during reference resolution; e.g. a process is [+telic], hence the property [+telic], which is specific to events, cannot be added, yielding a feature mismatch.

Violating the abstractness constraint results in processing difficulties (enhanced N400): an anaphor cannot pick up an antecedent expression whose ontological type is higher on the abstractness scale (e.g. Process \( \Leftarrow \) Event).