Cognition 174 (2018) 37–42

Contents lists available at ScienceDirect

Cognition

journal homepage: www.elsevier.com/locate/cognit

Brief article

Investing in commitment: Persistence in a joint action is enhanced by the perception of a partner's effort

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ARTICLE INFO

Keywords:
Commitment
Joint action
Cooperation
Effort
Grit
Sunk costs

ABSTRACT

Can the perception that one's partner is investing effort generate a sense of commitment to a joint action? To test this, we developed a 2-player version of the classic snake game which became increasingly boring over the course of each round. This enabled us to operationalize commitment in terms of how long participants persisted before pressing a 'finish' button to conclude each round. Our results from three experiments reveal that participants persisted longer when they perceived what they believed to be cues of their partner's effortful contribution (*Experiment 1*). Crucially, this effect was not observed when they knew their partner to be an algorithm (*Experiment 2*), nor when it was their own effort that had been invested (*Experiment 3*). These results support the hypothesis that the perception of a partner's effort elicits a sense of commitment, leading to increased persistence in the face of a temptation to disengage.

1. Introduction

From assembling furniture to painting houses and playing games, joint action is a pervasive and important feature of human sociality. Joint action can be defined as 'any form of social interaction whereby two or more individuals coordinate their actions in space and time to bring about a change in the environment' (Sebanz, Bekkering, & Knoblich, 2006: 70; Butterfill, 2012). While many other species also participate in forms of joint action, such as birds flocking (Pulliam, 1973), fish schooling (Katz, Tunstrøm, Ioannou, Huepe, & Couzin, 2011) and chimpanzees hunting (Boesch, 2002), it has been argued that humans are uniquely able and motivated to coordinate their actions, and do so more flexibly and in a wider variety of contexts than other species (e.g. Konvalinka, Vuust, Roepstorff, & Frith, 2010; Melis & Semmann, 2010; Silk et al., 2009; Tomasello, 2009). This enables us to achieve outcomes we could not otherwise achieve, and to do so more efficiently than we otherwise could (Melis & Tomasello, 2013; Tomasello, 2009).

However, our predilection for joint action also presents us with the challenge of determining when and to what extent we should persist in contributing to joint actions when we may individually be tempted to stop. While it may be superfluous to persist longer than one wants to in joint actions that are unimportant to one's partner or indeed that one's partner may herself abandon, it could be damaging to one's reputation and to one's relationships to disappoint the expectations of a partner to whom the continuation of a joint action is highly valuable (Heintz, Celse, Giardini, & Data, 2015). But how does one distinguish the former sort of case from the latter sort? Following Michael, Sebanz and Knoblich (2016a, 2016b), we hypothesized that the motivation to remain engaged in joint actions and to resist tempting alternative options and distractions is governed by an implicit sense of commitment which is modulated by the amount of effort that one's partner has invested in the joint action. Imagine, for example, that you have agreed to attend a cocktail party at your colleague's apartment but, on the occasion, find yourself tired or otherwise tempted to leave after only a short time. If your colleague has obviously invested a great deal of effort in preparing the hors d'oeuvres and decorations, you might find that a sense of commitment leads you to stick around for a few hours after all.

If this is correct, then we should expect people's persistence in a joint action to be modulated by the amount of effort which they perceive their partner(s) to have invested. In order to test this hypothesis, we developed a 2-player version of the classic 'snake game' in which the participant controls the left-right axis while their partner (an algorithm) controls the up-down axis. In Experiment 1, participants were led to believe that their partner was a person whom they had met in the waiting area, and that, before each round of the snake game, the partner had to perform a cognitive task in order to 'unlock' the round. The cognitive task consisted in deciphering a captcha, which could be either difficult (High Effort condition) or easy (Low Effort condition). Then, the participant and the partner retrieved as many apples as

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https://doi.org/10.1016/j.cognition.2018.01.012
Received 15 September 2017; Received in revised form 25 January 2018; Accepted 25 January 2018

Fig. 1. Sample captchas. In the instruction phase, participants were presented with examples of easy and difficult captchas.

possible by jointly controlling the snake. Since the apples appeared at an ever-slowing rate, each round became progressively boring, generating an incentive to disengage. Participants were instructed to press a 'finish' button whenever they determined that it was time to move on to the next round. This enabled us to operationalize commitment in terms of how long participants persisted in each round. We predicted that participants would feel more committed to the joint action in the High Effort condition than in the Low Effort condition, and that they would therefore persist longer before pressing the 'finish' button in the High Effort condition than in the Low Effort condition.

Experiment 2 was identical to Experiment 1 except that participants were correctly informed that their partner was an algorithm. If any effect observed in Experiment 1 does indeed reflect the operation of an implicit sense of commitment that is engaged by the perception of others' efforts being invested in a joint action, then we should not expect participants to differentiate between the High Effort condition and the Low Effort condition when they do not believe that there is any agent investing effort at all.

Experiment 3 was designed to test an alternative explanation, namely that participants may persist longer in the High Effort condition due to sunk cost reasoning, i.e. they may persist longer in order to ensure that the effort invested by their partner 'pays off' (Arkes & Blumer, 1985; Staw, 1976). To this end, we instructed participants to perform the cognitive tasks themselves in order to unlock each round. We reasoned that if increased persistence in the High Effort condition is due to sunk cost reasoning, then we should observe the same pattern in Experiment 3.

2. Experiment 1

2.1. Participants

Using G*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) we determined that a sample size of twenty-six would provide 80% statistical power for detecting a medium-sized effect equivalent to what we observed in a pilot study ($d = 0.58$), assuming a two-tailed t-test and an alpha level of 0.05. Our stopping rule was therefore as follows: we continued recruitment until twenty-six participants had completed the number of trials which we determined a priori to mark the minimum threshold (as explained below). In addition to these twenty-six participants who constitute our sample (19 females; age range: 18–29, $M = 23.04$, $SD = 2.67$), eight further participants did not meet the minimum threshold and were excluded prior to analysis. All participants were recruited from student organizations in the Budapest area, were naïve to the purpose of the study, and reported normal or corrected to normal vision. All participants signed informed consent prior to the experiment, and received gift vouchers for their participation. The experiment was conducted in accordance with the Declaration of Helsinki and was approved by the (EPKEB) United Ethical Review Board for Research in Psychology.

2.2. Apparatus and stimuli

The experiment was displayed on a 13-inch computer screen (resolution: 2560 × 1600 pixels, refresh rate: 60 Hz). The program for the experiment was written in Python (Peirce, 2007), with a framerate of 17 frames per second.

The algorithm for the partner, which controlled the up-down axis, was programmed to behave in a human-like manner: it follows the shortest path to the apple, but sometimes (randomly) makes mistakes, reacting too late or turning in the wrong direction.

2.3. Procedure

Participants were first introduced to a person in the waiting area (a confederate), whom they were told would be their partner for the experiment, and who would be playing in the adjacent room. They were informed that their task, together with their partner, would be to collect as many apples as possible over the course of 20 rounds by jointly maneuvering the snake, with the participant controlling the left-right axis, and the partner controlling the up-down axis.

In addition, they were informed that they and their partner had each