Applying now these operations to

\[
\text{The two readings of turned into a determiner meaning by means of type shifting operations. This proposal is}
\]

While this ambiguity seems to be at odds with naïve intuitions, we provide experimental evidence for its existence.

### Theoretical Background

We assume that bare and modified numerals have a basic predicative meaning, which is turned into a determiner meaning by means of type shifting operations. This proposal is similar in spirit, although not in letter, to Geurts’ (2006) proposal.

(3) Predicative meanings (where \(x\) denotes the number of atoms which are parts of the plural individual \(x\)).

a. \(3 \rightarrow \text{exact} \cdot \text{num} \cdot \text{red} = 3\).

b. \(3 \rightarrow \text{at least} \cdot \text{num} \cdot \text{red} = [3, 5] = \max\{\text{between 3 and 5}\}\).

(4) Type shifting operations

a. Maximization: \(\max(\text{are red}) = \text{num} \cdot \text{red} = 3\).

b. Existentialization: \(\exists(\text{are red}) = \text{num} \cdot \text{red} = [3, 5]\).

The two readings of Bare sentences of (1) are derived as follows:

(5) Maximization gives rise to the two-sided reading \(\exists(3)\) (are red) – 1 if the maximal plural individual made of red dots contains 3 atomic parts.

(6) Existentialization gives rise to the lower-bounded reading \(\exists(3)\) (are red) – 1 if at least three dots are red.

Applying now these operations to Between sentences of (2) yields the following results:

(7) Maximization gives rise to the expected two-sided reading \(\exists(\exists(3)\) (are red) – 1 if the maximal plural individual made of red dots contains \([3, 5]\) atomic parts.

(8) Existentialization gives rise to a surprising lower-bounded reading \(\exists(\exists(3)\) (are red) – 1 if at least 3 dots are red.

Evidence in favor of the existence of the investigated ambiguity:

Res1 Between sentences in the Superior condition are judged intermittently between (a) the same sentence in conditions where both readings are false (Interim), or both are true (Intermediate), first group of bars on Fig1, all \(t > 0.05, p < 0.05\).

(b) True at most and clearly true (At least) conditional sentences in the same condition: first group of bars on Fig2, all \(t > 2.9, p < 0.01\).

Res2 Response patterns show that Between sentences behave the same as ambiguous Bare sentences, but differently from non-ambiguous Between* sentences: \(F(4, 99) = 16, p < 0.001\) for Fig1; \(F(4, 99) = 13, p < 0.001\) for Fig2.

For the three types of ambiguities, we found that correct responses to the true (a) and false (b) unambiguous conditions were faster than the true (c) and false (d) responses to the target condition. The first two bars are always shorter than the last two.

Conclusion

Plausible formal semantic approaches to bare and modified numerals predict the possibility of a lower-bounded reading for ‘between both and m’ sentences, despite the presence of an explicit upper-bound. We offered two types of experimental evidence for the existence of this previously unnoticed ambiguity phenomenon.