

per se ([11], p. 495). In this light, Pickering *et al.*'s argument that our account lacks coherence because of evidence that the amygdala is also important in neuroticism ([11], p. 494) conflates an argument of 'necessity' with one of 'sufficiency'. We contend that the core of the DMN is important in supporting representations that are not directly based on sensory input and that these can include negative experiences (coded for by regions such as the amygdala). In other words, our position is different from the proposal of Pickering *et al.* [1], because we argue that neurotic thought depends both on systems that support unpleasant experiences as well as a core representational system in mPFC and pCC that allows these to be integrated into conscious experience.

Another aspect of our proposal that Pickering *et al.* highlight in their commentary is the complex relationship between neuroticism and its associated functional outcomes. Pickering *et al.* present evidence that neuroticism is not always associated with creativity and this acts as an important counterpoint to the evidence we described in our paper. Such disagreements within the literature highlight that the functional outcomes associated with neuroticism are likely to be complex, and that a clear understanding will depend on future work that takes into account the multifaceted nature of creativity, and the different ways it can be operationalized (e.g., self-report vs occupational status). Although future research in this area will be important, there is a general issue that separates our view from the proposal of Pickering *et al.* Recent investigations have highlighted that the core of the DMN is crucial in several different forms of creativity [8,12]. When this evidence is considered in light of observations that the anterior core of the DMN shows a pattern of heightened activity at rest for people whose thoughts are unpleasant [13], it highlights the underlying puzzle that arises from the phenomena of the neurotic mind: How can we understand a fundamental aspect of the human mind that leads

unhappiness to share neural substrates with capacities, such as creativity, that reflect positive aspects of imagination? In this context, our approach is helpful because, unlike Pickering *et al.*, we adopt a 'process-orientated' understanding of the neurotic mind. According to our view, the capacity to imagine a threat shares neurocognitive processes with other imaginative states, some which could be beneficial, such as when we imagine the solution to a work-related problem or solve a problem in a creative manner. By proposing a process-orientated account, our view highlights that the most intriguing aspects of the neurotic state is coming to terms with the advantages (evolutionary or otherwise) that emerge from the capacity to imagine how events might unfold in ways that are different to the way the environment is right now, even if sometimes it is associated with worry and unhappiness. Regardless of whether the deployment of this capacity to neurotic worry always engenders better solutions to problems, the ability to see the world in a way that is not proscribed by the environment is a primary aspect of human consciousness that remains poorly understood despite the fact that it is at the core of many of the beneficial and detrimental aspects of our mind [14]. Our theoretical formulation of neuroticism provides an overarching perspective from which this domain of personality can be understood in light of this intriguing aspect of how imagination operates.

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Science & Society

Origins of Value Conflict: Babies Do Not Agree to Disagree

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It is human nature to like those who are like us. Even babies prefer individuals who share their tastes, and dislike those with contrasting views. However, our pluralistic society requires accepting differences and tolerating those who disagree. Can findings in infant research inform strategies to encourage acceptance of diversity?

We like people who resemble us. This liking of similarity (homophily) influences

our selection of friends, romantic partners, academic colleagues, and even pets [1–6]. We like those who resemble us in appearance, personality, interests, socio-economic status, and attitude. We even prefer those who share trivial or arbitrary characteristics with us [7,8].

A preference for those who are like us is found in preschool-aged children, who prefer others who share their physical traits, such as hair color; attitudes, such as food preferences; and even transient attributes, such as shirt color [9]. In addition, babies under 1 year old prefer individuals who speak their own native language over those who speak a foreign language or their own language with a foreign accent [10].

In my own lab, we have been examining infants' preference for individuals who are similar along the dimension of attitudes and values. Across several experiments, we found that babies in their first year preferred others who held the same opinions that they did. The general paradigm ran as follows: babies were brought into the lab and given a choice between options A and B (e.g., two snacks). They then saw two puppets given the same choice of A or B. One puppet expressed a liking for, and chose, the item the baby chose and a dislike of the second option; the other puppet expressed the opposite preference. We then gave the babies the opportunity to choose between the two puppets: did they like one of them more than the other?

Overwhelmingly, they did: over 80% of our infant subjects preferred the character who expressed the same view as them [11]. This held when the expressed attitudes pertained to clothing, such as yellow versus orange mittens. It also held when the attitudes pertained to foods that babies typically have distinct attitudes towards: graham crackers (which babies typically prefer) versus green beans (which they typically do not). It even held when the attitudes pertained to foods that babies tend to like equally: graham crackers versus cheerios. In all cases, babies

robustly preferred the individual who liked the same item they themselves chose.

There is an important exception to this pattern of response: it disappeared when the act of choosing was removed. (Infants' responses differ in this respect from those of adults; [Box 1](#) discusses this developmental change in our preference for the similar.) When babies (and the puppets) were not given the opportunity to choose between options A and B, but were simply handed one of the two by an experimenter, the effect disappeared, thus demonstrating the importance of choice as a true indicator of attitude. Being given, for example, orange mittens does not facilitate a preference for other orange-mittened individuals; infants' preference for the similar over the dissimilar individual is not about perceptual similarity (e.g., wearing the same clothing), or similarity of circumstance (e.g., having the same snack, or being treated similarly by an experimenter). Rather, it is based on the individual holding the same, or a different, opinion to the baby's own.

Overall, the findings of our studies suggest that, as early as we are able to look in development, we humans care fundamentally about shared values. ([Box 2](#) considers why this may be so, discussing the adaptive utility of a liking for likeminded others.)

Just how strong is this early preference for the likeminded? Does it comprise an

aversion to those with different views, or merely attraction to those with similar views? My colleagues and I have found, in another line of research, that babies overwhelmingly prefer individuals who are kind or helpful to third parties over those who are mean or interfering [12,13]. Consistent with this, babies want likeminded others to be treated well: they preferred an individual who is nice to the puppet who shares their views, over one who is mean to that puppet [14]. However, when it comes to how babies want other-minded individuals to be treated, it is a different story. Babies preferred an individual who was mean to a puppet whose views contrast with their own; even for babies, 'the enemy of my enemy is my friend' [14]. This suggests that it is not only human nature to like others who hold similar values to our own; it is also human nature to dislike those whose opinions and valuations differ from our own.

However, we live in societies of many different ideas and values, existing in an increasingly globalized world where different cultures, values, ideas, and opinions collide. We have to be able to engage with the other. If babies even before their first birthday feel ill will towards others merely because they prefer different-colored mittens or a different food from them, how can we hope to hold productive conversations about social issues that engage and highlight deep differences in fundamental values, such as abortion, the rights

Box 1. What are the Developmental Origins of Homophily?

One account of the origins of homophily is that it arises through experience (after all, it is easier to understand and predict the behavior of those like us). Another is that our preference for similarity is built-in wholesale (almost any trait can be a signal of group membership, so initial sensitivity to any similarity could be useful.) However, the empirical findings do not fit either account. Even babies prefer individuals who share their opinions over those whose views conflict, but unlike adults, they do not prefer those with arbitrary commonalities: babies' preferences track shared values. Three-year-olds show an intermediate pattern: they do not care about arbitrary commonalities, but do care about shared opinions (e.g., [9]), and prefer individuals who share their hair color (a permanent but unchosen attribute) and, less strongly, shirt color (a temporary attribute) [9].

Thus, while homophily is early-emerging and perhaps innately specified, it intensifies with age to embrace arbitrary similarity. This suggests the possibility of cultural influence: our response to similarities and differences may increase with our social experience, because much meaning is made of many differences: from large-cut distinctions like ethnicity and religion, to small-grain details of personal style (whether a Rolex watch, blue hair, or earlobe gauging).

Box 2. Why Do Humans Like the Like-Minded?

There are numerous ways in which a liking for those who share similar values could benefit individuals and provide the adaptive utility that would have been needed to drive the natural selection of this preference in our species. Those who share our own tastes may be sources from whom we can learn valuable information; if you, as I do, like, for example, sea bass, you may have knowledge of where to find them and techniques for securing them that will be helpful for me to learn. Similarity can signal group membership, useful when the 'us' is large enough that we can not recognize all the individuals and distinguish them from the 'them' by sight (if you love a snack of fried spiders, for example, you likely grew up in a different culture from me). Finally, associating with those who share our views gains us political clout. This is how special-interest groups are formed; this is the basis for collective action and the means by we achieve critical mass to promote our own agendas over competing ones. Humans are a richly social species, and political considerations have been a ubiquitous aspect of life throughout our evolutionary history.

of sexual minorities and of religious minorities, and the self-determination of cultural subgroups whose values conflict with the larger culture?

Agreeableness in the face of disagreement does not come naturally; it is a hard-won and tenuous achievement of civilization that must be intensively cultivated and that frequently collapses. Schools across the continent and around the world are attempting to increase children's tolerance for, and appreciation of, diversity, and they are applying a variety of individual and sometimes intuitive approaches. The developmental findings I have discussed here do not answer the question of how to cultivate respect (if not liking) for the other-minded, but they point towards one place to look for the solution.

If we are built to dislike difference, we are equally built to value agreement; the well-worn advice to 'build on similarities' to facilitate goodwill between individuals or groups may be deeply true. Given a foundational psychology that values similarity and denounces difference, it may be that articulating and expounding upon the vast

array of human cultural variety does not itself produce appreciation, or even tolerance, of those differences. (Imagine this approach applied in politics: 'Pro-life individuals value fetal rights; pro-choice individuals value women's rights.' This does not compel. However, what about: 'Both groups value and are defending human self-determination, but are championing the rights of different individuals.' A common value, articulated, may be the foot that cracks the door wide enough to admit the tolerance needed for the next round of debate.)

Of course, some differences run so deep that no resolution seems possible. In the face of strongly opposing values, no amount of compromise may be acceptable to either side. Some of the most intractable of human conflicts result from precisely this clash of 'sacred values' [15]. However, the only tool we have (other than oppression by the majority, or warfare) is discourse, which requires a willingness of each side to engage with the other view, no matter how unpalatable. Facilitating and encouraging individual willingness to do so is important, and understanding the

psychological foundations upon which we are building may help.

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