This post is part of our 'Pedagogy theory week' series.

For a very short presentation of pedagogy theory, see the Monday post. In this post, György Gergely replies to Marion and Olivier's concerns about the notion of a "Genericity Bias" (see in particular the Wednesday post).

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Natural Pedagogy theory claims that the Genericity Bias has been selected for because it serves an adaptive epistemic cognitive function. It enables infants to rely on ostensive communication not only to receive new and relevant episodic information, but also to infer and extract culturally shared generic knowledge about more abstract types of referents (including object kinds and various other general types of cognitively opaque, conventional and/or normative aspects of shared and generalizable cultural knowledge) that they expect knowledgeable communicative others to 'teach' them about. Importantly, the Genericity Bias allows even preverbal infants to bridge the inferential gap from token to type by extracting and encoding culturally shared generic knowledge about kind-specifying referent properties directly even from – non- or pre-linguistic – ostensive communicative acts that can employ only deictic referential gestures (such as gaze-shift, body orientation, and pointing) that by necessity can identify particular referents only.

The Genericity Bias is hypothesized to function as a built-in interpretational constraint or strategy to direct infants in the inferential disambiguation of the intended level of genericity and width of referential scope of the other's informative intention. According to our proposal, the Genericity Bias is set to maximize the likelihood of retrieving relevant information at the widest scope of referential generalizability that is compatible with the available communicative and contextual evidence relevant for specifying the intended referential scope of the communicative act.

But what about the argument that a built-in Genericity Bias of this sort would result in the epistemic danger of compulsively attributing referentially overly wide-scope generic interpretations to any communicative manifestation? It's true that if ostensive signals were pre-wired to trigger the mandatory assignment of a kind-level interpretation of the intended referential scope, this would result in a curious and obviously maladaptive form of interpretive maladie of 'specificity blindness': a deficiency in being able to understand communications as being about episodic properties of particular referents. This would have potentially disastrous epistemic consequences as the Genericity Bias would flood the system with a constant flow of pragmatic misinterpretations by inducing the attribution of an overly wide referential scope and generic interpretation to all communicative acts.

In this regard it's worth noting that as part of the evidence in support of the GB hypothesis we did identify such ostensively induced pragmatic misinterpretations in young infants. One obvious example is our demonstration of the ostensively induced nature of the perseverative search error in the standard A-not-B task discussed this week by Marion in some detail. We argued that the classical finding of robust and perseverative object search errors by 10-month-olds in the Piagetian A-not-B object-hiding and searching task are, in fact, a consequence of a mistaken assignment of an overly generic level of referential interpretation to the demonstrator's object hiding actions. This is suggested by our demonstration that infants' search errors are induced only in the presence of the ostensive communicative signals that the model directs towards the infant while performing the hiding actions. When the infants observe the same sequence of actions performed in a non-

communicative observation context without being ostensively addressed by the person doing the object hiding, the perseverative search errors have been drastically (if not fully) reduced.

We argued that under the spell of the ostensive signals that induced the Genericity Bias in them, the 10-month-olds were fooled into misinterpreting the basically episodic object hiding-and-searching game as a sequence of serious 'teaching' demonstrations. They were thus driven to make the (mistaken) inferential jump to interpret the demonstrator's hiding actions at a level of referential genericity that would have been justified only if they were correct in treating the other's communicative acts as pedagogical demonstrations intending to convey some generic type of knowledge about the kinds of referent objects and/or kinds of actions performed on them. As Marion is quick to point out, however, the demonstrated hiding actions are potentially compatible with a number of different but equally possible interpretations that would satisfy the expectation of genericity of referential content. For example, infants may have inferred that the adult – when repeatedly hiding the object under Container A – was pedagogically demonstrating to them that "this type of object 'belongs to' container A". Given this – conventional or even normative – referential interpretation of the communicator's informative intention, infants were led to search for the hidden object under it's 'proper place' (i.e., in Container A where they were just 'taught' it 'belongs to'). This would explain why they continued to perseveratively search for the object where it is 'ought to be' (in Container A) even when it was actually hidden in Container B during subsequent B trials.

Would this kind of ostensively induced generic level misinterpretation represent a real epistemic danger to the young infant? While we claim (and demonstrate) that such overly generic referential misinterpretations do exist (and are, in fact, developmental signatures of the early presence of GB), there is reason to suggest that such over-generic misinterpretations are likely to be sufficiently rare and developmentally transient mistakes not represent a serious danger of epistemic derailment of the young infant's conceptual development.

The argument for such errors being acceptably rare is based on the hypothesis that the Genericity Bias is not a mandatory code to map referent tokens onto kinds. Rather, it is – as it's name indicates – not more than a built-in 'bias' on inferential processes of referential disambiguation that fosters the assignment of wide-scope and generic interpretations over episodic ones as long as the former are compatible with the communicative and contextual evidence available to specify the intended referential scope of the manifested information.

Let me illustrate this point by another developmental phenomenon: infants' early competence at social referencing emerging around one year of age. Adults often use object-directed emotion displays accompanied by ostensive referential communicative signals to convey new and generalizable information about generic properties of the kind of objects they make deictic reference to. Imagine that while mom is baking a cake, she notices her baby approach the hot stove. She gets the child's attention by ostensive facial-vocal signals, then looks and points at the stove putting on an exaggerated emotion display of fear while looking back and forth between the stove (the source of danger) and the infant. If as a result of the ostensively induced GB the infant were driven to assign the most generic level of referential interpretation of the mother's communicative display, she would infer that "stoves are dangerous to approach". This would predict that apart from avoiding the stove in the future herself, she would also become alarmed when seeing her mom approach the stove next time. However, since the infant had frequently observed her mother approach and manipulate the stove before (and, in fact, see her do so even while ostensively addressing her fearful communicative expression to the infant), the baby is likely to be able to infer that the intended referential scope of the manifested information is more restricted, coming to the more plausible – but still generic – conclusion that the intended width of referential scope of the informative intention conveyed is something like "stoves are dangerous for children to approach". Thus, the level of genericity and width of referential scope that the infant arrives at is a matter of

pragmatic inference that is modulated by the availability of relevant contextual information and/or existing background knowledge (about mother often approaching the stove). This further relevant evidence can be used by the infant to block the assignment of an overly general interpretation of the intended referential scope of the mother's communicative display. Nevertheless, due to the ostensively induced GB, the infant will be still driven to assign a referential interpretation at the highest level of genericity compatible with the available contextual information instead of the equally compatible episodic alternative (such as "Mom is afraid of the stove she is looking at").

Arguably, therefore, the overly generic misinterpretations (exemplified by the ostensively induced A-not-B search error) represent an acceptably low cost incurred by the powerful inferential cultural learning system of Natural Pedagogy when compared to the high benefit gained in cognitive relevance provided by the possibility it affords – implemented through the Genericity Bias – for extracting and fast-learning relevant and generalizable cultural knowledge about referent kinds even from single communicative manifestations that employ deictically identified particular referents only. (We like to think of the ostensively induced A-not-B search error as a sort of 'conceptual illusion' – the "illusion of being taught" – that is comparable to perceptual illusions that demonstrate the existence of a pre-wired interpretive mechanism of perceptual inference through its rare malfunctioning under specific input conditions.)

The ostensively induced bias to preferentially assign generic and wide-scope referential interpretations to communicative manifestations when available reflects the fact that Natural Pedagogy has evolved as a cognitive inductive learning device that employs ostensive communication as a kind of evolutionary short-cut to bridge the inductive gap to make relevance-guided inferences from token to type. In other words, Natural Pedagogy treats ostensive communicative agents as a special source of demonstrative information designed to guide the learner's inferences to identify the generic contents of referent kinds through single and deictic referential acts of communicative manifestations of such culturally shared generic knowledge. In the terminology of Sperber & Hirschfeld, Natural Pedagogy can be hypothesized to be an adapted social cognitive system specialized for cultural learning whose proper target domain is to acquire the generalizable properties that specify abstract types of referents (such as sortal conceptual kinds).

Social referencing in infants

[Gergely, G., Király, I., & Egyed, K. (2007). On pedagogy. Developmental Science, 10:1, 139-146](#)

Sperber and Hirschfeld on 'target domains'

[The cognitive foundations of cultural stability and diversity.](#)