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Probing folk-psychology: Do Libet-style experiments reflect folk intuitions about free action?

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ABSTRACT

There is an ongoing debate in philosophy and psychology about when one should consider an action to be free. Several aspects are frequently suggested as relevant: (a) a prior intention, (b) a conscious action-related thought, (c) prior deliberation, (d) a meaningful choice, (e) different consequences of the action, and (f) the duration between intention and action. Here we investigated which criteria laypeople adopt and thus probed their intuitions about free actions in three surveys based on daily life scenarios. First, our results indicate that laypeople consider a conscious intention important for an action to be free. Second, laypeople consider spontaneous actions without consequences to be freer than actions with prior deliberation. Third, laypeople consider proximal rather than distal intentions relevant when it comes to judging actions as free. Taken together, these results suggest that simple laboratory experiments on action choices reflect laypeople's intuitions of free actions to a considerable degree.

1. Introduction

The problem of "free will" has been intensely debated among psychologists, neuroscientists, philosophers, and lawyers (Batthyany, 2009; Haggard, 2008; Libet, Gleason, Wright, & Pearl, 1983; Mele, 2009; Wegner, 2002). A main point of discussion is which implications can be drawn from Libet-style free choice experiments (Libet et al., 1983). The original study by Libet measured the relationship between the onset of brain activity and the timing of a conscious "urge" to move prior to an action. They found that the brain activity precedes the urge to move by around 350 ms. Similar findings were subsequently reported by other groups across delay periods of up to several seconds (Soon, Brass, Heinze, & Haynes, 2008; Soon, He, Bode, & Haynes, 2013). The fact that the brain activity predicts an upcoming decision even before the person consciously believes to be making it has often been interpreted to undermine free will (Bargh, 2008; Haggard, 2008; Harris, 2012; Wegner, 2002). This and similar experiments have led to considerable debates not only within the scientific disciplines involved, but also in the media and general public. In response to this public debate, philosophers have frequently criticized that the simple

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experiments used in neuroscience do not match typical concepts of free will held by laypeople (Mecacci & Haselager, 2015; Pauen, 2008, 2009; Roskies, 2011; Schlosser, 2014). Some philosophers have claimed to use definitions of free will that better approximate lay concepts (e.g. Mecacci & Haselager, 2015). However, there is considerable conflict between concepts of free will used by different philosophers and also by neuroscientists (Mecacci & Haselager, 2015; Pauen, 2008, 2009; Roskies, 2011; Schlosser, 2014). In an interdisciplinary debate with many divergent definitions, using a joint definition of free will that is maximally close to lay concepts is crucial in order to avoid misunderstanding. This is especially important if the debate extends into the general public. Thus, we sought to investigate the beliefs of laypeople regarding several aspects of free will. However, without direct empirical support it is unclear what beliefs laypeople hold about free will (Mele, 2001; Monroe & Malle, 2010, 2015; Nadelhofer & Nahmias, 2007; Nahmias, Morris, Nadelhoffer, & Turner, 2006; Stillman, 2011). Recently, a subfield on the border between philosophy and psychology, called experimental philosophy, has started to systematically investigate the beliefs of laypeople regarding philosophical questions (Knobe, 2007; Nahmias, Coates, & Kvaran, 2007; Sommers, 2010; Stillman, 2011). One focus of this research was on whether laypeople believe that a determinist universe allows for free will, a position termed "compatibilism" (Knobe, 2007; Knobe & Nichols, 2008; Nahmias, Stephen, Thomas, & Turner, 2005; Nahmias et al., 2006, 2007). Please note that the compatibilist claim is very generic. It pertains to whether free will is compatible with a purported general property of the universe, i.e. its deterministic nature. However, besides these theoretical positions people also judge whether everyday actions are free or not depending on the presence or absence of certain cognitive processes (e.g. Stillman, 2011). For example, people might consider an action to be free if a person was consciously thinking about the action (e.g. Matsuhashi & Hallett, 2008) or had an intention before engaging in it (e.g. Mele, 2009). Another factor might be whether a person spent time deliberating about the action beforehand, rather than acting spontaneously (e.g. Roskies, 2011). The attractiveness of the alternative options, and their potential consequences might also play a role (e.g. Schlosser, 2014). Finally, the relation between short-term ("proximal") intentions to long-term ("distal") intentions might be important (e.g. Nahmias, 2005). Our goal is to contribute to this debate by empirically investigating the beliefs of laypeople, as has been previously done for compatibilism (Knobe, 2007; Knobe & Nichols, 2008; Nahmias et al., 2005, 2006, 2007).

Here, we used three surveys to assess whether laypeople believe several factors to be relevant in order for an action to be considered free. In the first survey we investigate the role of consciousness, prior intentions, and action type (Levin, 2015; Mele, 2009; Nahmias, 2005). In the second survey, we address laypeople's beliefs concerning deliberation, choice, and consequences (e.g. Batthyany, 2009; Bayne, 2011; O'Connor, 2009; Roskies, 2011; Schlosser, 2012b, 2014, 2015). Finally, in a third survey we ask how important proximal and distal intentions are for judging an action as free (Nahmias, 2005; Pacherie & Haggard, 2010; Roskies, 2011; Schlosser, 2014; Sinnott-Armstrong, 2011).

2. Survey 1

2.1. Consciousness and intention

In the first study we assessed whether laypeople believe a person's conscious thoughts and/or their intentions to be relevant for their actions to be free. What laypeople believe about the relation of consciousness, intention, and free action has rarely been empirically studied before. We formulated a set of potential lay beliefs based on the previous literature.

2.1.1. Consciousness

The first potential factor is whether people consider an action to be free if it is preceded by a conscious action-related thought (Matsuhashi & Hallett, 2008; Shepherd, 2012). This thought must not necessarily be an intention. This view receives support by recent research on folk beliefs. For example, Shepherd (2012) found that laypeople judge actions as free if they are caused by conscious mental states (irrespective of whether or not these are intentions). This was not the case if an action was caused by an unconscious mental state.

2.1.2. Intention

Some philosophers have suggested that the concept of free action depends on the presence or absence of an intention, independent of whether it is conscious or not. This idea aims to account for routinized behavior that has no related conscious intention, but which still might be considered free (Breitmeyer, 1985; Marcel, 2003; Mele, 2009; Pockett, 2007; Schlosser, 2012a). Here we do not claim that unconscious intentions exist, but instead we want to probe what laypeople would think if they were to exist. An example of an unconscious intention might be thoughtless automatic behavior. Sometimes one carries out highly routinized actions without consciously intending to do so, e.g. when unlocking a door, making coffee in the morning etc. (Levin, 2015; Mele, 2009; Nahmias, 2005). Even though such actions are often carried out automatically without conscious intention, they are nonetheless goal-directed and thus might be considered to be guided by unconscious intentions (Breitmeyer, 1985; Marcel, 2003; Mele, 2009; Pockett, 2007; Schlosser, 2012a). Such routinized actions might also occur as a subpart of a more global, consciously initiated action plan. For example, driving home after work might require a conscious intention, whereas the action to stop at a red light might not. Some philosophers consider those automatic actions as free (Levin, 2015; Marcel, 2003; Mele, 2009). Having an intention prior to action no matter whether or not the intention is conscious is thus the second potential criterion we investigate.

2.1.3. Conscious intention

A third alternative criterion could be that a combination of the first two criteria is required, such that an action is judged as free depending on whether a person has a conscious intention prior to the action (Bargh, 2006; Bargh & Chartrand, 1999; Libet et al., 1983; Wegner, 2002). This notion is sometimes based on assumptions about folk beliefs (Newell & Shanks, 2014; Wegner, 2002) and sometimes it is assumed without further justification (Libet et al., 1983). The conscious intention criterion forms the basis of many experiments on free will and is often used as a paradigmatic case for operationalizing free actions (e.g. Haggard & Eimer, 1999; Libet et al., 1983; Soon et al., 2008, 2013; Trevena & Miller, 2002).

2.1.4. Action type

When judging how free a person's action is, the nature of the action might be relevant as well. For example the action to pick up a glass of water in order to drink it reflects an evolutionarily developed drive that aims at reinstating basic physiological homeostasis. The degree of freedom in such a biologically necessary action might be considered differently than when an action is optional, such as reading a book. Some suspect that lay judgements might be based on such details (Kauppinen, 2007). Because laypeople's judgements might depend on the nature of the action we included two types of actions in our survey (see below).

2.2. Methods

Participants were asked to answer an online questionnaire containing short written action scenarios implemented in the software Unipark (QuestBack GmbH, Cologne, Germany). For each scenario, respondents had to rate how free they considered an action. In each scenario we manipulated the factors intention, consciousness, and action type systematically and independently in order to assess the impact of each factor separately. The local ethics committee approved the research in accordance with the declaration of Helsinki.

2.2.1. Participants

We recruited 668 respondents through university email distribution-lists. By excluding all incomplete datasets we gained a sample of 471 respondents (63.9% female and 32.1% male). The age of the respondents ranged from 17 to 67 years (M_{age} = 27.02 years, SD_{age} = 6.62 years). Almost all respondents (96.7%) had a high-school or university degree. 54.3% of the respondents were naïve with respect to theoretical debates on free will and 43.7% had previously thought about the topic (the remaining 2% made no statement).

2.2.2. Material

Subjects were provided with 12 scenarios for which they had to judge to which degree the action was free. The 12 scenarios follow from a variation of three factors: intention, consciousness, and action type. The factor intention used three levels: intending the action, being indifferent to the action, and having an opposing intention (i.e. *not* to perform the action). The factor consciousness included two levels: conscious and unconscious. The factor action type involved one action driven by an intellectual curiosity (reading a book) and one driven by a basic physiological need (drinking water) (Table 1 for all scenarios used in this study).

2.2.3. Procedure

We used an online questionnaire to display the 12 scenarios. Instructions for completing the questionnaire were shown at the beginning. For each scenario the participants were asked to rate how free they intuitively considered the action. For each respondent, the order of the scenarios was randomized. The respondents were presented with one scenario at a time. Below each scenario two questions were presented. The first one asked, "How free was the presented action?" (freedom rating, FR). Subjects answered using a Likert-scale that ranged from 1 to 5, where 1 indicates "not free" and 5 "free". In order to monitor whether any scenarios would be counterintuitive and not evoke an intuition we introduced a second question that asked, "How confident are you about the rating?" (confidence rating, CR). The scale ranged from 1 "not certain" to 4 "certain". There were no time constraints for the responses.

2.3. Results

The analysis of the CRs revealed high values for each scenario (M = 3.23, SD = 0.75), ranging from 3.03 to 3.57 between conditions (Table 2). Thus, participants appear to have been confident in rating how free they considered the scenarios. The effects of intention, consciousness and action type on the FRs are plotted in Fig. 1. The FRs are highest for intentions that are conscious.

To analyze the effects in detail we performed a 3 × 2 × 2 (intention × consciousness × action type) factorial repeated measures ANOVA (Huynh-Feldt corrected due to non-sphericity; Mauchly's test: $\chi^2(2) = 71.99, p < 0.001$) (Field, 2009). The three main effects of intention, consciousness, and action type were statistically significant.

First, there was a significant main effect of the factor intention ($F(1.76, 825.63) = 291.64$; $p < 0.001$). FRs only barely differed between intention and indifference ($F(1, 470) = 8.00$, $p = 0.005$, Cohen's $d = 0.09$), but differed substantially between indifference and opposing intentions ($F(1, 470) = 451.93$, $p < 0.001$, Cohen's $d = 0.67$) (Table 2). Second, there was a signifi-

Table 1
Manipulated factors and corresponding scenarios of survey 1.

Design factors			Operationalization
Intention	Consciousness	Action type	Scenario
Intention	Conscious	Action 1	Susan sits in the kitchen. On the table in front of her she discovers an unknown book of her roommate. She consciously realizes that she wants to read the book. She opens the book and starts reading.
Intention	Conscious	Action 2	Matthew sits at the dining table with a glass of water in front of him. He consciously realizes that he wants to drink water. He grabs the glass and starts drinking the water.
Intention	Unconscious	Action 1	Susan sits in the kitchen. On the table in front of her she discovers an unknown book of her roommate. Without anything in mind she opens the book and starts reading. Only afterwards she consciously realizes that she wanted to read the book all the time.
Intention	Unconscious	Action 2	Matthew sits at the dining table with a glass of water in front of him. Without anything in mind he grabs the glass and starts drinking. Only afterwards he consciously realizes that he wanted to drink the water all the time.
Indifference	Conscious	Action 1	Susan sits in the kitchen. On the table in front of her she discovers an unknown book of her roommate. She consciously realizes that she is indifferent of reading the book. Although she is indifferent, she opens the book and starts reading anyway.
Indifference	Conscious	Action 2	Matthew sits at the dining table with a glass of water in front of him. He consciously realizes that he is indifferent of drinking water. Although he is indifferent, he grabs the glass and starts drinking anyway.
Indifference	Unconscious	Action 1	Susan sits in the kitchen. On the table in front of her she discovers an unknown book of her roommate. Without anything in mind she opens the book and starts reading. Only afterwards she consciously realizes that she was indifferent whether to read the book all the time.
Indifference	Unconscious	Action 2	Matthew sits at the dining table with a glass of water in front of him. Without anything in mind he grabs the glass and starts drinking. Only afterwards he consciously realizes that he was indifferent whether to drink the water all the time.
Opposing Intention	Conscious	Action 1	Susan sits in the kitchen. On the table in front of her she discovers an unknown book of her roommate. She consciously realizes that she does not want to read the book. Although she does not want to read the book, she opens the book and starts reading.
Opposing intention	Conscious	Action 2	Matthew sits at the dining table with a glass of water in front of him. He consciously realizes that he does not want to drink water. Although he does not want to drink water, he grabs the glass and starts drinking.
Opposing intention	Unconscious	Action 1	Susan sits in the kitchen. On the table in front of her she discovers an unknown book of her roommate. Without anything in mind she opens the book and starts reading. Only afterwards she consciously realizes that she did not want to read the book all the time.
Opposing intention	Unconscious	Action 2	Matthew sits at the dining table with a glass of water in front of him. Without anything in mind he grabs the glass and starts drinking. Only afterwards he consciously realizes that he did not want to drink water all the time.

Table 2
Descriptive statistics of survey 1.

Design factors			Freedom rating (FR)		Confidence rating (CR)	
Intention	Consciousness	Action type	M	SD	M	SD
Intention	Conscious	Action 1	4.32	1.07	3.56	0.63
Intention	Conscious	Action 2	4.23	1.21	3.57	0.66
Intention	Unconscious	Action 1	3.47	1.35	3.20	0.74
Intention	Unconscious	Action 2	3.20	1.42	3.22	0.74
Indifference	Conscious	Action 1	3.91	1.16	3.26	0.73
Indifference	Conscious	Action 2	3.83	1.21	3.31	0.72
Indifference	Unconscious	Action 1	3.58	1.30	3.11	0.78
Indifference	Unconscious	Action 2	3.42	1.35	3.13	0.77
Opposing intention	Conscious	Action 1	2.79	1.53	3.08	0.82
Opposing intention	Conscious	Action 2	2.66	1.58	3.20	0.80
Opposing intention	Unconscious	Action 1	2.89	1.49	3.03	0.82
Opposing intention	Unconscious	Action 2	2.69	1.50	3.04	0.81

cant main effect of the factor consciousness. The FRs for conscious scenarios were significantly higher than for unconscious scenarios with a small to moderate effect size ($F(1, 470) = 104$, $p < 0.001$, Cohen's $d = 0.29$) (Table 2). Third, there was also a significant main effect of the factor action type ($F(1, 470) = 50$, $p < 0.001$, Cohen's $d = 0.11$), however with a very small effect

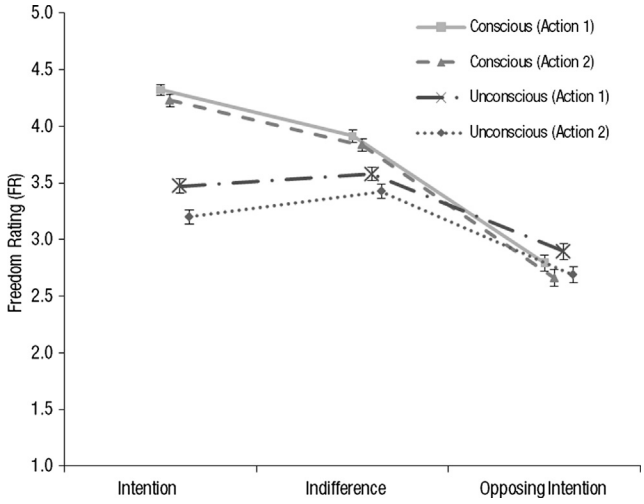

Fig. 1. Mean values of freedom ratings (FR) on a five-level Likert scale (1–5) for intention, indifference, and opposing intention scenarios ($N = 471$; error bars indicate SEM).

size. Thus, the ratings of free actions were only marginally dependent on the nature of the action. For this reason the following analyses were collapsed across both actions (Table 2).

There was a significant interaction between the factors intention and consciousness ($F(1.93, 908) = 125.78$; $p < 0.001$), indicating that consciousness had a different effect on people's ratings depending on the type of intention. The combination of having an intention and consciousness yielded the highest FRs (Table 2).

We also assessed whether the various subgroups in our sample differed in their ratings. There were no significant effects of being familiar with the topic (yes/no) ($F(1, 459) = 3.646$, $p = 0.057$), gender (male/female) ($F(1, 449) = 1.55$, $p = 0.21$), field of study (humanities/social science/natural science/economics/law) ($F(4, 424) = 1.184$, $p = 0.32$), or education (no degree/secondary modern school/secondary school/high school/university degree) ($F(4, 451) = 1.72$, $p = 0.14$). Thus, the subgroups had no traceable effect on FRs.

2.4. Interim discussion: intention, consciousness, and action type

Our findings demonstrate that neither the presence of an intention prior to an action alone nor consciousness alone determine whether a person considers an action to be free (Fig. 1). Instead, a combination of the two factors is required. Thus, purely consciousness-based (Matsuhashi & Hallett, 2008; Shepherd, 2012), or purely intention-based accounts of freedom judgements (Breitmeyer, 1985; Levin, 2015; Marcel, 2003;Mele, 2009; Nahmias, 2005; Pockett, 2007; Schlosser, 2012a) are not supported by our data. Instead, the conscious intention view that has been widely employed in the cognitive neuroscience literature (Bargh, 2006; Bargh & Chartrand, 1999; Haggard & Eimer, 1999; Lau, 2004; Libet et al., 1983; Trevena & Miller, 2002; Wegner, 2002) is most compatible with the beliefs of the laypeople in our sample. However, our results suggest that also this view needs to be modified. There was only a marginal difference between cases where people had an intention versus when they were indifferent to the action. Thus, the relevant criterion might be that a person has no opposing intention. Please note that our findings are replicated across two very different action types.

3. Survey 2

3.1. Deliberation, choice, and consequences

The second survey addresses three further aspects that might play a role when judging actions as free. It has frequently been suggested that deliberation prior to an action might be important for a free action (Batthyany, 2009; Bayne, 2011; Mecacci & Haselager, 2015; Roskies, 2011). Furthermore, in order to deliberate there has to be a choice with distinguishable options (Kane, 2005; Mecacci & Haselager, 2015; Schlosser, 2014; Van Inwagen, 1989). These options might also vary in their potential consequences for personal life (Mecacci & Haselager, 2015; Roskies, 2011; Schlosser, 2014). We thus assessed the effects of these three factors on the freedom judgements of laypeople in survey 2.

3.1.1. Deliberation vs. spontaneity

Survey 1 showed that conscious intentions are highly predictive of whether a person considers an action to be free. However, a person might not only be briefly aware of their intention, but might also spend an extended period of active delib-

eration considering which alternative to take before making a final choice. Most philosophers have introduced the idea that the deliberation of reasons or at least the responsiveness to reasons is an important feature of a person executing a free action (Fischer, 1994; Fisher & Ravizza, 1998; Kane, 1996; Mele, 2006; Schlosser, 2015). In contrast, some experimental scientists hold the view that only a total lack of any internal or external cues whatsoever yields a free action (Schüür & Haggard, 2011). In Libet-style experiments, researchers explicitly diminish or eliminate the influence of potential biases such as deliberation by instructing participants to act spontaneously without pre-planning (Haggard & Eimer, 1999; Libet, 1983; Soon et al., 2008, 2013; Trevena & Miller, 2002). For this reason we studied whether prior deliberation versus spontaneity had an influence on people's freedom judgements.

3.1.2. Choosing vs. picking

Another important extension of experiment 1 concerns the exact nature of indifference. Actions differ with respect to the options the agent can choose from. In some cases an action might be chosen from a variety of options that have different value to the agent. Alternatively, the choice might be only between several options that are of equal value and thus the agent is indifferent. In line with previous work (Ullmann-Margalit & Morgenbesser, 1977) we refer to these as "choosing" (multiple options, different values) and "picking" (multiple options, same values) sometimes also referred to as "Buridan situations" (Kane, 2005). Some philosophers consider an action deriving from a picking scenario a "degenerated form" of free action (Roskies, 2011, p. 18), a form of free action that is "not proper" (Schlosser, 2014, p. 251), or simply an action that is not free at all (Van Inwagen, 1989, p. 417). They argue that free action should be based on reasons, preferences or character traits and not on arbitrary or random decisions (Kane, 1996; Mecacci & Haselager, 2015; Mele, 2006; Pauen, 2008, 2009; Roskies, 2011; Schlosser, 2014). In contrast, experimental scientists often hold the opposing view (Haggard & Eimer, 1999; Libet, 1985; Libet et al., 1983). They consider actions performed in a picking situation the purest form of freedom (Schüür & Haggard, 2011), a notion also called "liberty of indifference" (Kane, 1996, 2005; Van Inwagen, 1983, 1989). The idea behind this notion is that only a picking scenario provides a total equilibrium between different options and by that the absolute freedom to choose without biases (Kane, 2005). In contrast, choosing scenarios are considered a form of externally triggered response and thus a potential form of bias (Haggard, 2011; Schüür & Haggard, 2011). Especially in the famous Libet-style experiments, experimenters deliberately use picking scenarios in order to avoid biases.

3.1.3. Consequences vs. no consequences

A related question to the issue of indifference and value is whether an action has real-world consequences or not (Ullmann-Margalit, 2006, 2007). Imagine that you are taking a pen in order to sign a job contract or you take a pen in order to take down an insignificant note. Both actions are similar from a behavioural point of view. However, the former action has important real-world consequences while the latter does not. Often philosophers claim that actions with significant consequences are good examples of free actions because they truly matter for the agent, while insignificant actions without consequences are meaningless (Roskies, 2011; Schlosser, 2012b). In experimental settings most scientists use choices between actions that have only very limited consequences (Haggard & Eimer, 1999; Libet et al., 1983; Soon et al., 2008, 2013), the maximum typically being a small reimbursement for participation, but not a differential payoff between the different actions. It has been proposed that also insignificant actions, without real-world consequences qualify as good examples of full-fledged free actions (Libet et al., 1983; Wegner, 2002).

3.2. Methods

As in survey 1 participants were asked to answer an online questionnaire containing short written action scenarios that were implemented in the software Unipark (QuestBack GmbH, Cologne, Germany). For each scenario, respondents had to rate how free they considered the presented action. In each scenario we manipulated the factors deliberation, choice, and consequence. The research was approved by the local ethics committee in accordance with the declaration of Helsinki.

3.2.1. Participants

We deployed an online-questionnaire via university email distribution-lists. We received responses of 503 participants. After excluding all incomplete datasets we obtained a sample of 346 respondents (64.6% female and 32.2% male). The age of the respondents ranged from 18 to 51 years (M_{age} = 25.01 years, SD_{age} = 5.61 years). Almost all respondents (98.8%) had a high-school or university degree. 47.8% of the respondents were naïve, thinking about the question of free will for the first time, while 27.1% had previously thought about the topic. The rest did not know for sure.

3.2.2. Material

Subjects were provided with a questionnaire containing eight scenarios. Those scenarios followed from a combination of the three factors: deliberation, choice, and consequence. The factor deliberation used two levels: deliberation and spontaneity. The factor choice included two levels: choosing and picking, and the factor consequence had two levels: a significant action with consequences for a person's life (signing a job contract) versus an insignificant action with no consequences (taking an insignificant note) (Table 3 for all scenarios used in this study).

Table 3
Manipulated factors and corresponding scenarios of survey 2.

Design factors			Operationalization
Deliberation	Choice	Consequence	Scenario
Deliberation	Choosing	Yes	Matthew looks for a new long-term job. He has gotten two job offers. For both jobs he received contracts to sign. The job conditions are very different. Matthew deliberates which job would be better. Only after careful consideration he decides for a job and signs one contract.
Deliberation	Choosing	No	Matthew looks for a pen to take a rather unimportant note. On the desk in front of him he sees two very different pens. Matthew deliberates which pen to choose. Only after careful consideration he decides and takes one pen.
Deliberation	Picking	Yes	Matthew looks for a new long-term job. He has gotten two job offers. For both jobs he received contracts to sign. The job conditions are identical. Matthew deliberates which job would be better. Only after careful consideration he decides for a job and signs one contract.
Deliberation	Picking	No	Matthew looks for a pen to take a rather unimportant note. On the desk in front of him he sees two identical pens. Matthew deliberates which pen to choose. Only after careful consideration he decides and takes one pen.
Spontaneity	Choosing	Yes	Matthew looks for a new long-term job. He has gotten two job offers. For both jobs he received contracts to sign. The job conditions are very different. Matthew does not deliberate which job to choose. He signs one contract spontaneously.
Spontaneity	Choosing	No	Matthew looks for a pen to take a rather unimportant note. On the desk in front of him he sees two very different pens. Matthew does not deliberate which pen to choose. He takes one pen spontaneously.
Spontaneity	Picking	Yes	Matthew looks for a new long-term job. He has gotten two job offers. For both jobs he received contracts to sign. The job conditions are identical. Matthew does not deliberate which job to choose. He signs one contract spontaneously.
Spontaneity	Picking	No	Matthew looks for a pen to take a rather unimportant note. On the desk in front of him he sees two identical pens. Matthew does not deliberate which pen to choose. He takes one pen spontaneously.

3.2.3. Procedure

An online questionnaire was used to display all scenarios. Instructions for completing the questionnaire were shown at the beginning. Respondents were asked to assess the displayed eight scenarios according to their intuition. For each respondent, the order of the scenarios was randomized. The respondent saw only one scenario at a time. Below each scenario two questions were presented. The first one read, "How free was the presented action?" (freedom rating, FR). Subjects answered using a Likert-scale with a range from 1 to 7, where 1 indicates "not free" and 7 "free". The second question read, "How confident are you about the rating?" (confidence rating, CR) and was to be answered on a scale that ranged from 1 "not certain" to 7 "certain". This was done to monitor whether subjects had clear intuitions about the different scenarios. There were no time constraints for responding to the questions.

3.3. Results

CR was constantly high ($M = 5.80$, $SD = 1.42$), ranging from 5.26 to 6.05 between conditions (Table 4). Thus, we found no evidence that participants lacked intuitions concerning our scenarios. We performed a $2 \times 2 \times 2$ (deliberation $\times$ choice $\times$ consequence) factorial repeated measures ANOVA on the freedom ratings (FRs) (Field, 2009). The three main effects were significant (see below) (Fig. 2).

First, there was a significant main effect of the factor deliberation. Spontaneous actions were judged freer than deliberative actions, with a small to moderate effect size ($F(1, 345) = 33.95$, $p < 0.001$, Cohen's $d = 0.26$) (Table 4). Second, there was

Table 4
Descriptive statistics of survey 2.

Design factors			Freedom rating (FR)		Confidence rating (CR)	
Deliberation	Choice	Consequence	M	SD	M	SD
Deliberation	Choosing	Yes	5.03	1.79	5.26	1.29
Deliberation	Choosing	No	5.26	1.90	5.80	1.40
Deliberation	Picking	Yes	5.20	1.65	5.86	1.30
Deliberation	Picking	No	4.99	2.07	5.80	1.45
Spontaneity	Choosing	Yes	5.28	1.86	5.44	1.71
Spontaneity	Choosing	No	5.26	1.57	6.00	1.33
Spontaneity	Picking	Yes	5.51	1.60	5.65	1.58
Spontaneity	Picking	No	5.88	1.60	6.05	1.34

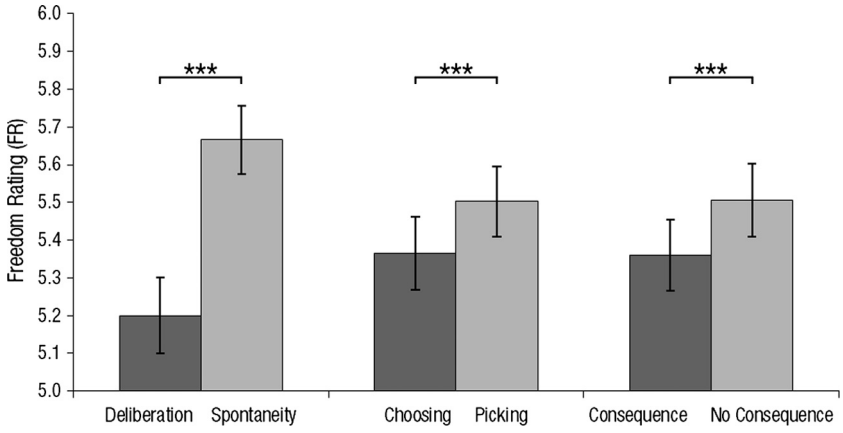

Fig. 2. Mean differences of the freedom ratings (FR) collapsed across all other conditions for the factor: deliberation (left), choice (middle), and consequence (right) ($N = 346$; error bars indicate SEM).

a significant main effect of the factor choice, with a marginal effect size ($F(1, 345) = 7.88$, $p = 0.005$, Cohen's $d = 0.08$) (Table 4). Third, the factor consequence showed a significant main effect with a marginal effect size ($F(1, 345) = 5.17$, $p = 0.024$, Cohen's $d = 0.08$) (Table 4).

Importantly, we found a significant interaction between the factors consequence and deliberation ($F(1,345) = 23.3$, $p < 0.001$), such that deliberation had different effects depending on the consequences it entailed. Spontaneity (versus deliberation) increased the FRs in scenarios without consequences more than in scenarios with consequences (Table 4). Thus, actions were considered particularly free if they were spontaneous and had no consequences.

There were no differences between the demographic subgroups in our sample. There were no significant effects of being familiar with the topic (yes/no) ($F(1,337) = 1.89$, $p = 0.11$), gender (male/female) ($F(1,337) = 0.032$, $p = 0.86$), field of study (humanities/social science/natural science/economics/law) ($F(1,326) = 2.67$, $p = 0.10$), and education (no degree/secondary modern school/secondary school/high school/university degree) ($F(1,337) = 3.11$, $p = 0.079$).

3.4. Interim discussion: deliberation, choice, and consequences

Our results demonstrate that laypeople in our sample judge spontaneous actions freer than deliberate ones. To a small degree they also judge picking actions (with outcomes of equal preference) freer than choosing actions (with outcomes of different preference), and actions without real-world consequences freer than actions with real-world consequences (Fig. 2). Spontaneous actions without consequences were considered particularly free. Thus, in contrast to many philosophical positions (Batthyany, 2009; Bayne, 2011; Kane, 2005; Roskies, 2011; Schlosser, 2014; Van Inwagen, 1989) our data show that it neither requires deliberation nor choosing nor real-world consequences for an action to be considered free by laypeople. On the contrary, laypeople in our sample tend to believe the opposite: free actions are associated with spontaneity, picking, and no real-world consequences. Results might look different, though, when the picking condition would involve two equally bad outcomes while the choosing condition would contrast outcomes that are either good or bad from the subject's point of view.

Our results reveal that laypeople and philosophers differ in the actions they would consider "free". For example, laypeople considered balanced choice actions where no option offers a clear advantage as more free than some philosophers would have predicted. One important question is whether this reflects a semantic difference in the use of the term "free". For example, laypeople might interpret the attribute "free" in the sense of "care-free". In contrast, philosophers have often focused on situations that involve moral decisions. Previous research demonstrated that a moral context can alter lay responses dramatically (Knobe et al., 2012). Given that our scenarios are not morally charged one could argue that the deviation between certain philosophical positions and the lay concepts could be due to the presence versus absence of moral contexts. Thus, laypeople might use the attribute "free" to mean "care-free", in the neutral scenarios as used here, but change their definition if the action involves a moral context. Please note, however, that our primary aim was to empirically test when exactly laypeople would assign the attribute "free" to actions in exactly the scenarios employed here. A next interesting step will be to investigate whether the judgements of laypeople depend on the moral context of a scenario.

4. Survey 3

4.1. Distal and proximal intention

In the second survey we employed scenarios where people acted immediately after making up their mind (spontaneously or deliberately). However, in daily life we often do not act immediately. In fact, frequently we intend to perform an action

long ahead of time, before putting it in action. This form of intention has been variously termed as "future-directed intention" (Bratman, 1987), "prospective intention" (Brand, 1984), or "distal intention" (Mele, 1992). So far we have not distinguished between these forms. In the third survey we thus further examined the factor intention that we already investigated in survey 1 and studied the influence of the temporal distance between intention and action on the perceived freedom.

The type of intention we investigated in the first survey is a proximal intention (P-intention) in the terminology of Mele (1992). It is formed immediately prior to action. Philosophers widely hold the opinion that a distal intention (D-intention) is at least as important for free action as a P-intention (Nahmias, 2005; Roskies, 2011; Sinnott-Armstrong, 2011). For this reason we investigate the relative role of D-intentions and P-intentions on freedom ratings. Please note that a D-intention is not only temporally removed, but it might also have a more general content than a P-intention (Pacherie, 2008; Searle, 1983). Thus, we additionally studied each combination with two types of D-intentions: (1) D-intentions that only differ from P-intention in the aspect of temporal proximity to action and (2) D-intentions that are temporally removed from P-intentions and that are more general than the P-intention. We refer to this as the "generality" factor.

4.2. Methods

As in survey 1 and 2 we asked participants to answer an online questionnaire containing short written action scenarios. For each scenario, respondents had to rate how free they consider the presented action. In each scenario we manipulated the factors P-intention, D-intention, and generality. The local ethics committee approved the research in accordance with the declaration of Helsinki.

4.2.1. Participants

We recruited respondents through university email distribution-lists. By excluding all incomplete datasets we gained a sample of 103 respondents (64.9% female and 33.9% male). The age of the respondents ranged from 18 to 59 years (M_{age} = 25.84 years, SD_{age} = 6.05 years). Almost all of the respondents (98.2%) had a high-school or university degree. 61.4% of the respondents were naïve with respect of freedom of will and action while 38.0% had previously thought about the topic (the remaining respondents made no statement).

4.2.2. Material

Subjects were provided with 18 scenarios where they had to judge to which degree they consider the displayed action as free. The 18 scenarios derive from the manipulation of three factors: P-intention, D-intention, generality. For the factor P-intention we used the same factor level as in the first survey: having an intention, being indifferent, and having an opposing intention. We introduced the same factor levels for D-intention: having an intention, being indifferent, and having an opposing intention. Finally the factor generality involved one level where there is no difference of generality between P- and D-intentions (P- and D-intentions only differ in the temporal proximity to action) and a level where there is a difference of generality between them (D-intention have a more general content than P-intention) (Table 5 for all scenarios used in this study).

4.2.3. Procedure

Also in the third survey we used the software Unipark (QuestBack GmbH, Cologne, Germany) to implement the questionnaire. Instructions were shown at the beginning. For each scenario we asked the participants to rate the scenarios according to their intuitions. The order of the scenarios was randomized. The respondent saw only one scenario at a time. As in surveys 1 and 2 there were two questions below each scenario. The first was, "How free was the presented action?" (freedom rating, FR). Subjects answered using a scale that ranged from 0 to 100% free. The second was, "How confident are you about the rating?" (confidence rating, CR). This scale ranged from 0 to 100% confident. There were no time constraints for the responses.

4.3. Results

We found no evidence that the participants lacked intuitions concerning our scenarios. The CRs were high for all scenarios (M = 76.57, SD = 20.77), ranging from 69.18 to 85.44 between conditions (Table 6). Thus, we found no evidence that participants lacked intuitions concerning our scenarios. Scenarios entailing proximal intention were rated highest (Fig. 3). We performed a 3 × 3 × 2 (D-intention × P-intention × generality) factorial repeated measures ANOVA on the FRs (Huynh-Feldt corrected due to non-sphericity; Mauchly's test: $\chi^2(2) = 71.26$, $p < 0.001$) (Field, 2009).

First, there was a significant main effect of the factor P-intention ($F(1.34, 138.21) = 134.49$, $p < 0.001$). FRs were higher for proximal intention than for proximal indifference with a moderate effect size ($F(1, 103) = 70.58$, $p < 0.001$, Cohen's $d = 0.56$). FRs were lower for opposing proximal intention than for proximal indifference with a strong effect size ($F(1, 103) = 125.04$, $p > 0.001$, Cohen's $d = 0.88$) (Table 6). Second, there was also a significant main effect of the factor D-intention ($F(1.19, 194.56) = 22.47$, $p < 0.001$). Additionally, FRs were higher for distal intentions than for distal indifference with a very small effect size ($F(1, 103) = 4.14$, $p = 0.044$, Cohen's $d = 0.073$). FRs also differed significantly between distal indifference and distal opposing intention but with a small effect size ($F(1, 103) = 23.48$, $p >$. 001, *Cohen's d* = 0.18) (Table 6). There was no sig-

Table 5
Manipulated factors and corresponding scenarios of survey 3.

Design factors			Operationalization
Proximal intention	Distal intention	Generality	Scenario
Intention	Intention	No	On Monday Anne has the intention to go out for brunch with her friends on Saturday. On Saturday she also intends to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Intention	Intention	Yes	On Monday Anne has the intention to do something with her friends on Saturday. On Saturday she intends to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Intention	Indifference	No	On Monday Anne is indifferent whether to go out for brunch with her friends on Saturday. However, on Saturday she intends to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Intention	Indifference	Yes	On Monday Anne is indifferent whether to do something with her friends on Saturday. However, on Saturday she intends to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Intention	Opposing intention	No	On Monday Anne has the intention not to go out for brunch with her friends on Saturday. However, on Saturday she intends to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Intention	Opposing intention	Yes	On Monday Anne has the intention not to do something with her friends on Saturday. However, on Saturday she intends to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Indifference	Intention	No	On Monday Anne has the intention to go out for brunch with her friends on Saturday. However, on Saturday she is indifferent whether to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Indifference	Intention	Yes	On Monday Anne has the intention to do something with her friends on Saturday. However, on Saturday she is indifferent whether to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Indifference	Indifference	No	On Monday Anne is indifferent whether to go out for brunch with her friends on Saturday. On Saturday she is still indifferent whether to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Indifference	Indifference	Yes	On Monday Anne is indifferent whether to do something with her friends on Saturday. On Saturday she is indifferent whether to go out and brunch with her friends either. Afterwards, Anne meets up with her friends for brunch.
Indifference	Opposing intention	No	On Monday Anne has the intention not to go out for brunch with her friends on Saturday. However, on Saturday she is indifferent whether to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Indifference	Opposing intention	Yes	On Monday Anne has the intention not to do something with her friends on Saturday. However, on Saturday she is indifferent whether to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Opposing intention	Intention	No	On Monday Anne has the intention to go out for brunch with her friends on Saturday. However, on Saturday she intends not to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Opposing intention	Intention	Yes	On Monday Anne has the intention to do something with her friends on Saturday. However, on Saturday she intends not to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Opposing intention	Indifference	No	On Monday Anne is indifferent whether to go out for brunch with her friends on Saturday. However, on Saturday she intends not to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Opposing intention	Indifference	Yes	On Monday Anne is indifferent whether to do something with her friends on Saturday. However, on Saturday she intends not to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Opposing intention	Opposing intention	No	On Monday Anne has the intention not to go out for brunch with her friends on Saturday. On Saturday she still intends not to go out and brunch with her friends. Afterwards, Anne meets up with her friends for brunch.
Opposing intention	Opposing intention	Yes	On Monday Anne has the intention not to do something with her friends on Saturday. On Saturday she intends not to go out and brunch with her friends either. Afterwards, Anne meets up with her friends for brunch.

nificant effect of the factor generality ($F(1, 103) = 0.471$, $p = 0.494$) indicating that the degree to which the distal intention was more general or less clearly specified played no role for FRs (Table 6).

We could not find any differential effects in the demographic subgroups of our sample. There were no significant effects of being familiar with the topic of free will (yes/no) ($F(1, 102) = 0.46$, $p = 0.50$), gender (male/female) ($F(1, 102) = 0.017$,

Table 6
Descriptive statistics of survey 3.

Design factors			Freedom rating (FR)		Confidence rating (CR)	
Proximal intention	Distal intention	Generality	M	SD	M	SD
Intention	Intention	No	81.64	24.07	82.86	20.51
Intention	Intention	Yes	79.62	23.97	85.44	17.49
Intention	Indifference	No	78.63	21.18	77.98	22.53
Intention	Indifference	Yes	76.97	22.80	80.32	20.01
Intention	Opposing intention	No	76.42	21.20	80.49	19.37
Intention	Opposing intention	Yes	75.54	21.22	79.46	19.93
Indifference	Intention	No	64.57	22.73	75.47	20.27
Indifference	Intention	Yes	72.19	22.02	78.18	19.12
Indifference	Indifference	No	67.08	21.96	70.77	26.60
Indifference	Indifference	Yes	67.92	22.11	77.26	19.07
Indifference	Opposing intention	No	61.88	22.34	73.98	20.47
Indifference	Opposing intention	Yes	60.32	21.21	69.18	22.88
Opposing intention	Intention	No	44.66	27.38	77.00	20.66
Opposing intention	Intention	Yes	46.93	27.63	74.52	22.09
Opposing intention	Indifference	No	45.14	31.46	75.25	23.69
Opposing intention	Indifference	Yes	43.13	29.03	75.00	20.80
Opposing intention	Opposing intention	No	38.64	30.30	78.35	19.65
Opposing intention	Opposing intention	Yes	39.92	28.54	76.29	18.50

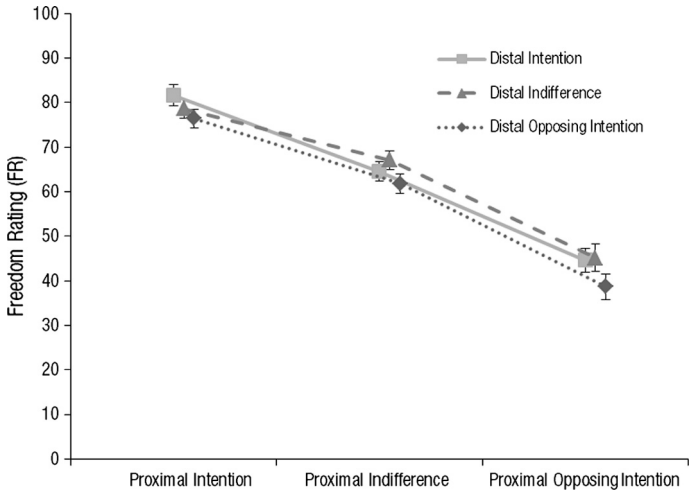

Fig. 3. Mean values of freedom ratings (FR) on a scale from 0 to 100 for proximal intention, proximal indifference, and proximal opposing intention scenarios ($N = 103$; error bars indicate SEM).

$p = 0.68$), field of study (humanities/social science/natural science/economics/law) ($F(1, 93) = 0.30$, $p = 0.86$), and education (no degree/secondary modern school/secondary school/high school/university degree) ($F(1, 102) = 2.78$, $p = 0.10$).

4.4. Interim discussion: distal and proximal intentions

Our results demonstrate that laypeople in our sample largely based their freedom judgements on P-intentions. We found only a minor effect of D-intention, independent of whether this was more general / less specific or not. When there was a conflict between P- and D-intention the P-intention was almost exclusively dominant. For example, in the case of an agent first (distally) opposing the action and then proximally intending the action laypeople perceived the action almost as free as if they had intended to do it all the time.

5. General discussion

The folk psychological intuitions of our samples of laypeople suggest that actions are considered most free if they involve a conscious intention, if they involve spontaneous actions without prior deliberation, if there are no preferences driving the choice, and if there are no consequences. Furthermore, proximal intentions that occur immediately before an action are considered more relevant than future-directed or distal intentions that are temporally separated from the action. Interestingly,

neither the action type, nor the generality of the intention appeared to play any decisive role. Furthermore, our laypeople considered positive intentions (i.e. cases where someone intended to perform an action) rather similar to indifference (i.e. cases where someone didn't care about the action). Both in turn were considered much freer than actions that went opposite to a person's intentions.

Based on these findings one can conclude that the intuitions of the laypeople sampled here do not reflect typical theoretical positions held by many philosophers (Dennett, 1984; Kane, 1996; Mele, 2006; Van Inwagen, 1989). Our data are in contrast to positions that free actions should be based on deliberation (Batthyany, 2009; Bayne, 2011; Roskies, 2011) meaningful choices (Kane, 2005; Schlosser, 2014; Van Inwagen, 1989), real-world consequences (Roskies, 2011; Schlosser, 2014) and distal intentions (Nahmias, 2005; Roskies, 2011; Sinnott-Armstrong, 2011). Please note that there is an ongoing debate whether philosophical theoretical positions refer (Cappelen, 2012; Deutsch, 2009, 2010) or should refer (Cummins, 1998; Weinberg, Nichols, & Stich, 2001; Williamson, 2007) to folk intuitions, however frequently the positions are argued for based on an appeal to common sense intuitions (e.g. Kane, 1999; Pink, 2004; Smilansky, 2003).

An interesting implication of our findings concerns the debate as to whether behavioral and neuroscientific laboratory experiments adequately capture the lay concept of freedom (Bayne, 2011; Levin, 2015; Roskies, 2011; Schlosser, 2014). Critics complain that participants had to act spontaneously without deliberation (Batthyany, 2009; Bayne, 2011; Roskies, 2011), that participants faced a picking situation that did not allow them to favor one action over another (Roskies, 2011; Schlosser, 2014), and that the actions the participants engaged in had no real-world consequences (Roskies, 2011; Schlosser, 2014). The Libet-style experiments are a well-known example of this kind. In the original Libet-experiment (Libet et al., 1983) participants could only decide when to press a button, thus the choices pertained to several very similar timing options, for each of which the participants presumably had no strong preferences. In other experiments participants could choose between very similar options, such as moving the left or right hand (Haggard & Eimer, 1999; Soon et al., 2008; Trevena & Miller, 2002) or adding and subtracting numbers (Soon et al., 2013). In all these situations participants were forced to act without deliberation and faced choices without preferences and without any real-world consequences. Interestingly, our results show that laypeople consider such actions to be maximally free (among the options investigated here). In contrast to the criticism, our findings demonstrate that Libet-style experiments provide a good operationalization of lay intuitions of free action.

Finally the form of intention operationalized in Libet-style experiments is a matter of debate as well. Libet-style experiments measure conscious intention. If it can be demonstrated that conscious intentions arise after the onset of brain activity in motor regions (Haggard & Eimer, 1999; Libet et al., 1983) and prefrontal cortex (Soon et al., 2008) this mainly challenges the causal efficacy of conscious intentions. However, it does not rule out that an earlier unconscious intention might cause this brain activity and conscious intention (e.g. Levin, 2015). While unconscious intention prior to brain activity might or might not exist, our data show that laypeople do not consider it as relevant for their freedom judgement. We found that laypeople do not associate free action with unconscious intention. Other critics challenged Libet's operationalization because it investigates only proximal intentions; i.e. the intention to press a particular button now (e.g. Mele, 2009). Libet-style experiments challenge the causal efficacy of proximal intentions (Haggard & Eimer, 1999; Libet et al., 1983; Soon et al., 2008, 2013). However, they do not challenge a possible causal efficacy of distal intentions (Flanagan, 1995; Keller & Heckhausen, 1990; Nahmias, 2005; Roskies, 2011; Schlosser, 2012a, 2012b, 2014; Sinnott-Armstrong, 2011; Zhu, 2003). While distal intentions might or might not be causally efficacious, our data show that distal intentions are largely irrelevant for whether laypeople consider an action to be free. Please note that this investigation of lay intuitions does not mean that distal or unconscious intention are not causal efficacious or should not investigated. It simply means that experiments that limit themselves to proximal conscious intentions investigate actions that are considered full-fletched free actions by laypeople. Thus, taken together, the operationalization of free actions in Libet-style experiments matches the intuitions of laypeople surprisingly well.

6. General conclusion

In sum, our results show that the intuitive freedom judgements of our sample of laypeople are closely matched by the actions cognitive neuroscientists have employed in Libet-style experiments. We found that actions are judged free if they are associated with prior conscious, proximal intentions, spontaneity, picking, and the absence of consequences. The picture emerging resembles closely the abovementioned concept of "liberty of indifference" that has been widely rejected by modern philosophers (Kane, 1996, 2005; Van Inwagen, 1983, 1989). One could thus speculate that contrary to what most philosophers claim laypeople consider liberty of indifference a variant of free will worth wanting.

Author contributions

RD, MP and JDH developed the study concept. Data collection was performed by RD. RD performed the data analysis and interpretation under the supervision of JDH and MP. RD and JDH drafted the manuscript, MP provided critical revisions. All authors approved the final version of the manuscript for submission.

Declaration of conflicting interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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References

Bargh, J. A. (2008). Free will is un-natural. In J. Baer, J. C. Kaufman, & R. F. Baumeister (Eds.), *Are we free?: Psychology and free will* (pp. 128–154). Oxford University Press.
Bargh, J. A., & Chartrand, T. L. (1999). The unbearable automaticity of being. *American Psychologist, 54*(7), 462–479.
Bargh, J. A. (2006). Bypassing the will: Toward demystifying the nonconscious control of social behavior. In R. R. Hassin, J. S. Uleman, & J. A. Bargh (Eds.), *The new unconscious* (pp. 37–58). Oxford: Oxford University Press.
Batthyany, A. (2009). Mental causation and free will after Libet and Soon: Reclaiming conscious agency. In A. Batthyany & A. Elitzur (Eds.), *Irreducibly conscious. Selected papers on consciousness*. Heidelberg: Universitats-Verlag Winter.
Bayne, T. (2011). Libet and the case for free will scepticism. In R. Swinburne (Ed.), *Free will and modern science*. Oxford, New York: Oxford University Press.
Brand, M. (1984). *Intending and acting: Toward a naturalized theory of action*. Cambridge, Mass: MIT Press.
Bratman, M. E. (1987). *Intention, plans, and practical reason*. Cambridge, Mass: Harvard University Press.
Breitmeyer, B. G. (1985). Problems with the psychophysics of intention. *Behavioral and Brain Sciences, 8*(4), 539–540.
Cappelen, H. (2012). *Philosophy without intuitions*. Oxford: Oxford University Press.
Cummins, R. C. (1998). Reflection on reflective equilibrium. In M. DePaul & W. Ramsey (Eds.), *Rethinking intuition* (pp. 113–128). Lanham, Md: Rowman & Littlefield.
Dennett, D. C. (1984). *Elbow room: The varieties of free will worth wanting*. Cambridge, Mass: MIT Press.
Deutsch, M. (2009). Experimental philosophy and the theory of reference. *Mind & Language, 24*(4), 445–466.
Deutsch, M. (2010). Intuitions, counter-examples, and experimental philosophy. *Review of Philosophy and Psychology, 1*(3), 447–460.
Field, A. P. (2009). *Discovering statistics using SPSS: (And sex and drugs and rock "n" roll)*. Los Angeles, London: SAGE Publications.
Fischer, J. M. (1994). *The metaphysics of free will: An essay on control*. Oxford: Blackwell.
Fischer, J. M., & Ravizza, M. (1998). *Responsibility and control a theory of moral responsibility*. Cambridge: Cambridge University Press.
Flanagan, O. (1995). *Consciousness reconsidered*. Cambridge, Mass.: MIT Press.
Haggard, P. (2008). Human volition: Towards a neuroscience of will. *Nature Reviews Neuroscience, 9*(12), 934–946.
Haggard, P., & Eimer, M. (1999). On the relation between brain potentials and the awareness of voluntary movements. *Experimental Brain Research, 126*, 128–133.
Haggard, P. (2011). Does brain science change our view of free will? In R. Swinburne (Ed.), *Free will and modern science*. Oxford New York: Oxford University Press.
Harris, S. (2012). *Free will*. New York: Free Press.
Kane, R. (1996). *The significance of free will*. New York: Oxford University Press.
Kane, R. (1999). Responsibility, luck, and chance: Reflections on free will and indeterminism. *The Journal of Philosophy, 96*(5), 217–240.
Kane, R. (2005). *A contemporary introduction to free will*. Oxford New York: Oxford University Press.
Kauppinen, A. (2007). The rise and fall of experimental philosophy. *Philosophical Explorations, 10*, 95–118.
Keller, I., & Heckhausen, H. (1990). Readiness potentials preceding spontaneous motor acts: Voluntary vs. involuntary control. *Electroencephalography and Clinical Neurophysiology, 76*(4), 351–361.
Knobe, J. (2007). Experimental philosophy. *Philosophy Compass, 2*, 81–92.
Knobe, J., Buckwalter, W., Robbins, P., Sarkissian, H., Sommers, T., & Nichols, S. (2012). Experimental Philosophy. *Annual Review of Psychology, 63*(50), 72–73.
Knobe, J., & Nichols, S. (2008). An experimental philosophy manifesto. In J. Knobe & S. Nichols (Eds.), *Experimental philosophy*. Oxford New York: Oxford University Press.
Lau, H. C. (2004). Attention to intention. *Science, 303*(5661), 1208–1210.
Levin, J. (2015). Libet, free will, and conscious awareness. *Details Journal of Cognition and Neuroethics, 3*(1), 265–280.
Libet, B. (1985). Unconscious cerebral initiative and the role of conscious will in voluntary action. *Behavioral and Brain Sciences, 8*(4), 529–566.
Libet, B., Gleason, C. A., Wright, E. W., & Pearl, D. K. (1983). Time of conscious intention to act in relation to onset of cerebral activity (Readiness Potential). *Brain, 106*(3), 623–642.
Marcel, A. (2003). The sense of agency: Awareness and ownership of actions and intentions. In N. Eilan & J. Roessler (Eds.), *Agency and self awareness* (pp. 48–83). Oxford New York: Oxford University Press.
Matsuhashi, M., & Hallett, M. (2008). The timing of the conscious intention to move. *European Journal of Neuroscience, 28*(11), 2344–2351.
Mecacci, G., & Haselager, P. (2015). A reason to be free. *Neuroethics, 8*(3), 327–334.
Mele, A. R. (1992). *Springs of action: Understanding intentional behavior*. Oxford New York: Oxford University Press.
Mele, A. R. (2006). *Free will and luck*. Oxford New York: Oxford University Press.
Mele, A. R. (2009). *Effective intentions*. Oxford New York: Oxford University Press.
Mele, A. R. (2001). Acting intentionally: Probing folk notions. In B. Malle, L. J. Moses, & D. Baldwin (Eds.), *Intentions and intentionality: Foundations of social cognition* (pp. 27–43). Cambridge, Mass.: MIT Press.
Monroe, A. E., & Malle, B. (2010). From uncaused will to conscious choice: The need to study, not speculate about people's folk concept of free will. *Philosophical Psychology, 1*(2), 211–224.
Monroe, A. E., & Malle, B. F. (2015). Free will without metaphysics. In A. R. Mele (Ed.), *Surrounding free will* (pp. 25–48). Oxford New York: Oxford University Press.
Nadelhofer, T., & Nahmias, E. (2007). The past and future of experimental philosophy. *Philosophical Explorations, 10*(2), 123–149.
Nahmias, E. (2005). Agency, authorship, and illusion. *Consciousness and Cognition, 14*(4), 771–785.
Nahmias, E., Coates, D. J., & Kvaran, T. (2007). Free will, moral responsibility, and mechanism: Experiments on folk intuitions. *Midwest Studies in Philosophy, 31*(1), 214–242.
Nahmias, E., Morris, S. G., Nadelhoffer, T., & Turner, J. (2006). Is incompatibilism intuitive? *Philosophy and Phenomenological Research, 73*(1), 28–53.
Nahmias, E., Stephen, M., Thomas, N., & Turner, J. (2005). Surveying freedom: Folk intuitions about free will and moral responsibility. *Philosophical Psychology, 18*(5), 561–584.

Newell, B. R., & Shanks, D. R. (2014). Unconscious influences on decision making: A critical review. *Behavioral and Brain Sciences, 37*(1), 1–19.
O'Connor, T. (2009). Conscious willing and the emerging sciences of brain and behavior. In N. Murphy, G. R. Ellis, & T. O'Connor (Eds.), *Downward causation and the neurobiology of free will* (pp. 173–186). Berlin, Heidelberg: Springer.
Pacherie, E. (2008). The phenomenology of action: A conceptual framework. *Cognition, 107*(1), 179–217.
Pacherie, E., & Haggard, P. (2010). What are intentions? In L. Nadel & W. Sinnott-Armstrong (Eds.), *Conscious will and responsibility. A tribute to benjamin libet* (pp. 70–84). Oxford New York: Oxford University Press.
Pauen, M. (2008). Self-determination. Free will, responsibility, and determinism. *Synthesis Philosophica, 22*(2), 455–475.
Pauen, M. (2009). Human self-understanding, neuroscience, and free will: A revolution ahead? In F. J. Rubla (Ed.), *The brain: Recent advances in neuroscience* (pp. 51–66). Madrid: Complutense.
Pink, T. (2004). *Free will: A very short introduction*. Oxford New York: Oxford University Press.
Pockett, S. (2007). The concept of free will: Philosophy, neuroscience and the law. *Behavioral Sciences & the Law, 25*(2), 281–293.
Roskies, A. L. (2011). Why Libets studies don't pose a threat. In W. Sinnott-Armstrong & L. Nadel (Eds.), *Conscious will and responsibility* (pp. 11–22). Oxford New York: Oxford University Press.
Schlosser, M. E. (2012a). Causally efficacious intentions and the sense of agency: In defense of real mental causation. *Journal of Theoretical and Philosophical Psychology, 32*(3), 135–160.
Schlosser, M. E. (2012b). Free will and the unconscious precursors of choice. *Philosophical Psychology, 25*(3), 365–384.
Schlosser, M. E. (2014). The neuroscientific study of free will: A diagnosis of the controversy. *Synthese, 191*(2), 245–262.
Schlosser, M. E. (2015). The neuroscience of agency and free will. In C. W. Gruber, M. G. Clark, S. H. Klempe, & J. Valsiner (Eds.), *Constraints of agency* (pp. 113–124). New York, NY: Springer.
Schüür, F., & Haggard, P. (2011). What are self-generated actions? *Consciousness and Cognition, 20*(4), 1697–1704.
Searle, J. R. (1983). *Intentionality: An essay in the philosophy of mind*. Cambridge, Cambridgeshire, New York: Cambridge University Press.
Shepherd, J. (2012). Free will and consciousness: Experimental studies. *Consciousness and Cognition, 21*(2), 915–927.
Sinnott-Armstrong, W. (2011). Lessons from Libet. In W. Sinnott-Armstrong & L. Nadel (Eds.), *Conscious will and responsibility: A tribute to Benjamin Libet* (pp. 235–248). Oxford New York: Oxford University Press.
Smilansky, S. (2003). Compatibilism: The argument from shallowness. *Philosophical Studies, 115*(3), 257–282.
Sommers, T. (2010). Experimental philosophy and free will. *Philosophy Compass, 5*(2), 199–212.
Soon, C. S., Brass, M., Heinze, H.-J., & Haynes, J.-D. (2008). Unconscious determinants of free decisions in the human brain. *Nature Neuroscience, 11*(5), 543–545.
Soon, C. S., He, A. H., Bode, S., & Haynes, J.-D. (2013). Predicting free choices for abstract intentions. *Proceedings of the National Academy of Sciences, 110*(15), 6217–6222.
Stillman, T. F. (2011). Free will in everyday life: Autobiographical accounts of free and unfree actions. *Philosophical Psychology, 24*(3), 381–394.
Trevena, J. A., & Miller, J. (2002). Cortical movement preparation before and after a conscious decision to move. *Consciousness and Cognition, 11*(2), 162–190.
Ullmann-Margalit, E. (2006). Big decisions: Opting, converting, drifting. *Royal Institute of Philosophy Supplement, 58*, 157–172.
Ullmann-Margalit, E. (2007). Difficult choices: To agonize or not to agonize? *Social Research: An International Quarterly, 74*(1), 51–78.
Ullmann-Margalit, E., & Morgenbesser, S. (1977). Picking and choosing. *Social Research, 44*(4), 757–785.
Van Inwagen, P. (1983). *An essay on free will*. Oxford: Clarendon Press.
Van Inwagen, P. (1989). When is the will free? *Philosophical Perspectives, 3*, 399–422.
Wegner, D. (2002). *The illusion of conscious will*. Cambridge London: Bradford Books MIT Press.
Weinberg, J. M., Nichols, S., & Stich, S. P. (2001). Normativity and epistemic intuitions. In *Experimental philosophy* (pp. 17–45). Oxford New York: Oxford University Press.
Williamson, T. (2007). *The philosophy of philosophy*. Oxford: Blackwell Publishing.
Zhu, J. (2003). Reclaiming volition: An alternative interpretation of Libet's experiment. *Journal of Consciousness Studies, 10*(11), 61–77.