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Why scarcity can both increase and decrease prosocial behaviour: A review and theoretical framework for the complex relationship between scarcity and prosociality.

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Abstract

In recent years, scholars from different fields have studied the effects of scarcity on social behaviour, producing mixed findings. This review synthesizes the most recent literature on the topic and proposes a framework to organize the evidence. According to this framework, scarcity produces an attentional shift towards the scarce resource and a cognitive load that triggers heuristic thinking; this affects social behaviour in various ways, depending on individual and contextual factors, which can be transient (e.g., emotional states or social expectations), or enduring (e.g., personality or social environment). We then apply this framework to explain when and how scarcity influences parochialism. We conclude with a caution against the uncritical use of scarcity salience as a tool for social behavioural change.

Keywords: scarcity mindset; prosociality; parochialism; social expectations; behavioural change.

Introduction

Scarcity – the *feeling* of not having enough of what one needs – has been described as a catalyst for a *scarcity mindset*, a psychological state characterized by altered cognitive abilities and behaviours [1-4], often exacerbating conditions of poverty by increasing reliance on risky, short-term strategies aimed at acquiring the missing resource [5], like resorting to high-interest predatory loans or engaging in gambling [6-8].

Much of the literature on scarcity has focused on consumer behaviours [9-12], economic and health outcomes [13-15], and strategies to improve them [16,17]. More recently, scholarly attention has expanded towards understanding how a scarcity mindset may impact social behaviours like cooperation, honesty, or trust. This exploration has yielded mixed findings [18], with scarcity at times promoting [19] and other times hindering [20] prosocial behaviours. Understanding how scarcity may influence social behaviours is of pivotal importance to explain and predict collective actions in situations where people experience scarcity of resources (e.g., money, food, water), such as pandemics, wartimes, or the climate emergency, and to develop behavioural interventions aimed at increasing prosocial behaviour in these contexts.

Here, we synthesize recent literature on this topic and propose a framework in two steps: 1) scarcity affects cognition, through attentional tunnelling and cognitive load which, in turn, 2)

influences social behaviour. Crucially, the latter relationship depends on individual and contextual factors. Both these factors can be enduring or transient, the former enter as moderators, the latter as mediator (see Figure 1). Considering this framework, we then discuss the specific case of parochialism, and conclude discussing the importance of context for interventions that use scarcity salience as a nudge.

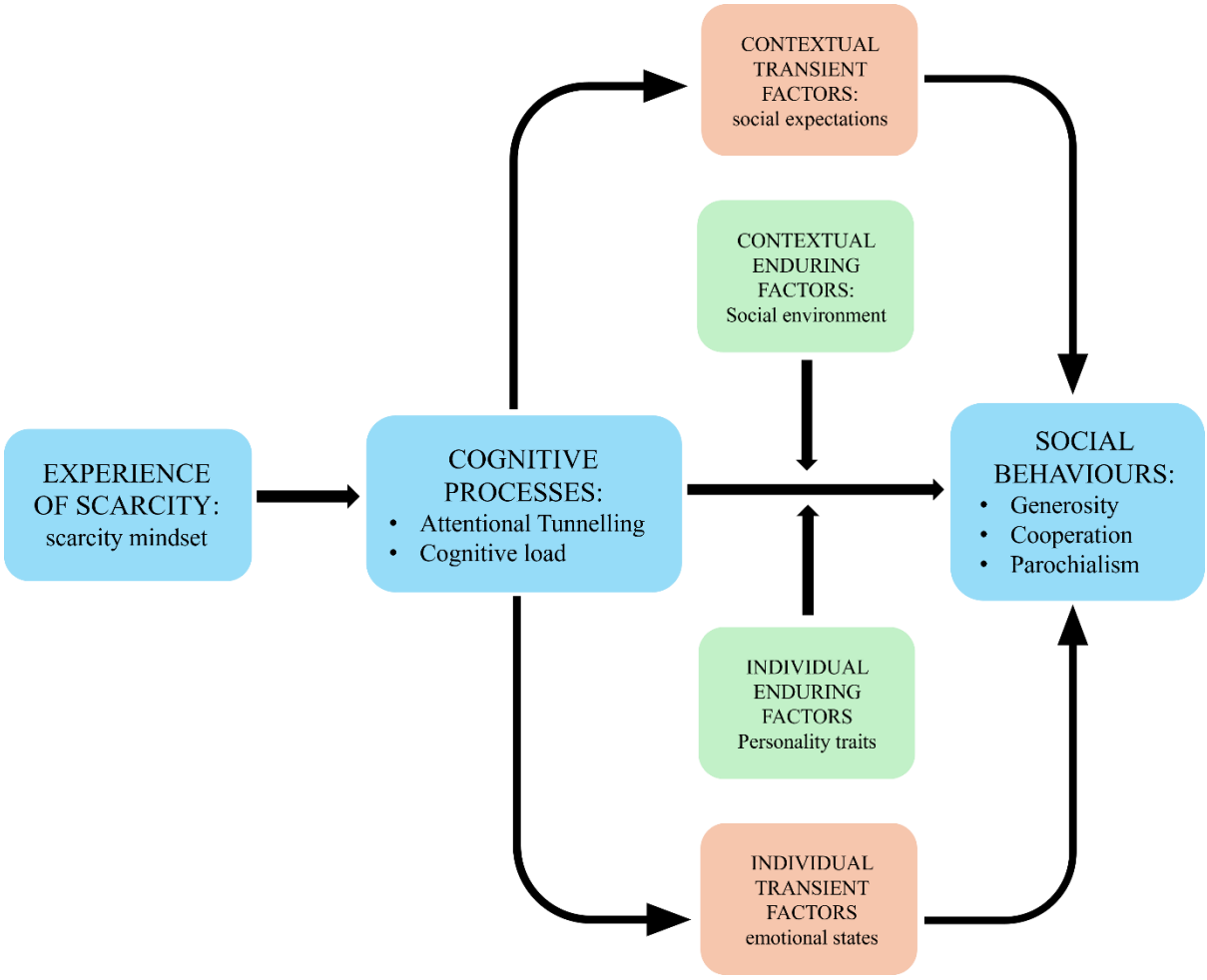

Figure 1. Theoretical framework of how experiences of scarcity, operationalized as a scarcity mindset, can influence social behaviours. A scarcity mindset alters cognitive processes by increasing attentional tunnelling and cognitive load, which, in turn, influence social behaviours. Transient contextual and individual factors can mediate the effect by affecting social behaviours after being influenced by scarcity. Enduring contextual and individual factors can moderate the effects of scarcity on social behaviour.

Effects of scarcity on cognition

Previous literature has identified a series of psychological effects of scarcity on cognitive functions, such as increased attentional focus on the scarce resource (tunnelling) and increased cognitive load that impairs cognitive flexibility and working memory caused by

scarcity-induced preoccupations [1-6,21,22]. These findings have been established in various applied settings [23,24]. Attentional tunnelling can result in sub-optimal decision-making by leading individuals to neglect other potentially useful information in the environment: for example, financial scarcity may lead people to focus exclusively on the price of items, ignoring information on discounts [25]. Whilst this effect makes people more efficient in dealing with the immediate effect of the scarce resource [6], it also impairs exploration and information detection [26]. Cognitive load increases reliance on decision-making heuristics such as present bias [3], as well as on emotions and social expectations, as reviewed below. These effects are also observed for scarcity of non-material resources such as time [4] or social connections [27].

Scarcity mindset and social behaviour

Scarcity cues shift attention towards the scarce resource and increase reliance on decision heuristics, thus influencing behavioural outcomes, including social behaviours. Whether these behaviours will appear to be prosocial or antisocial will depend on multiple factors, including whether they allow individuals to regain the missing resource [5,18]. If prosociality can aid in alleviating the resource discrepancy, then scarcity may increase prosociality; conversely, if the resource can be obtained through selfish or antisocial actions, then scarcity may encourage such behaviours [20]. For example, during the COVID-19 pandemic lockdown, people experiencing predominantly scarcity of freedom were *less* likely to cooperate in a public goods game and to sacrifice their time outside to help shorten the lockdown for everyone, as cooperation would not lead to regain the missing resource, i.e., freedom. In contrast, people experiencing primarily scarcity of social connections were *more* likely to cooperate and sacrifice their time outside: here, cooperation was useful to regain the missing resource, i.e., socialisation [28]. Similarly, cognitive load may trigger heuristic thinking by undermining deliberation, but heuristics can lead to either prosocial or selfish actions, depending on internalised previous experiences [29]. For example, stress elicited by COVID-19-related scarcity depleted cognitive resources and triggered either selfish (hoarding) or prosocial (donations) behavioural coping strategies, depending on individual and cultural differences [30-32].

An interesting case comes from a large-scale cross-cultural study reporting that subjective chronic experiences of scarcity, indexed by low subjective socioeconomic status, are associated with higher scores in several morality measures (moral identity, morality-as-

cooperation, prosocial intentions) suggesting that these chronic experiences may lead people to increase reliance on one's social environment, hence enhancing the willingness to cooperate and behave prosocially [33].

Therefore, social behaviours resulting from perceived scarcity, such as cooperation and generosity, or the lack thereof, depend not only on changes to cognitive processes, but also on individual and contextual factors.

Individual factors: personality traits and social emotions

The effect of scarcity on social behaviour can be moderated by personality traits like empathy. Cognitive empathy mitigates the negative effect of scarcity on generosity (sharing behaviour), both behaviourally, in that people under scarcity are more willing to share resources if they report a higher cognitive empathy, and neurally, by reducing the negative effect of scarcity on the activation of the medial prefrontal cortex, an affective area [34], as well as on the functional connectivity between the medial prefrontal cortex and the temporo-parietal junction, associated with theory of mind [35]. Furthermore, financial threats caused by economic crises increase helping behaviour, but crucially, this correlation is positively moderated by empathic concerns [36].

Notably, when empathy is measured as a pain intensity rating of others' pain, as opposed to a personality trait, scarcity reduces the strength of this response, suggesting that an empathic response to others' suffering is a transient state that works as a mediator of the scarcity effect on social behaviour [37]. Similarly, research has shown that scarcity affects other social emotions, including compassion, envy, anticipated guilt, and pride [32,38,39] which are likely to mediate the effect of scarcity on behaviour. For example, scarcity reduces anticipated guilt of waste and lead people to use more resources, behaving less cooperatively [39]. Similarly, perceived vaccine scarcity lowers the sense of priority and, in turn, vaccine intentions, likely due to perceived scarcity triggering compassion and altruistic attitudes towards the more needy [40].

Contextual factors: social environment and social expectations

Enduring contextual factors such as social environment (e.g., inequality between agents or tight (strong norms) vs loose (weak norms) societies [41]) can moderate the relationship between scarcity and social behaviours.

A theoretical study [42] explored farmers' water usage during the rainy and dry seasons, focusing on the resilience of cooperation (i.e., willingness to restrain water consumption and willingness to punish defectors) against resource scarcity, agent heterogeneity, and resource inequality. The model showed that scarcity can hinder cooperation, particularly when inequality among agents leads poorer landowners to adopt the selfish behaviours of richer ones, who are relatively less affected by sanctions. Additionally, cooperation is weakened when there is agent heterogeneity, as the absence of small, cohesive groups of farmers undermines the cooperative network. Supporting this latter intuition, a lab-in-the-field study [43] found that Afghan farmers were less likely to punish unfair dictators during the lean season (scarcity) compared to the post-harvest season (abundance). These farmers live in a tight society (village) and know the potential future need for leniency; during scarcity, cooperation is crucial and more likely in tight societies where mutual trust and reciprocity are expected.

The relationship between scarcity and social behaviours can also be mediated by transient contextual factors such as social expectations, defined as perceptions of what others ought to do or actually do in a given situation [44,45]. A lab-based study showed that people donated more money when they witnessed someone experiencing material scarcity (a lower-class person) donating money, a scarce resource for them; conversely, they donated more time as volunteers when observing a higher-class person volunteering, on the assumption that higher-class people experience a greater scarcity of time (vs. money) [46].

The case of parochialism

Parochialism, defined as the tendency to prioritise one's group interests above those of other groups, represents one of the most extensively studied phenomena in behavioural science, particularly for its implications in intergroup conflicts. In this section, we narrow our focus to review the literature on the effect of scarcity on parochialism.

Most studies suggest that scarcity increases parochialism. When people perceive financial scarcity, they tend to donate more to local charities than to international ones [47]. A recent fMRI study found that the anterior cingulate cortex, associated with decision-making and value attribution, shows a higher activation and a higher connectivity with theory of mind areas for the ingroup (vs outgroup) in the scarcity condition [48]. A recent meta-analysis suggests that cheating increases when people are reminded of the scarcity of certain resources, but only if these anti-social behaviours benefit the ingroup [49]. In other works,

white Americans experiencing scarcity were found to encode dark faces differently, as demonstrated by a delayed EEG component associated with face processing, and a lower activation in the right fusiform gyrus, an area involved in face recognition. This different encoding was also associated with a lower sharing of resources with black people, indicating increased discrimination towards an outgroup [50,51]. Taken together, these findings support the notion that people differentiate more sharply between ingroup and outgroup, when scarcity is present.

There are also cases in which scarcity decreases parochialism. For instance, lab-in-the-field studies have demonstrated that parochialism increased among Thai rice farmers post-harvest (abundance) compared to pre-harvest (scarcity) [52], and a similar rise in parochialism was observed among Guatemalan coffee farmers during the harvest compared to before [53]. This highlights that the effect of scarcity on parochialism might depend on context.

These seemingly contrasting results can be explained by the moderating effect of the social environment. Acting prosocially with both ingroups and outgroups may be beneficial during scarcity in homogeneous societies like those of the farmers, where ingroups and outgroups share the same reality. When social expectations are universally shared, scarcity may boost prosocial behaviour rooted in the principle of reciprocity: sharing resources and showing leniency toward defectors during tough times benefits everyone in the long term. Conversely, when social expectations are more uncertain, as in heterogeneous societies or when social distance is greater (e.g., local vs international charities), scarcity may lead to selfishness and resource-protective behaviours.

Overall, findings show that people favour reciprocity and resource redistribution when resources are abundant, or when the group involved is homogeneous [54] and trustworthy [55]; in such cases, redistribution of resources may also occur during scarcity. As with other social behaviours, scarcity may either increase or decrease parochialism depending on long-term gains.

Conclusions: scarcity as a tool for social behavioural change, with warnings.

Given its strong and heterogeneous effects, scarcity perception could be used as a potent *nudge* to alter social behaviours such as those described above. However, its effect can vary considerably across contexts. For example, attaching a scarcity nudge to non-financial resources, such as water, and highlighting their uniqueness and irreplaceability, can increase moral obligation towards their conservation [56]. Conversely, individuals who experience

financial scarcity tend to avoid sustainable choices as they are more expensive [57-59]. Therefore, context-specific investigations are crucial when devising interventions. For example, an intervention to reduce meat consumption may fail if it focuses on increasing the desirability of typically more expensive meat alternatives through scarcity salience nudges in regular supermarkets (e.g., "only five items left") [60], as these can cause feelings of financial scarcity, but may succeed if it emphasizes the scarcity of farmland. Additionally, it is pivotal to consider any potential unforeseen effects of scarcity: for example, communications that stress vaccines shortage may unintentionally contrast government efforts in vaccine promotion, as they may lead some people to de-prioritise their own wellbeing, thereby reducing vaccine uptake intentions [40].

Our key takeaway is that considering the scarcity mindset to promote prosocial behaviours and discourage anti-social behaviours is essential, especially in situations characterized by severe resource scarcity, like pandemics, conflicts, or economic crises. Overlooking the behavioural effects of perceived scarcity can lead to a significant waste of resources on ineffective or potentially damaging behavioural interventions. The impact of scarcity on these behaviours is complex and multidimensional, and still relatively underexplored considering the heterogeneity of influencing factors. Therefore, tailored, context-specific investigations on scarcity's influence on prosocial behaviours are crucial to avoid incorrect predictions and unwanted effects.

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This paper combines an experimental approach with real-world data by investigating the behaviour of people coming from higher or lower percentiles of neighbourhood disadvantage in a game of resource foraging in resource-rich and resource-depleted environments. Results show that people living in more disadvantaged neighbourhoods, i.e., in real-world relative scarcity condition, are less likely to engage in resource-maximising, exploratory behaviour in the game. However, there is no difference when it comes to social norm compliance: everyone is more likely to violate social norms in resource-depleted (vs resource-rich) environments.

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