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Brief report

Person-centred positive emotions, object-centred negative emotions: 2-year-olds generalize negative but not positive emotions across individuals

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Prior work suggests that young children do not generalize others' preferences to new individuals. We hypothesized (following Vaish *et al.*, 2008, *Psychol. Bull.*, *134*, 383–403) that this may only hold for positive emotions, which inform the child about the person's attitude towards the object but not about the positivity of the object itself. It may not hold for negative emotions, which additionally inform the child about the negativity of the object itself. Two-year-old children saw one individual (the emoter) emoting positively or negatively towards one and neutrally towards a second novel object. When a second individual then requested an object, children generalized the emoter's negative but not her positive emotion to the second individual. Children thus draw different inferences from others' positive versus negative emotions: Whereas they view others' positive emotions as person centred, they may view others' negative emotions as object centred and thus generalizable across people. The results are discussed with relation to the functions and implications of the negativity bias.

Young children learn a great deal from others' emotional signals. It was long assumed that children use positive and negative referential emotions in equal but opposite ways: When a positive message is provided about a novel object, children approach it, and when a negative message is provided, children avoid it. However, a recent review observed a negativity bias: Children robustly avoid novel objects that others have emoted negatively about but do not necessarily approach those they have emoted positively about (Vaish, Grossmann, & Woodward, 2008). This bias may be evolutionarily adaptive: Because it is harder to reverse the consequences of a harmful event than of missing an opportunity to interact with the environment, it is more critical to heed negative information. On the other hand, positive information simply indicates that the stimulus is safe and one may pursue the course one wants, whether to explore or avoid the stimulus.

It follows that the negativity bias may have significant implications for how children interpret others' emotions. If children do not view positive emotions as objective signals about the stimulus, they may instead see them as subjective or person centred – indicating

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that the emoter feels positively about the stimulus but others need not. They should thus use positive emotions only to predict the emoter's behaviour, not that of others. On the other hand, children seem to view negative emotions as object centred – applying both to the emoter and to others (including themselves). They should thus use negative evaluations to predict both the emoter's and others' behaviour. Accordingly, we hypothesized that children generalize others' negative but not positive referential emotions across individuals (Vaish *et al.*, 2008).

In prior work, when an adult indicated her preference for a novel object, 2-year-olds selectively gave that object when the same adult requested an object but not when a new adult requested an object (e.g., Henderson & Graham, 2005). This is thought to indicate that children view preferences as person centred. However, this work used only positive emotions; it is possible that negative emotions are generalized across individuals. Interestingly, a recent study that included both positive and negative emotions revealed object-centred responding in infants (Egyed, Király, & Gergely, 2013). An adult emoted positively about one and negatively about another novel object, using either ostensive or non-ostensive cues. When the adult provided ostensive cues, 18-month-olds generalized the emotion information to a new adult, giving her the positive-valence rather than the negative-valence object. However, because the emoter displayed both positive and negative emotions, it is not clear how negative versus positive emotional information may have contributed to this result. To address this issue, it is necessary to de-couple positive and negative valences (cf. Vaish & Woodward, 2010).

In the present study, 2-year-olds saw an adult emoting either positively or negatively towards one and neutrally towards a second novel object. The emoter or a second adult then requested an object. We expected children to appropriately use both positive and negative emotions when the requester was the emoter, and not to generalize the emoter's positive emotion to the second adult. Our central hypothesis was that children would generalize the emoter's negative emotion to the second adult.

Method

Fifty-three 2-year-olds were tested, of which 13 were excluded because they did not point on one or both trials ($n = 9$; five in positive), due to inattentiveness (2), and due to experimenter error (2), resulting in 40 participants in the final sample ($M = 25$ months, 1 day; $SD = 17$ days; range = 24 months, 1 day to 25 months, 28 days; 10 girls and 10 boys per condition).

Procedure

We used a 2×2 mixed design with one between-subject (condition: Positive, negative) and one within-subject variable (trial type: Same experimenter, different experimenter, order counterbalanced across children). Materials were two pairs of novel, ambiguous objects (Figure 1). Preference tests with twelve 2-year-olds (not in study) indicated no object preferences.

Familiarization trials

Experimenter 2 (E2) introduced her handbag in which she 'collects things she likes/dislikes' (positive/negative) and conducted two familiarization trials: She expressed like/

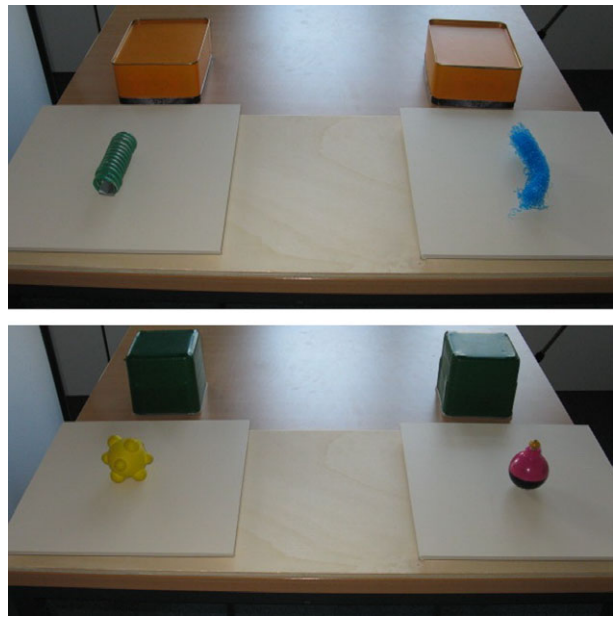

Figure 1. The two pairs of novel objects, the boards, and the covers used in the study.

dislike for one of two familiar objects, said she wanted to put it into her bag, and asked children to point to it.

Experimenter 1 (E1) then requested Experimenter 3 (E3) to clean up some toys – to show that E3 cleans up (important later). E2 and E3 exited. Children (on parents' laps) and E1 sat opposite to one another at a table. Behind E1 to her left and right were two tall tables with barriers such that children but not anyone entering behind E1 could see the tabletops (important later). E1 introduced her handbag in which she 'collects things she likes/dislikes', and conducted two familiarization trials (details in Appendix S1).

Emotional displays

E1 'noticed' a board with covers on each end. She raised one cover to reveal a novel object, emoted (positively/negatively) or was neutral towards it (10 s), then revealed the second novel object and displayed the other response (neutral or emotion) for 10 s (details in Appendix S2).

Test trials

E1 or E2 requested an object (same- and different-experimenter trials, respectively).[1] On same-experimenter trials, E1 looked at the child and began, 'I'll put one of the objects in my bag. I'll put. . .' but was interrupted by a knock. She said she would return, and left. E3 (blind to objects' valences) entered, 'cleaned up' by placing the objects on the tall tables,

[1] *To make positive and negative conditions comparable, the requester's request always implied the valenced object. However, as children may be unwilling to touch a negative-valence object, the requester asked children to point to (rather than give) an object in both conditions.*

and left.[2] E1 returned (12–15 s after leaving) and, looking at children, said, 'So. . . I was about to put an object in my bag'. Looking at the board's centre, she noted with surprise, 'Oh, it's gone!' Then looking at children: 'Where is it?' If children did not point within 10 s, she said, 'I was about to put an object in my bag. Where is it now?' If children did not respond, E1 'noticed' the objects, pointed to both simultaneously, and asked again. Finally, parents prompted children. All else failing, E1 put the positive-valence object in her bag.

On different-experimenter trials, E1 did not say she would put an object in her bag. Instead, after the emotional displays, there was a knock and E1 left. After 3–5 s, E2 (blind to objects' valences) entered, 'noticed' the objects, and looking at children, said, 'I'd like to put one of these [pointing simultaneously to both] in my bag. Which should I take?' After 10 s, she provided a reminder: 'You know I have things I like/dislike in my bag. Now I'd like to put in one of these. Which should I take?'[3] Next, parents prompted children. In the rare instances in which children still did not respond, E2 moved the board towards children and asked them to give her an object. Finally, she simply put an object in her bag. E2 left. E1 returned for the second test trial (with the other trial type and pair of objects).

Coding and reliability

The primary coder (blind to condition and hypotheses) used video to code which object children first pointed to or gave (henceforth simply 'pointed') after the first request. For same-experimenter trials, if children pointed before E1 left (after saying she would take an object), this was also coded, and for the one child whose points conflicted across phases, we used the point before E1 left.

E1's live coding of all children was used to assess reliability. Intercoder agreement was excellent: $\kappa = .92$.

Results

Preliminary analyses revealed no effects of gender or order of trial type, order of object pair, order of valenced versus neutral responses, or side emoted to first, all ps $> .101$. All reported p-values are two-tailed.

As predicted, in the positive condition, a significant majority of children (16 of 20) pointed to the positive-valence object on same-experimenter trials ($p = .012$), but only half (10 of 20) pointed to the positive-valence object on different-experimenter trials ($p = 1.00$). This difference was significant, McNemar's test, $\chi^2(1, N = 20) = 4.17$, $p = .041$; children were thus likelier to use E1's positive emotion when responding to E1's than E2's request. These results replicate prior findings that children do not generalize positive emotions across individuals.

In support of our central hypothesis, in the negative condition, a significant majority of children (15 of 20) pointed to the negative-valence object on different-experimenter trials ($p = .041$), indicating that children generalized E1's negative emotion to E2. Surprisingly,

[2] *We included this 'cleaning-up' on same-experimenter trials as it seemed odd if E1, who had just displayed her preferences, proceeded to ask which object she should take. The cleaning-up created a more naturalistic 'finding' situation (described next) to elicit pointing. The cleaning-up was not included on different-experimenter trials because E2 had not displayed her preferences, so it was not odd that the objects simply remained on the table and E2 asked children which she should take.*

[3] *E2 provided this reminder to jog children's memory as they had learned about her bag early on. No reminder was given on same-experimenter trials as E1 had introduced her bag later in the procedure.*

only a non-significant majority of children pointed to the negative-valence object on same-experimenter trials (12 of 20, $p = .5$). Notably, however, the proportion of children who pointed to the negative-valence object on same- versus different-experimenter trials did not differ significantly, McNemar's test, $\chi^2(1, N = 20) = 0.57$, $p = .450$; children were thus similarly likely to use E1's negative emotion when responding to E1 and E2.

Discussion

Two-year-olds generalized an emoter's negative but not her positive emotion to a second individual. This demonstrates for the first time that children interpret others' positive referential emotions as person centred but negative referential emotions as object centred. These distinct interpretations lead to distinct inferences: From positive emotions, children learn about the emoter's attitude towards the referent but do not apply that attitude to other people, whereas from negative emotions, children learn not only about the emoter's negative attitude towards the referent but assign a negative valence to the object itself, thus also applying the negative attitude to other individuals. Positive and negative emotions thus teach children distinct lessons about the world.

Note that this difference holds primarily in situations of ambiguity (e.g., Cacioppo & Berntson, 1999). If children know an object is safe, receiving negative information about it is unlikely to change their evaluation of it. In this case, children may also interpret another's negative emotion as person centred. Relatedly, negative emotions likely generalize to new individuals only in the absence of other information about those individuals' attitudes.

Surprisingly, children did not robustly use E1's emotion on same-experimenter trials in the negative condition. One possible reason is the somewhat unusual nature of the negative condition in which children needed to point to the object the requester *disliked*. This, coupled with the facts that E1 did not provide a reminder about what goes into her bag on same-experimenter trials and that the delay between emotional displays and test was longer on same- than different-experimenter trials, may have proved especially challenging for children. Modifying the procedure to address these limitations will be an important next step.

A further limitation is that this study focused on one age group and thus does not permit inferences about the development of children's differential responses to positive versus negative emotions. It is thus vital to extend this work to younger ages, perhaps with the aid of more sensitive measures such as looking time or anticipatory looking, in order to chart the developmental course (see Buresh & Woodward, 2007).

In support of our principal hypothesis, we found that children generalize negative but not positive emotions across individuals. This may have significant implications. For instance, if an individual is unaware of the presence of a novel object, children may be likelier to 'warn' her about the object's location if an emoter previously emoted negatively rather than positively about the object (cf. Knudsen & Liszkowski, 2013). This aligns with and extends the evolutionary account of the negativity bias. For an ultra-cooperative species such as humans – which greatly relies on group living and success (see Vaish & Tomasello, 2014) – it is not only vital that the provider and recipient of negative information avoid the negative stimulus but that their group members do so as well. It thus makes sense for individuals to expect that negative information generalizes across individuals, and perhaps even inform ignorant individuals about negative stimuli.

Interpreting negative referential emotions as object centred thus likely serves important adaptive functions.

Adaptive functions of the negativity bias may in turn elucidate developmental mechanisms underlying the differential generalization. In particular, as negative emotions frequently indicate threat-relevant stimuli and as there is substantial consensus about what poses a threat, children likely see multiple individuals provide similar negative signals about certain stimuli (e.g., a sharp knife). On the other hand, as positive emotions simply indicate that a stimulus is safe to explore and form one's own opinion about, children likely receive varied signals from different individuals about non-threatening stimuli (e.g., building blocks). This distinct statistical information may lead children to distinct expectations about how these emotions generalize. Indeed, in prior work, preschoolers were more likely to generalize a preference to a new individual if multiple individuals had demonstrated that preference than if only one individual had done so (Diesendruck, Salzer, Kushnir, & Xu, 2015). Thus, if negative (but not positive) emotions are generally conveyed by multiple individuals, it stands to reason that children come to expect negative (but not positive) emotions to generalize to new individuals. Children's social experiences of positive versus negative emotions may thus partially explain why children differentially generalize these emotions.

Our findings point to important considerations for parenting and childcare. In particular, we have shown that negative emotions are potent information devices, as they impact not only children's own behaviour (Vaish *et al.*, 2008) but also children's expectations about others' preferences and behaviour. Thus, if a caregiver emotes negatively about a food that is unfamiliar to the child, the child may not only adopt the negative attitude herself but also infer that others dislike that food, leading her to incorrect (or even socially inappropriate) expectations about her world. This may have far more serious consequences in other domains (e.g., a caregiver's racial biases). Caregivers thus need to be mindful of the impact of their emotional messages on children's construal of their world.

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Supporting Information

The following supporting information may be found in the online edition of the article:

Appendix S1. Familiarization trials.
Appendix S2. Emotional displays.