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A test to confirm the Neighbour Effect

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Abstract

Introduction:- We demonstrated previously that people show a profound underlying 'neighbour effect' by significantly avoiding doing 'bad' things to their direct spatial neighbours. This emerged when the 'bad' thing was voting for a fellow contestant on the UK version of the 'Weakest Link' TV quiz programme (Goddard et al 2013; Noh et al, 2014). *Aims*:-We wanted to test how robust this 'neighbour effect' was by first observing whether it would extend to other voting scenarios and second to test whether it occurred for doing 'good' as well as 'bad' things. *Method:-* Participants were first year students seated in a lecture theatre (n=233). They were asked to cast a closed, secret vote, for another person on the same row, by marking a 'X' on a seating plan. The vote carried either a positive or negative outcome for its recipient by gaining or removing lottery tickets. *Results:-* Participants that cast a negative vote demonstrated a significant 'neighbour effect' by avoiding voting for their nearest neighbours. However, the reverse pattern was found when participants gave a positive vote. *Conclusion:-* We suggest that the 'neighbour effect' is a robust and strong bias in decision-making.

Keyword: Neighbour Effect, Spatial Dynamics, Valence Effect, Voting, Weakest Link

Introduction

The 'neighbour effect' occurs when individuals that are required to elect somebody to receive something negative, significantly avoid picking their direct spatial neighbours (Goddard et al, 2013). The empirical demonstration of the 'neighbour effect' was based on an observational field experiment using the 'Weakest Link' (WL) TV game-show. The feature of the show that was of particular to us occurred when the contestants had to pick a fellow contestant to be eliminated from the show as the worst performer in the group following a round of quiz questions. The successive elimination of 'the weakest link' by vote became the distinctive feature of the show and gave rise to its distinctive name. As well as our demonstration of the 'neighbour effect' the WL format has also been studies to assess the optimal banking strategy used by contestants on the show (Haan et al, 2011), as a method to measure the trade-off between risk and return strategies (Février & Laurent, 2006) and to test for discrimination by gender and race (Levitt, 2004; Antonovics et al, 2005).

The show is so appealing to researchers because it offers a specific set of conditions that are very difficult to simulate in the laboratory by incorporating precise game rules, recruiting large numbers of participants and offering high stake prizes. Taken together these features makes the WL an ideal observational field experiment (Barmish & Boston, 2009). Nevertheless, however powerful the demonstration of the 'neighbour effect' is, field studies lack the required control to scrutinise the phenomenon further. The aim of this paper is to describe how we set about testing predictions based on the 'neighbour effect'. Given that people tend to avoid conflict more when an outcome is potentially positive (Weber & Camerer, 1998) then the 'neighbour effect' might also be expected to switch if the valence of the vote (positive or negative) changed.

This leads to the following predictions and tests regarding the robustness of the 'neighbour effect' and of its nature:-

i.) Replication:-The demonstration of the 'neighbour effect' in the WL should be tested for its robustness by being replicated in other voting scenarios and

ii.) Valence:- Given i.), if the 'neighbour effect' occurs as a simple spatial bias in voting per se, then the 'neighbour-effect' would be expected irrespective of vote valence. That is, if there is an inherent avoidance of selecting neighbours, then it will occur whether the consequences of choosing them are positive/ neutral/negative. If however, the 'neighbour effect' is selective for vote valence, by only occurring when the vote has a negative valence, then it shows that it can be interpreted as a social preference.

Method

First year psychology undergraduate students (N=233) were recruited during their first orientation lecture. Each participant was assigned a seat number and given an *instruction sheet*, which explained that they would be asked to take part in a voting activity. Participants were pseudo-randomly distributed in three blocks of seating comprising seven rows.

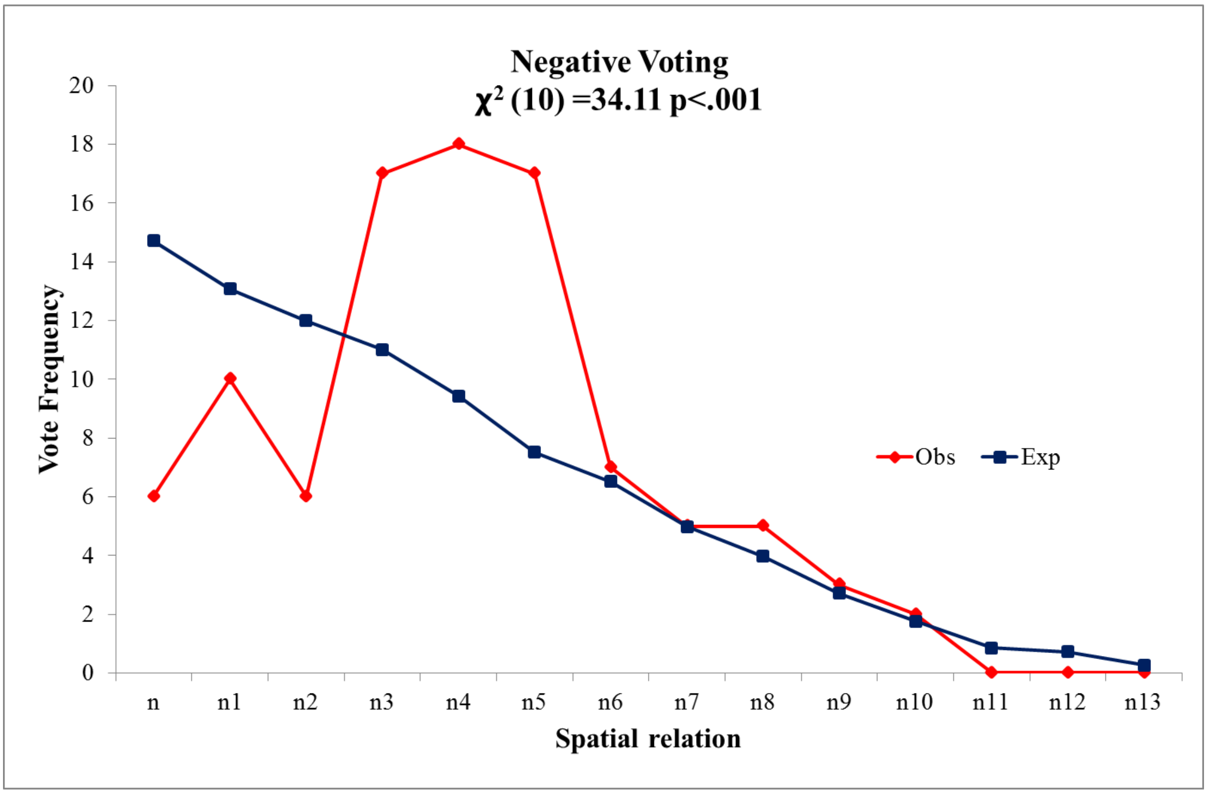
A *response sheet* served as a ballot paper was issued to each participant that explained the 'value' of a vote varied in that the vote could be positive (+1 or +5) by increasing its recipients' chances in a lottery (by adding the number of lottery tickets) for course related materials. Conversely, the negative vote (-1 or -5) decreased their chances of winning the lottery, whilst the neutral votes (0) had no effect on the chances to win the prize material. The 'voting activity' required each participant to vote for another participant sitting in the same block and the same row of seats.

Prior to vote, the participants first identified their seat number on the *response sheet* and cast their vote by marking 'X' on the seating plan. The *response sheet* was later placed in an envelope, sealed, and given to the researchers upon completion of the voting activity.

Result

The expected frequencies of the participants' votes was based on simple probability theory with the assumption of a random unbiased model where there was equal probability associated with a participant voting for any of the other participants on the same row. For example, if there were nine people sat on the row then the chance of one contestant voting for any of the others was 1/8, because they were not allowed to vote for themselves. The number of expected votes for neighbours was therefore, 8*1/4 = 2, because seven on the row had two neighbours aside from the two at the ends that only had one neighbour. Expected frequencies were calculated for all spatial relationships, neighbour, neighbour + 1, neighbour + 2, …neighbour + n.

Fig. 1. shows vote frequency plotted as a function of the spatial relationship between the voter and the other participants when the vote valence was negative, either -1 or -5 (upper panel) and positive, either +1 or +5 (lower panel), n represented votes directed to a direct neighbour (n1 for the participants two seats away, n2 for the participants three seats away and so on). In the upper panel the observed frequencies show a significant departure from the expected frequencies with a significant avoidance of voting for direct neighbour(s) (n) was significant, χ^2 (10) = 34.11, $p <0.001$, 2-tailed. Voters demonstrated the 'neighbour effect' as they avoided voting for their direct neighbour(s) (n). However, a reversed polarity pattern where the 'neighbour effect' for voting the direct neighbour disappeared in a positive valence voting.



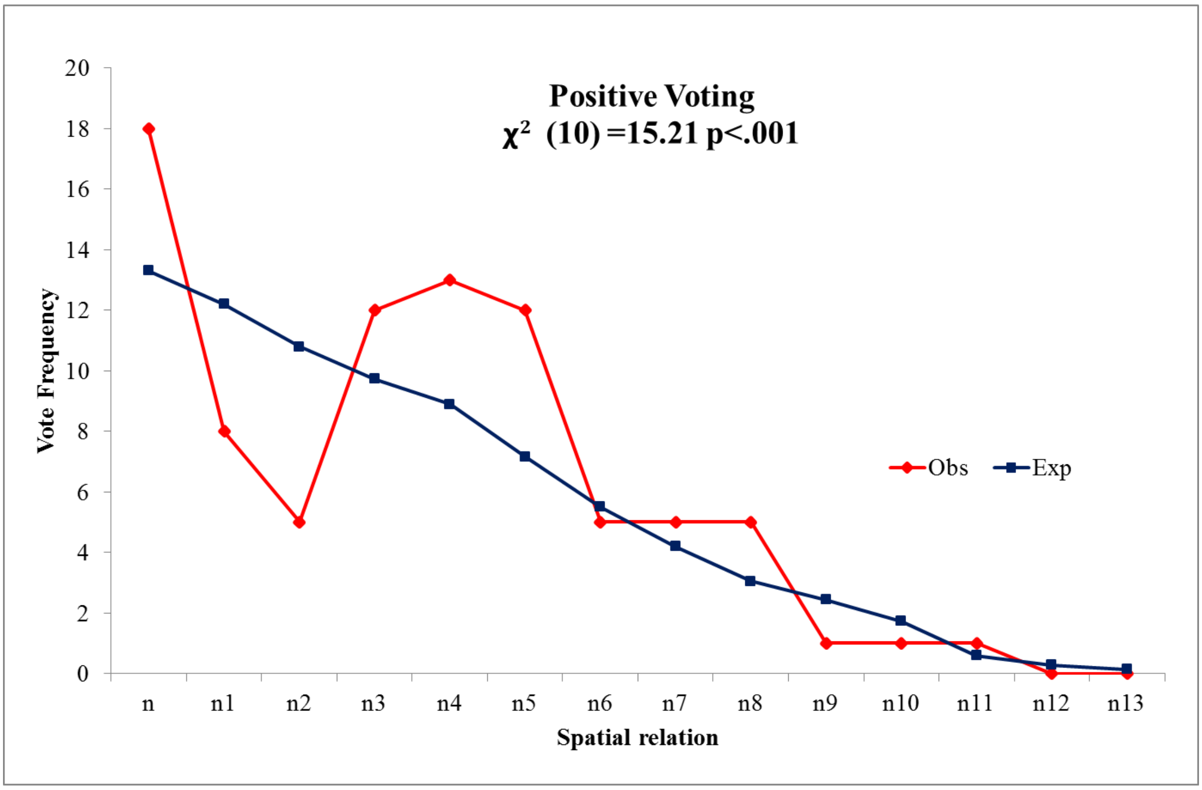


Fig. 1: Voting performance

Discussion and Conclusion

Our main finding was that a significant ‘neighbour effect’ was seen by the significant drop in the observed frequency of votes cast for direct neighbours relative to the frequency expected based on simple probability.

This observation is important for a number of reasons. Firstly, it replicates the ‘neighbour effect’ that we had originally shown in the voting patterns of contestants on the WL game-show (Goddard et al 2013). The contestants on the WL game-show significantly avoided doing a ‘bad thing’ to their direct spatial neighbour(s), by not voting for them as the ‘weakest link’. However, our replication in the lecture study was in some ways even more surprising because, whereas the votes cast in the WL were open and public, in the lecture study votes were closed and private.

A limitation of the WL field experiment was the lack of control over key variables and conditions. In the lecture study, however, we were able to include the scenario where the students’ selection of a peer carried a positive outcome rather than just the negative outcome in WL. When the student participants were asked to do a nice thing towards someone along the same row, they tended to favour their direct spatial neighbour(s) when it was seen as conferring a positive benefit. This is a particularly important finding as it shows that the ‘neighbour effect’ is not simply a bias in making spatial selections per se, rather it changes with the positive/negative valence of the outcome.

At a cognitive level the voting behaviour in the WL and the lecture study can be considered in terms of them utilising two sources of information to make their decision and cast their vote. Firstly there is the primary source, of open public information that everybody has access to and can be used to make a rational informed decision. For example, in WL this would be the performance of the contestants answering questions. If one contestant repeatedly makes errors responding to questions but all their fellow contestants make no errors, then the decision is simple. However, when this information is equivocal, uncertain and ambiguous, then the secondary source of information based on intuition is used. This is private, individual, subjective and prone to bias. This secondary source of information comes to the fore when the primary source is not reliable. We suggest that in WL, and in our lecture study, that the ‘neighbour effect’ comes about when the contestants and student participants have to make decisions when there is a limited primary source of information on which to base their judgement. Under these conditions, error prone, biased intuition dominated objective decision criteria. This ‘neighbour effect’ is an underlying bias in decision making that is part of this secondary source of information. This is akin to Kahneman’s (2012) fast and slow thinking in decision making and it concurs with bounded rationality theory (Simon, 1955), where the decision maker’s rationality is limited by information processing capacities and access to information.

When the valence of the vote is negative it can be considered as in some way punishing the receiver. This places the voter in a dilemma especially if they operate a ‘do-no-harm’ principle (Baron, 1995), where participants will be reluctant to harm others. It seems that they avoid meeting out ‘punishment’ to their direct neighbours possibly through fear of retaliation? On the other hand when the valence of the vote is positive it can be considered as a kind of gift to be bestowed on a valued individual (e.g. Bell, 1991). In this case the ‘neighbour effect’ disappears and the neighbour is once again favoured. Nevertheless, the effect was asymmetric being far stronger in the negative rather positive valence scenario. This suggests that the participants’ fairness norm was stronger in the negative valence condition compared to the positive valence condition, whereby the participants were favouring the negative recipient(s) by avoiding doing bad thing towards them (Leviveld, et al, 2009).

We suggested that the ‘neighbour effect’ occurred as an implicit bias in decision making, probably working at an unconscious level and possibly arising as a reluctance to engage in actions that could potentially result in conflict with those most nearest to them.

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