



# Overstepping the boundaries of free choice: Folk beliefs on free will and determinism in real world contexts



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## ABSTRACT

We know little about the commonality of folk beliefs around applications of psychological research on the unconscious control of behaviours. To address this, in Experiment 1 (N = 399) participants volunteered examples of where research on the unconscious has been applied to influence their behaviours. A subset of these were presented in Experiment 2 (N = 198) and Experiment 3 (N = 100). Participants rated the extent to which the behaviour being influenced in these contexts was: (1) via the unconscious, (2) free, (3) the result of prior conscious intentions, (4) under conscious control. Relative to judgements about the extent to which behaviour was influenced via the unconscious, the remaining judgements regarding conscious control of behaviours were either higher (e.g., political contexts) or lower (e.g., therapy). This study is the first to show, using ecologically valid examples, the folk beliefs people share on psychological constructs concerning free will and determinism.

## 1. Introduction

There are numerous ways in which psychologists and neuroscientists have characterised the properties of consciousness (e.g., Gangopadhyay, Madary, & Spicer, 2010; Kihlstrom, 2009; Melnikoff & Bargh, 2018; Newell & Shanks, 2014; Pennartz, 2018; Shea & Frith, 2016). However, in the broadest of terms, consciousness can be conceived of relating to matters regarding awareness (e.g., of ourselves, of our social and physical environment), as well as control (e.g., of perceptual-motor activities, of our social and physical environment) (Osman, 2014). The focus of the present study is to investigate folk beliefs on applications of psychological research on the unconscious control of behaviours.

Do people share similar beliefs regarding the ways in which psychological research on the unconscious has been utilised beyond the academic world (e.g., advertising, government, clinical practice)? Which are the most commonly held beliefs? Moreover, if unconscious control of behaviours is perceived to be used to influence behaviours in the real world, what type of folk beliefs are there regarding the extent to which conscious choice, conscious intentions, and free-will are maintained? To date, there has been no empirical work designed to answer these questions. Therefore, the aim of this study, which includes three experiments, is to empirically answer these questions.

*Folk beliefs on the unconscious and free will.* As mentioned, while there is little work investigating the general views people hold regarding the application of psychological research on the unconscious in daily life, there is work examining people's beliefs on the unconscious, and more often their views on the relationship that this has to free will. For instance, Monroe and Malle (2010) presented people with the question "Please explain in a few lines what you think it means to have free will?", the responses of their

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student population were coded into three categories: (a) decision or choice; (b) following one's desires; and (c) overcoming (internal or external) constraints. The majority of participants volunteered responses falling under the category of 'decision or choice' (65%), with another 33% of responses classified under the option 'following one's desires', and 29% providing responses under the category of overcoming external or internal constraints'. The findings suggest some overall agreement in the belief that making a deliberate choice is a demonstration of having free will.

To further explore this, and to consider the role of determinism which was not a concept explicitly referred to by participants in their first study, [Monroe and Malle \(2010\)](#) followed up their study by presenting participants with the following statement "Neuroscientists claim that free will is a false impression; that all of our behaviour is caused by our neural impulses; and that any feelings of controlling our actions are an illusion." Participants were then asked, "Does this sound believable to you?" and if they disagreed, they were asked to give an argument against the claim. 49% of respondents rejected the claim posed to them, and when it came to rejoinders to the claim, 55% gave responses that referred to having personal choice regardless of the fact that neural impulses may be the underlying basis of behaviour. These, and other findings examining folk beliefs on the unconscious and its association with free will show that the preservation of choice is a strong indicator of conscious behaviour, and a critical indicator of the presence of free will (e.g., [Forstmann & Burgmer, 2018](#); [Malle, 2004](#); [Malle & Knobe, 1997](#); [Stillman, Baumeister, & Mele, 2011](#)). This also supports theoretical and empirical work suggesting the strong association that people make between conscious choice, and their sense of personal agency and control ([Osman, 2010, 2014](#)). Moreover, the findings examining folk beliefs regarding free will and consciousness also tend to suggest that people maintain a more complex view of the relationship between the causal efficacy of their conscious choices, which in turn is used as a proxy for free will ([Osman, 2014](#)).

In other work exploring the association between folk beliefs on the unconscious and free choice, [Shepherd \(2012\)](#) study finds general support for the view that people judge an agent to have acted freely when presented with descriptions in which consciousness plays a central causal role in an agent's behaviour. In addition, when consciousness does not play a central causal role in an agent's behaviour, people tend to judge that the agent did not act freely. Here the evidence suggests that people generally have nuanced beliefs about the central causal relation between consciousness and free choice ([Shepard, 2012](#); [Stillman et al., 2011](#)). In [Stillman et al. \(2011\)](#) study, half of their participants were asked to volunteer examples that refer to experiences in their life in which they took an action they considered to be of their own free will. These were coded along several dimensions that included, positive outcomes, goal-attainment, level of consciousness, moral behaviour, acting against external forces, long-term self-interest and short-term self-interest. The study was able to show that general folk beliefs around acting freely relate to experiences of conscious reflection that occurs prior to an action taking place. It is worth noting that the study had independent researchers classify and rate the examples according to different psychological constructs. However, it did not report details about what the actual contexts were, or asked other participants to assess the volunteered contexts according to their judgments and beliefs, instead; this would provide some insights into general folk beliefs regarding experiences where volition is judged to be commonly present and where it is absent.

Further work by [Deuschländer, Pauen, and Haynes \(2017\)](#) examined the way in which folk beliefs impact the interpretation of daily events in relation to consciousness (in the presence of a free action rather than determined by automatic or habitual processes), intention (the presence or absence of conscious intention prior to the action being performed), and whether or not the action is biologically driven (e.g. drinking because one is thirsty) or self-directed (e.g., picking up a book to read). Participants were presented with 12 different scenarios of simple descriptions of daily actions taken (drinking water, reading a book) in which 3 different dimensions were varied (i.e. consciousness, intentions, biological determined actions), and were asked to rate each scenario on the basis of "How free was the presented action?" (on a scale from 1 = not free to 5 = free) and their confidence in their rating. [Deuschländer et al. \(2017\)](#) found that, a combination of prior intention to act, along with being free to act explained the majority of ratings regarding the extent to which the scenarios demonstrated a free action.

The reviewed work on folk beliefs reveals a close relationship between consciousness and deliberation taking place prior to acting, particularly when early intentions are formed prior to what is judged by people to be a free choice. Furthermore, this work suggests that making conscious decisions is directly related to beliefs about free choice, and that by extension in the absence of making deliberate choices, people believe that they are less free ([Vonasch, Baumeister, & Mele, 2018](#)). However, much of the work in the domain of examining folk beliefs tends to involve participants responding to constructed realistic scenarios ([Deuschländer et al., 2017](#); [Feltz, 2015](#); [Forstmann & Burgmer, 2018](#); [Malle & Knobe, 1997](#); [Shepherd, 2012](#)), but few are actually drawn from the participants' own experiences ([Monroe & Malle, 2010](#); [Stillman et al. \(2011\)](#)). Therefore, the present study is motivated to further explore people's lay beliefs on free will and determinism, by using ecologically valid examples volunteered from the participants themselves.

Thus, to establish the generalisability of the pattern findings and to examine the range of actual examples participants volunteer, which has also attracted little empirical attention, the present study aims to address both. In particular, the present study examines the degree of convergence of folk psychological beliefs of the unconscious and related constructs across people, when they are presented with natural examples (by which is meant the examples that are freely volunteered based on personal beliefs and experiences). In addition, it is worth noting that, while [Stillman et al. \(2011\)](#) asked people to volunteer examples of instances in which they had no free choice, they and others have yet to investigate the extent to which the relationship between free will, conscious intentions, conscious control and the unconscious are associated when people don't have free choice. This matters to the extent that it is possible to show that the direction of the relationship between these four constructs is sensitive to the context in which people are perceived to be acting freely or not, based on natural examples.

For instance, there is a large body of psychological research that examines the role of the unconscious on behaviour (e.g., priming studies), which has had many applications in the real world (e.g., advertising) (e.g., [Bargh, 2002](#); [Dijksterhuis, Smith, Van Baaren, & Wigboldus, 2005](#); [Martin & Morich, 2011](#); [Yoo, Peña, & Drumwright, 2015](#)). Similarly, there is an amassing literature on the use of

behavioural interventions, such as nudges – decision-support techniques, designed to direct people to make better lifestyle choices for themselves around their health, finances and wellbeing (e.g., Thaler & Sunstein, 2008; Sunstein, 2017). These methods often, though not exclusively, rely on purported indirect methods of persuasion that apparently redirect unconscious processes, such as presenting artwork on stairwells to unconsciously cue people to use the stairs instead of elevators (e.g. (Åvitsland, Solbraa, & Riiser, 2017; Kerr, Eves, & Carroll, 2001; Marshall, Bauman, Patch, Wilson, & Chen, 2002), or the use default options, such as opt-in investment and pension funds that also apparently implicitly redirect attention towards "better" choices (e.g., Benartzi et al., 2017). There has been considerable discussion on whether these methods are ethical assuming that they do change people's behaviour without them being aware of the basis for that change (for review see - Lin, Osman, and Ashcroft, 2017; Osman, Lin, and Ashcroft, 2017). Furthermore, there are debates regarding the extent to which methods of this kind can actually influence people's behaviour unconsciously (Lin et al., 2017). Nevertheless, examples of this kind are often used to suggest that, if information critical to making choices in the real world is presented in a way that people are not conscious of, then they are likely to be making choices that are not under their conscious control, and therefore, not construed as free. However, thus far, there is no empirical work that examines peoples' folk beliefs regarding the applications of psychological research on the unconscious control of behaviours in typical experiences in daily life, and so the aim of this study is to explore this.

*Present study:* Experiment 1 was an exploratory study that presented participants with a single open ended question in which participants were asked to describe a typical context in which they thought that psychological research on the unconscious had been used to manipulate people's choices. The most common categories generated from Experiment 1 were used to form a set of naturalist examples in Experiment 2. In Experiment 2 participants rated the examples according to psychological properties that have been previously studied in the context of folk beliefs on conscious choice and free will (Deutschländer et al., 2017; Malle, 2004; Malle & Knobe, 1997; Stillman et al., 2011), and Experiment 3 served as a replication of Experiment 2.

## 2. Experiment 1: Exploratory study

### 2.1. Methods

*Design:* Experiment 1 was an exploratory study with a single independent variable, which was the country in which the samples were randomly drawn. There were four countries in total, each of which were English speaking (i.e. Australia, Canada, UK, US). There were two sets of dependent variables, the first set was four demographic questions (i.e. Age, Gender, Education level, Political affiliation) and second was the main experimental question which was to volunteer a typical example of a context in which the participant thought psychological research on the unconscious had been used to influence behaviour.

*Participants:* Experiment 1 included a total of 399 participants, US (Total  $N = 99$ ), UK samples (Total  $N = 100$ ), Canadian (Total  $N = 104$ ), and Australian (Total  $N = 96$ ), (see Table 1). The experiment was presented via Qualtrics which is an online platform for running experiments, and launched via Prolific Academic - a crowd sourcing system for participant recruitment worldwide. All participants were financially compensated for their time (60 cents). The experiment gained ethics approval from Queen Mary University of London (QMUL) college ethics board, QMERC2018/54. Participants were first given 1 probative question regarding the influence of the unconscious on organisation and presented with 4 demographic questions (the responses to which are summarised in Table 1).

*Procedure:* After consenting to take part in the experiment, all participants were provided with general instructions regarding the nature of the study "..., in psychology the unconscious is taken to mean many things. The simplest description is that the unconscious is a type of process that influences what we do (thoughts, feelings, behaviours, attitudes, beliefs, judgments) in some way without us being consciously aware of HOW it influences what we do. That is, there is something that is guiding what we are doing at the back of our minds, but we can't easily explain what it is, and how it might be doing that. In the space provided below, all you need to do is describe a TYPICAL context, it could be any context, in which you tend to think that psychological research on the unconscious has been used in some way to manipulate behaviour. This question is left deliberately open so that you can answer in whichever way you think captures a typical experience in which you think the unconscious was influenced in some way that would in turn have changed your behaviour. There is no right or wrong answer, and the answers that you will provide will be extremely informative." Participants were provided a text box to enter their answers as an open ended response to the question. Once participants had responded to this main question, they were presented with 4 demographic questions that asked about their age, gender, education level, and political affiliation, after which the experiment was complete. Participants were asked to fill in a text box to indicate their age, they were asked to select from four response options (female, male, other, prefer not to say) when indicating their gender, and for educational level they were required to fill in a text box to indicate their highest level of education, and to do the same to indicate their political affiliation.

*Coding of open ended responses:* The full response set of all open ended responses can be found on in the supplementary materials. The method of coding the responses was as follows. After reading through all the responses, three independent coders generated categories that they identified as the most common from the entire set of 399 responses. The categories generated by each of the three coders is presented in Table 2. As can be seen from Table 2, many of the categories that were generated were similar, though the coders varied in the number of categories that they generated, (Coder 1 = 9, Coder 2 = 11, Coder 3 = 11).

From the categories generated, the coders were presented with each other's list, and when asked to generate a complete set of categories that took into account the other identified categories, a consensus was reached on the final set of 5 categories: **Marketing** (inclusive of sales, advertising, marketing), **Research** (inclusive of psychology, medical research, and other health related sciences that were referred to), **Therapy** (inclusive of hypnotherapy, clinical psychology), **Political** (inclusive of political campaigns,

**Table 1**  
Participants profile from Experiment 1.

Sample	US	UK	Canada	Australia
Total participants	N = 99 (all US residents, US nationals, first language English)	N = 100 (all UK residents, UK nationals, first language English)	N = 104 (all Canadian residents, Canadian nationals, first language English)	N = 96 (all Australian residents, Australian nationals, first language English)
Females	29 (29%)	66 (66%)	32 (31%)	36 (37.5%)
Males	70 (71%)	32 (32%)	71 (68%)	59 (61.5%)
Prefer not to say	0	2 (2%)	1 (1%)	1 (1%)
Age	Mean 30.54 (SD = 10.88) ranging from 18 to 68	Mean 33.32 (SD = 11.13) ranging from 19 to 80	Mean 29.49 (SD = 9.30) ranging from 18 to 61	Mean 29.53 (SD = 11.12) ranging from 18 to 67
Educational background	52.1% qualified with a degree (at bachelor degree and postgraduate level), 47.9% responded with Prefer not to say/other.	47.5% qualified with a degree (at bachelor degree and postgraduate level), 52.5% responded with Prefer not to say/other.	59.8% qualified with a degree (at bachelor degree and postgraduate level) 40.2% responded with Prefer not to say/other.	60.4% qualified with a degree (at bachelor degree and postgraduate level), 39.6 % responded with Prefer not to say/other.
Political affiliation	14.9% as conservative, and 4.3% as prefer not to say/unsure/other	49.5% identifying as liberal, 23.2% as centre, 13.2% as conservative, and 14.1% as prefer not to say/unsure/other	55.9% identifying as liberal, 20.6% as centre, 9.8% as conservative, and 13.7% as prefer not to say/unsure/other	54.2% identifying as liberal, 12.5% as centre, 11.5% as conservative, and 21.9 as prefer not to say/unsure/other

**Table 2**

Categories generated by each of the three coders.

Categories	Coder 1	Coder 2	Coder 3
1	Advertising	Advertising	Advertising
2	Marketing	Consumer choices/Marketing	Sales/Retail
3	Research	Scientific studies	Shopping
4	Therapy	Psychology	Psychological research
5	Hypnosis	Hypnosis	Casinos
6	Social Media	Hypnotherapy	Psychotherapy
7	Media (TV, FILM)	Clinical	Hypnosis
8	Political	Social Media	Hypnotherapy
9	Voting	Government	Media
10		Nudging	Elections
11		Police	Religion

**Table 3**

The proportion of responses in which there was disagreement between at least two coders.

Category	Disagreement across all three coders
Marketing	10.5%
Research	16.6%
Therapy	23.5%
Media	26%
Political	0%
Other	19.2
No	0%
Don't know	0%

government, Nudge<sup>1</sup>), **Media** (inclusive of social media, TV, films). The same three independent coders were then required to apply the 5 agreed categories to the complete set of 399 responses. While coding the complete set three additional categories were generated (**Don't know**, **None**, **Other**): these accounted for responses in which the respondent had answered "Don't know", responses in which respondents had answered that there were no applications of psychological research that influence behaviour in any context – 'None', and finally responses that included contexts (e.g., dating, casinos, walking around parks, police tactics) which were infrequently referred to and did not directly fit into the 5 main categories identified by the coders – 'Other'.

## 2.2. Results

**Inter-rater reliability:** In order to establish inter-rater reliability several tests were implemented. First a correlational analysis was conducted. A Pearson's correlation coefficient was applied to the ratings of Coder 1 and Coder 2 revealing,  $r^2(399) = 0.928$  (high correlation),  $p = .000006$ , Coder 1 and Coder 3 revealing,  $r^2(399) = 0.896$  (high correlation),  $p = .00003$ , and Coder 2 and Coder 3 revealing,  $r^2(399) = 0.823$  (high correlation),  $p = .00002$ . Each analysis suggested a high correlation between ratings between each coder. Second, the proportion of disagreement between at least 2 coders for each of the 8 categories was coded and examined (See Table 3). There were no categories in which responses were coded entirely differently by each coder, therefore, the final responses set was based on responses that were classified according to the agreement of at least two coders, and of course by all three coders. The raw frequencies were entered into a chi-squared analysis to determine if there were any differences in agreement/disagreement (coded as 1 = agreement, 2 disagreement). The analysis revealed that there was no overall significant difference in the amount based on coding of the responses to the full 8 categories, Chi-squared (7) = 11.69,  $N = 399$ ,  $p = .11$ , though it should be noted that there was an expected count of less than 5 for some of the categories. On this basis, a second analysis was conducted omitting the three categories in which there were 0 disagreement (See Table 3). An analysis was performed looking at the overall level of agreement in coded responses to disagreement, Chi-squared (1) = 177.31,  $N = 361$ ,  $p = .0001$ , the analysis revealed that there was significantly more agreement in the way responses were coded than disagreement. Based on these analyses, the remainder of the results section is focused on the responses coded with the most agreement between coders.

**Responses by Country:** The proportion of responses that fell into each category for each country are presented in Table 4. The raw frequencies were entered into a chi-squared analysis to determine if there were any differences in the pattern of responses by country. The analysis revealed that there was no significant difference between countries based on their responses to the categories, Chi-

<sup>1</sup> Nudge refers to a programme of regulatory tools that governments currently use based on behavioural insights to develop soft interventions designed to shape the way people make decisions (e.g., the use of defaults such as Opt-Out organ donation registers that default people into donating, and if they do not wish to donate, they can opt-out (for details see Lin, Osman, Harris, & Read, 2018)).

**Table 4**

The proportion of responses by country and gender.

Category	Overall	US	UK	Canada	Australia	Female (N = 163)	Male (N = 232)	Prefer not to say (N = 4)
Marketing	45.1	42.4	44	43.3	51	44.2	45.7	50
Research	18.0	20.2	10	21.2	20.8	17.2	19.0	
Therapy	4.3	6.1	6	1.9	3.1	4.9	3.9	
Media	4.8	2.0	9	3.8	4.2	6.1	3.9	
Political	6.3	7.1	6	5.8	6.3	7.4	5.6	
Other	18.3	20.2	19	22.1	11.5	17.2	18.5	50
No	1.3	0	3	0	0	1.8	0.9	
Don't know	2.0	2	3	1.9	3.1	1.2	2.6	

squared (21) = 26.65,  $N = 399$ ,  $p = .18$ .

*Responses by Gender:* Collapsed across country, these analyses looked at whether there were gender differences by responses. For ease of analysis only responses of those identifying themselves as male or female were included. The analysis revealed that there was no significant difference between genders based on their responses to the categories, Chi-squared (7) = 3.62,  $N = 395$ ,  $p = .82$ . *Responses by Age:* Collapsed across country, these analyses looked at whether there were age differences by responses. To conduct this analysis respondents were categorised into two age groups based on a media split of age (median = 28) (18–28, 29–80). The analysis revealed that there was no significant difference in responses to the categories based on age, Chi-squared (7) = 7.27,  $N = 399$ ,  $p = .40$ . *Responses by political affiliation:* Collapsed across country, these analyses looked at the impact of political affiliation on responses. Then responses were re-classified according to participants' self-identification of political affiliation into three categories into Liberal, Centre, and Conservative; responses reported as 'unsure' were excluded. The analysis revealed that there was no significant difference in responses to the categories based on political affiliation, Chi-squared (7) = 17.09,  $N = 345$ ,  $p = .25$ . *Responses by education level:* Collapsed across country, these analyses looked at the impact of education level on responses. Participants responses were re-classified according to those that had a Bachelor's degree or higher level of classification and those without obtaining a higher education degree. The analysis revealed that there was no significant difference in responses to the categories by educational level, Chi-squared (7) = 5.19,  $N = 399$ ,  $p = .63$ .

*Response by Category:* Given that there were no differences by country, responses were collapsed across country to look at whether the responses differed by category. All 8 categories were included in the analysis. The analysis revealed that there was a significant difference in the frequencies of examples volunteered by category, Chi-squared (7) = 488.76,  $N = 399$ ,  $p = .00002$ . Looking at Table 4, across all participants, the most common examples volunteered were under the category Marketing, which accounted for approximately 45% of the examples, with the next most common examples associated with the Research category which accounted for approximately 18% of the examples, and Other, which also accounted for 18% of the examples. *Responses under the Marketing category:* Given that Marketing made up close to half of the examples that participants volunteered, these were further analysed by country, age, gender, education and political affiliation. A chi-squared analysis did not reveal any difference in the number of respondents volunteering examples by country, Chi-squared (3) = 0.57,  $N = 180$ ,  $p = .90$ . When conducting binomial tests on gender, significantly more men ( $N = 106$ ) than women ( $N = 72$ ) volunteered examples that fell under this category ( $p = .01$ ). The same test was performed on age, and no significant difference was found by age (using the median split) (18–28,  $N = 90$ ; 29–80,  $N = 90$ ), and no significant difference by level of education (Bachelors and above = 90, Other = 90). A chi-squared analysis revealed a difference in the number of respondents by political affiliation (including only categories Liberal = 91, Centre = 44, Conservative = 16), Chi-squared (2) = 57.07,  $N = 151$ ,  $p = .0001$ . For those referring to advertising ( $n = 106$ ) as an example which fell under the category of Marketing, 45% referred to the term subliminal or associated terms involving reference to manipulation of the perceptions in the absence of peoples' awareness.

### 2.3. Experiment 1 discussion

Experiment 1 revealed that generally demographical and sample factors didn't play a major role overall in the types of examples generated by participants, though gender and political affiliation played a role for a sub-category (i.e. marketing) of examples that were generated. More specifically, participants with a liberal leaning political affiliation were more likely to generate responses in the marketing category compared to those with a centre, or more conservative leaning political affiliation. Also, more men than women generated examples that fell into this category. Without any *a priori* hypotheses, it is difficult to speculate on why these particular demographic factors generated differences in the frequency of examples in this category.

In sum, in answer to the first question posed in this study, the findings from Experiment 1 indicate that, with exception of one subcategory, there is general convergence across samples from different countries as to the examples they volunteer when it comes to thinking about common applications of psychological research on the unconscious control of behaviours. Also, in answer to the second question posed in this study, it appears that marketing is the category to which the most frequent examples belong. In order to answer the third question posed in this study, which is the extent to which people judge they have free will in category of examples volunteered by participants, Experiment 2 was designed around the ecologically valid materials from Experiment 1.

**Table 5**  
Participants profile from Experiment 2 and 3.

Sample	Experiment 2				Experiment 3	
	US	UK	Canada	Australia	UK	UK
Total participants	N = 48 (all US residents, US nationals, first language English)	N = 52 (all UK residents, UK nationals, first language English)	N = 49 (all Canadian residents, Canadian nationals, first language English)	N = 49 (all Australian residents, Australian nationals, first language English)	N = 100 (all UK residents, UK nationals, first language English)	
Females	24 (50%)	35 (67%)	21 (43%)	21 (43%)	69 (69%)	
Males	22 (46%)	17 (33%)	28 (57%)	28 (57%)	31 (31%)	
Prefer not to say	2 (4%)	0	0	0	0	
Age	Mean 31.81 (SD = 10.02) ranging from 18 to 59	Mean 33.03 (SD = 9.12) ranging from 18 to 61	Mean 30.65 (SD = 98.45) ranging from 18 to 56	Mean 28.50 (SD = 7.54) ranging from 18 to 50	Mean 36.28 (SD = 12.19) ranging from 19 to 66	
Educational background	33.3% qualified with a degree (at bachelor degree and postgraduate level), 47.9% college level, 18.8% prefer not to say/other	44.2% qualified with a degree (at bachelor degree and postgraduate level), 40.4% college level, 8% prefer not to say/other	63.3% qualified with a degree (at bachelor degree and postgraduate level), 22.4% college level, 14.3% prefer not to say/other	67.3% qualified with a degree (at bachelor degree and postgraduate level), 18.4% college level, 14.3% prefer not to say/other	58% qualified with a degree (at bachelor degree and postgraduate level), 29% college level, 13% prefer not to say/other	
Political affiliation	37.5% identifying as liberal, 31.3% as centre, 14.6% as conservative, and 16.7% as prefer not to say/unsure/other	30.8% identifying as liberal, 17.3% as centre, 7.7% as conservative, and 44.2% as prefer not to say/unsure/other	34.7% identifying as liberal, 16.3% as centre, 8.2% as conservative, and 40.8% as prefer not to say/unsure/other	38.8% identifying as liberal, 14.3% as centre, 6.1% as conservative, and 40.8% as prefer not to say/unsure/other	40% identifying as liberal, 0% as centre, 9% as conservative, and 51% as prefer not to say/unsure/other	
Religiosity	47.9% identifying as having a religion, 35.4% identifying as having no religion, 16.7% prefer not to say/other	55.8% identifying as having a religion, 19.2% identifying as having no religion, 25% prefer not to say/other	49% identifying as having a religion, 34.7% identifying as having no religion, 16.3% prefer not to say/other	46.9% identifying as having a religion, 38.8% identifying as having no religion, 14.3% prefer not to say/other	45% identifying as having a religion, 36% identifying as having no religion, 19% prefer not to say/other	

### 3. Experiment 2: Ratings tasks probing folk beliefs

The aim of Experiment 2 was to further explore folk beliefs on the applications of psychological research on the unconscious control of behaviours, and to connect this to prior work examining people's folk psychological beliefs on the unconscious and free will. Previous studies have shown that people's folk beliefs on the unconscious are closely connected to free will, conscious intentions, and conscious control (Deutschländer et al., 2017; Malle, 2004; Malle & Knobe, 1997; Stillman et al., 2011). Therefore, to build on this work, the aim of Experiment 2 was to determine, based on an entirely natural set of materials, if, in the presented examples, the direction of judgments would be as follows: The higher the ratings of unconscious influence the lower the ratings of free will, conscious intentions, and conscious control.

#### 3.1. Methods

**Participants:** The experiment included a total of 198 participants, US (Total  $N = 48$ ), UK samples (Total  $N = 52$ ), Canadian (Total  $N = 49$ ), and Australian (Total  $N = 49$ ), (see Table 2). The experiment was presented via Qualtrics using the same crowd sourcing system as Experiment 1. All participants were financially compensated for their time (90 cents). Participants were presented with 5 demographic questions (the responses to which are summarised in Table 5), and 4 ratings for each of the 16 examples drawn from volunteered contexts by participants in Experiment 1.

**Design:** Experiment 2 also had a single independent variable, which was the country in which the samples were randomly drawn from. These were the same four countries as in Experiment 1 (i.e. UK, Canada, US, Australia). There were two sets of dependent variables, the first was five demographic questions (i.e. Age, Gender, Education level, Political affiliation, Religiosity) and the second set was the four ratings for each of the 16 examples drawn from those generated in Experiment 1. The presentation of each example was randomised for each participant, along with the ordering of each of the four rating questions presented for each example.

**Materials:** The criteria for generating the examples used in Experiment 2 were the following: (1) the examples were drawn exclusively from the 5 main categories revealed in Experiment 1, (2) the examples were more than 10 words long, and less than 50 words long; (3) they identified a single context in which the unconscious was thought to influence behaviour; (4) there was no overt or highly personalised opinions about whether or not the application of psychological research on the unconscious in the context described was good or bad; (5) there were no personalised references to subjective experiences of the application of psychological research on the unconscious in contexts that they had felt had influenced their behaviour; (6) there were no explicit references to named brands, companies, firms; (7) there were no explicit references to technical terminology (e.g., nudge, implicit attitude tests, automatic association). Following the application of these 7 criteria to the 384 examples from Experiment 1 (excluding, NO and Don't know responses), a total of 96 met the criteria, from which 16 were selected (see Table 6).

To get to the final agreed 16 examples, the following additional criteria to the 96 screened examples were applied: (1) the examples has to be simple and easy to understand; (2) the details has to be specific enough to identify the context and the targeted behaviour, (3) the descriptions had to be neutral.

The four main dependent measures used to assess judgments of the 16 examples were as follows, each of with a response scale ranging from 0 = not at all to 10 = completely. Rating of the Unconscious: *To what extent do you think that [reference to method of influence] influences [reference to behaviour] unconsciously?* Ratings of Free Will: *To what extent do you think that [reference to the behaviour] under the influence [reference to method of influence] is the result of free choice?* Ratings of Conscious intentions: *To what extent do you think that [reference to the behaviour] under the influence [reference to method of influence] is the result of conscious intentions formed before [reference to behaviour]?* Ratings of Conscious Control: *To what extent do you think that [reference to the behaviour] under the influence [reference to method of influence] is under conscious control?*

**Procedure:** Participants were given instructions regarding the fact that they would have 16 examples to think about and for each example, they were required to make a rating on four different dimensions (Ratings of the Unconscious, Ratings of Free Will, Ratings of Conscious intentions, Ratings of Conscious Control), and that when they had completed all four ratings for each of the 16 examples, and provided their demographic details (these were presented in the same way as Experiment 1, but for the inclusion of religiosity, for which participants were asked to type in a text box provided if they identified with a particular belief system, otherwise if they preferred not to say, they were simply asked to type an 'X' in the free text box), the experiment would be complete.

#### 3.2. Results

**Comparison by country:** The ratings for each of the four dependent variables (Ratings of the Unconscious, Ratings of Free Will, Ratings of Conscious intentions, Ratings of Conscious Control) were each collapsed across the 16 different scenarios, so that an overall mean rating was calculated for each of the four dependent variables (see Fig. 1). From this, a Univariate analysis of variance was performed on each of the dependent variables to determine the extent to which ratings differed by country. The analyses revealed that for each of the ratings there were no differences by country; Ratings of the Unconscious,  $F(1,194) = 0.26$ ,  $p = .86$ , partial  $\eta^2 = 0.004$ ; Ratings of Free Will  $F(1,194) = 0.58$ ,  $p = .62$ , partial  $\eta^2 = 0.01$ ; Ratings of Conscious Intentions  $F(1,194) = 1.34$ ,  $p = .26$ , partial  $\eta^2 = 0.02$ ; Ratings of Conscious Control,  $F(1,194) = 0.46$ ,  $p = .71$ , partial  $\eta^2 = 0.007$ .

**Relationship between the four ratings:** A one-tailed Pearson's correlation was conducted, to examine the extent to which the following predicted pattern was detected: There should be a negative relationship between ratings of unconscious and the other three ratings (i.e. free will, prior conscious intentions, conscious control). The analyses did not confirm this prediction. Instead, they revealed a positive correlation between ratings of Free Will and ratings of Conscious Intentions  $r^2(198) = 0.43$  (moderate

**Table 6**

Final selection of descriptions generated by participants in Experiment 1, and the modified versions used in Experiment 2.

Domain	Original Description from Exp 1.	Modified Description For Exp 2.
1 Marketing	<p>Advertisement jingles have been researched and implemented with the intention of having people unconsciously think of the product or service when they hear it and want to use that service or buy that product mentioned.</p> <p>Subliminal messaging, such as seeing how the exposure of a product can leave an impression on someone for an extended amount of time, no matter how small the impression.</p> <p>Advertisers utilize psychological research in order to maximize their chance of selling to you, like 'Buy two get one free' sales where the buyer thinks they are getting a great deal.</p> <p>When purchasing things at a supermarket, psychological research has shown eye level is good, and end of row displays are more eye catching, thus manipulating people into purchasing particular things.</p> <p>Dealership or other areas where a sales person or someone is trying to steer a person to making the decision they want, the way certain questions are posed and actions are taken are deliberately taken to steer the person to spend more money and make more for the dealership</p>	<p>Advertisement jingles that are used so that people think of the product or service when they hear the jingle and then buy that service or buy the product.</p> <p>Subliminal adverts (messed flashed so quickly that they are not aware of seeing them) that presents a product so that it stays in people's mind and they then go and buy the product.</p> <p>Advertisers that increase their chance of selling to people when using 'buy two get one free' sales on products so that people think that they are getting a great deal.</p> <p>Supermarkets that present goods at eye level and at the end of row displays so that they are more eye catching to people to influence their purchasing of particular products.</p> <p>Car Dealerships that employ staff to steer people by the way that they pose certain questions so that people spend more money.</p>
Research	<p>In research when showing someone a picture of something before a study so it is in their minds, then having them pick between it and something else during the study.</p> <p>Studies involving people sleeping. When they are asleep they have had messages played to them and they may influence their unconscious mind.</p> <p>Giving them sugar cubes and pretending that they're pills, and the pills having an affect on them due to their mental belief.</p> <p>Flashing a positive or negative stimulus so quickly that the person does not consciously see it before another stimulus will affect that person's attitude towards the second stimulus.</p> <p>Examining implicit bias and how it forms. For instance, causing negative or positive associations towards a neutral stimulus and seeing if it affects people's perception of it.</p>	<p>Research that involves showing people a picture of something before a study so that it is in their minds, in order to study the influences on their choice when asked to select between the same picture and another picture.</p> <p>Research studying people sleeping that involves playing messages to them while they are asleep to examine the influence on their mind.</p> <p>Research that involves giving people sugar cubes posing as pills to study the influence on peoples mental belief that the pills will have an effect on them.</p> <p>Research that flashes up positive or negative information so quickly that people are not aware of seeing it, and then studying how this will effect peoples' attitudes towards the quickly flashed up information.</p> <p>Research that examines biases by creating either positive or negative links with a neural piece of information, and then studying how it effects the way people then perceive the information.</p>
Hypnosis/therapy	<p>Hypnosis techniques work on people while they are unconscious and then it is possible to manipulate their choices more easily while under that state.</p> <p>Hypnosis is one of the ways we can uncover hidden secrets of the unconscious mind and then begin to heal from past traumas.</p>	<p>Hypnotic methods that are used on people while they are in a relaxed state so that it is possible to influence their choices while they are under that state.</p> <p>Hypnotic methods that are used on people to uncover hidden memories so that it is possible to heal them from past traumas.</p>
Political	<p>Research on the unconscious has been used to present political party leaders in a certain way to sway the public's vote choice, such as how they dress and speak.</p> <p>It has been used to target ads to specific groups of people so that they lean towards one political candidate (Manipulating the voters into leaning towards some candidate)</p>	<p>Political campaigning that helps political party leaders to dress and speak in a certain way so that it is possible to influence people's voting choice.</p> <p>Political campaigning that uses political advertisements targeted towards specific groups of people in such a way as to influence them towards one political candidate over another.</p>
Media	<p>Social Media through targeted advertising that can be used to manipulate people's opinions</p> <p>Social media is an example. The experience has been tailored to influence the unconscious minds of users.</p>	<p>Social Media that use advertisements targeted towards specific groups of people in such a way as to influence their opinions.</p> <p>Social Media that is designed in such a way so that the people using the social media experience it in such a way that it influences the way that they think.</p>

correlation), ( $\beta = 0.29$ ),  $p < .00005$ , as well a positive correlation between ratings of Free Will and ratings of Conscious Control  $r^2(198) = 0.45$  (moderate correlation), ( $\beta = 0.31$ ),  $p < .00005$ . Ratings of Conscious Intentions were also positively correlated with ratings of Conscious Control,  $r^2(198) = 0.47$  (moderate correlation), ( $\beta = 0.36$ ),  $p < .00005$ . No other correlational analyses were found to be significant, suggesting that overall, there was no relationship between ratings of the Unconscious and Free will, Conscious Intentions, and Conscious control, but a positive relationship with the remaining three ratings.

*Differences in mean ratings by context:* The mean ratings were calculated separately for each context (e.g., mean rating of the Unconscious for the context 'marketing' were based on averaging across the 5 different examples for that context). Then each dependent variable was subjected to an analysis of variance. When comparing the 5 different contexts (Marketing, Research, Therapy, Political, Media) on ratings of the Unconscious, a repeated ANOVA, with country as the between subject factor, did not reveal a significant main effect of context,  $F(1,194) = 3.15$ ,  $p = .07$ , partial eta = 0.02; no significant main effect of country was found and no interaction effects. The same analysis performed on ratings of Free Will revealed a main effect of context,  $F(1,194) = 9.10$ ,  $p < .005$ , partial eta = 0.05, as was the case with ratings of Conscious Intentions,  $F(1,194) = 22.69$ ,  $p < .0005$ , partial eta = 0.11,

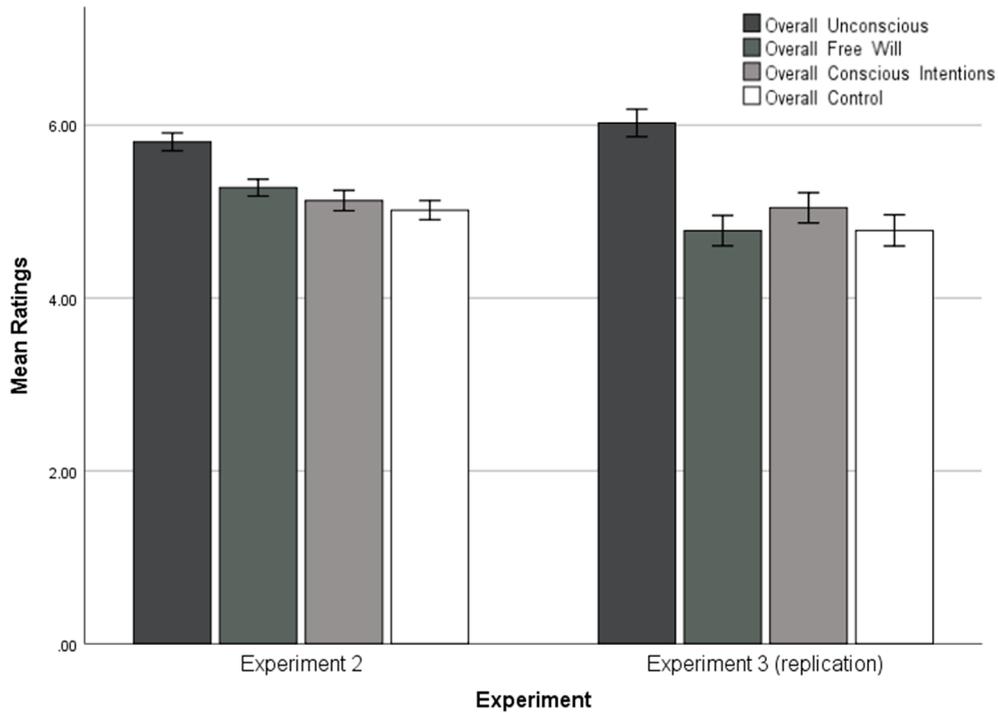


Fig. 1. Mean ratings (SE ± 1) of the Unconscious, Free Will, Conscious Intentions and Conscious Control by Experiment 2 and 3.

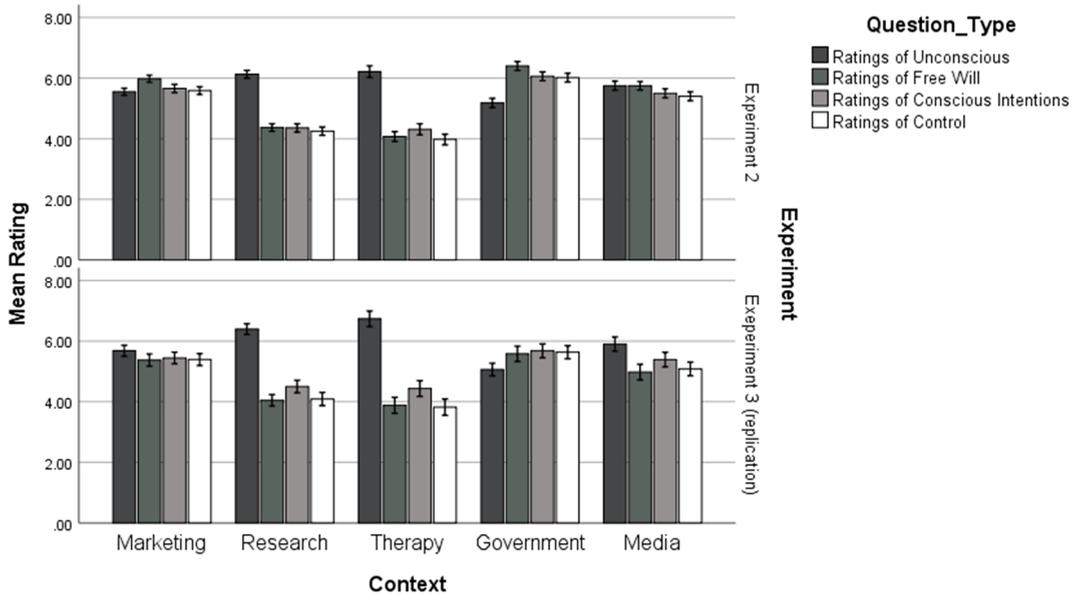


Fig. 2. Mean ratings (SE ± 1) of the Unconscious, Free Will, Conscious Intentions and Conscious Control for each of the 5 contexts presented to participants, by Experiment.

and ratings of Conscious Control,  $F(1,194) = 23.74, p < .0005$ , partial eta = 0.11. In each case, there was no significant main effect of country, and no interaction effects. The indication here is that the context impacted the pattern of ratings of Free Will, Conscious Intentions, and Conscious Control but not on ratings of the Unconscious. To examine these patterns more closely the remaining analysis considers each of the ratings in each context individually.

*Ratings in Marketing Contexts:* The ratings for each of the four dependent variables (Ratings of the Unconscious, Ratings of Free Will, Ratings of Conscious Intentions, Ratings of Conscious Control) were collapsed across the 5 different marketing scenarios and averaged, (See Fig. 2). Paired sample t-tests were conducted. The analyses revealed that when compared against ratings of the Unconscious, ratings of Free Will were significantly higher ( $M = -0.43, SD = 2.36, N = 198, t(197) = 2.55, p = .01, BF = 0.72$ ),

as were ratings of Conscious Control ( $M = 1.30$ ,  $SD = 2.51$ ,  $N = 198$ ),  $t(197) = 7.29$ ,  $p < .00005$ ,  $BF_{10} = 0.18$ ), but no significant difference was found when compared with ratings of Conscious Intentions ( $M = -0.11$ ,  $SD = 2.49$ ,  $N = 198$ ),  $t(197) = 0.61$ ,  $p = .54$ ,  $BF = 14.73$ ). Thus, in the context of marketing, average ratings of the Unconscious were significantly lower than Free Will and Conscious Control.

**Ratings in Research Contexts:** When it came to the overall mean ratings under the context “Research” (see Fig. 2), the analyses revealed that when compared against ratings of the Unconscious, ratings of Free Will were significantly lower ( $M = 1.76$ ,  $SD = 2.71$ ,  $N = 198$ ),  $t(197) = 9.12$ ,  $p < .000005$ ,  $BF_{14} = 1.85$ ), as were ratings of Conscious Intentions ( $M = 1.77$ ,  $SD = 2.68$ ,  $N = 198$ ),  $t(197) = 9.32$ ,  $p < .000005$ ,  $BF_{15} = 5.13$ ), and ratings of Conscious Control ( $M = 1.88$ ,  $SD = 2.72$ ,  $N = 198$ ),  $t(197) = 9.73$ ,  $p < .000005$ ,  $BF_{16} = 3.53$ ). Thus, in the context of research, average ratings of the Unconscious were significantly higher than Free Will, Conscious Intentions and Conscious Control.

**Ratings in Therapy Contexts:** The overall mean ratings for each of the four dependent variables were analysed (see Fig. 2). Comparing against ratings of the Unconscious, ratings of Free Will were significantly lower ( $M = 2.14$ ,  $SD = 3.86$ ,  $N = 198$ ),  $t(197) = 7.82$ ,  $p < .000005$ ,  $BF_{11} = 5.55$ ), as were ratings of Conscious Intentions ( $M = 1.90$ ,  $SD = 4.10$ ,  $N = 198$ ),  $t(197) = 6.54$ ,  $p < .000005$ ,  $BF_8 = 7.60$ ), and ratings of Conscious Control ( $M = 2.24$ ,  $SD = 4.09$ ,  $N = 198$ ),  $t(197) = 7.70$ ,  $p < .00005$ ,  $BF_{10} = 1.12$ ). Thus, in the context of therapy, average ratings of the Unconscious were significantly higher than Free Will, Conscious Intentions and Conscious Control.

**Ratings in Political Contexts:** The mean ratings for each of the four dependent variables across the 2 different political examples were analysed (see Fig. 2). Comparing against ratings of the Unconscious, ratings of Free Will were significantly higher ( $M = -1.22$ ,  $SD = 3.16$ ,  $N = 198$ ),  $t(197) = 5.45$ ,  $p < .00005$ ,  $BF_5 = 0.02$ ), as were ratings of Conscious Intentions ( $M = -0.88$ ,  $SD = 3.12$ ,  $N = 198$ ),  $t(197) = 3.98$ ,  $p < .0005$ ,  $BF = 0.009$ ), and ratings of Conscious Control ( $M = -0.84$ ,  $SD = 3.04$ ,  $N = 198$ ),  $t(197) = 3.86$ ,  $p < .0005$ ,  $BF = 0.01$ ). Thus, in the context of politics, average ratings of the Unconscious were significantly lower than Free Will, Conscious Intentions and Conscious Control.

**Ratings in Media Contexts:** The mean ratings for each of the four dependent variables across the 2 different media scenarios (see Fig. 2), revealed that, when comparing against ratings of the Unconscious, there were no significant differences to ratings of Free Will ( $M = 0.003$ ,  $SD = 3.19$ ,  $N = 198$ ),  $t(197) = 0.01$ ,  $p = .99$ ,  $BF_{17.72}$ ), ratings of Conscious Intentions ( $M = 0.25$ ,  $SD = 3.10$ ,  $N = 198$ ),  $t(197) = 1.15$ ,  $p = .25$ ,  $BF = 9.24$ ), and ratings of Conscious Control ( $M = 0.35$ ,  $SD = 3.13$ ,  $N = 198$ ),  $t(197) = 1.57$ ,  $p = .12$ ,  $BF = 5.27$ ). In the context of the media, average ratings of the Unconscious were not significantly different from Free Will, Conscious Intentions and Conscious Control.

### 3.3. Experiment 2: Discussion

Overall, across all four countries the ratings people gave regarding the involvement of the Unconscious, Free Will, Conscious Intentions and Conscious Control in the 16 examples they were presented were similar. Correlational analyses revealed positive associations between ratings of Free Will, Conscious Intentions and Conscious Control, though ratings of the Unconscious were not associated with the other three ratings. While ratings of the unconscious did not significantly differ by context, looking at the five different contexts (Marketing, Research, Therapy, Politics, Media) individually, for research and therapy the patterns suggested that ratings were higher for the involvement of the unconscious relative to ratings of free will, conscious intentions and conscious control. The opposite pattern was found in marketing and political contexts where ratings of the involvement of the unconscious were lower relative to ratings of free will [marketing, political], conscious intentions [political] and conscious control [marketing, political]. Thus, while ratings of the involvement of the unconscious in behaviour was the same across contexts, ratings of free will, conscious intentions and conscious control did discriminate by context, in which they were either consistently higher (marketing, political), or lower (research, therapy) relative to the ratings of the involvement of the unconscious influences on behaviour.

## 4. Experiment 3: Replication of ratings tasks probing folk beliefs

Given that the materials that were investigated in Experiment 2 were new, the purpose of Experiment 3 was to examine the replicability of the findings reported. In all respects Experiment 3 was identical to Experiment 2, except that the sample tested were all from the UK (see Table 5), and 100 participants were recruited in total to take part.

### 4.1. Results

**Relationship between the four ratings:** Consistent with the findings in Experiment 2, Experiment revealed a positive correlation between ratings of Free Will and ratings of Conscious Intentions  $r^2(100) = 0.48$  (moderate correlation), ( $\beta = 0.31$ ),  $p < .00005$ , as well as a positive correlation between ratings of Free Will and ratings of Conscious Control  $r^2(100) = 0.49$  (moderate correlation), ( $\beta = 0.29$ ),  $p < .00005$ . Ratings of Conscious Intentions were also positively correlated with ratings of Conscious Control,  $r^2(100) = 0.58$  (high), ( $\beta = 0.48$ ),  $p < .000005$ . In addition, in line with the prediction tested in Experiment 2, there were weak negative relationships between ratings of the Unconscious and rating Conscious Control,  $r^2(100) = 0.23$  (low), ( $\beta = -0.27$ ),  $p < .05$ , and with ratings of Free Will,  $r^2(100) = 0.19$  (low), ( $\beta = -0.15$ ),  $p < .05$ .

**Differences in mean ratings by context:** When comparing the 5 different contexts (Marketing, Research, Therapy, Political, Media) on ratings of the Unconscious, a repeated ANOVA revealed a significant main effect of context,  $F(1,99) = 4.03$ ,  $p < .05$ , partial  $\eta^2 = 0.04$ . The same analysis performed on ratings of Free Will revealed a main effect of context,  $F(1,99) = 20.55$ ,  $p < .0000001$ ,

partial eta = 0.17, as was the case with ratings of Conscious Intentions,  $F(1,99) = 13.10$ ,  $p < .000001$ , partial eta = 0.12, and ratings of Conscious Control,  $F(1,99) = 5.11$ ,  $p < .05$ , partial eta = 0.05. To examine these patterns more closely the remaining analysis considers each of the ratings in each context individually.

**Ratings in Marketing Contexts:** The analyses revealed that when compared against ratings of the Unconscious, ratings of Free Will were not significantly different ( $M = 0.31 = 2.95$ ,  $N = 100$ ),  $t(99) = 1.06$ ,  $p = .29$ ,  $BF = 7.3$ ), as were ratings of Conscious Control ( $M = 0.24$ ,  $SD = 2.60$ ,  $N = 100$ ),  $t(99) = 0.94$ ,  $p = .35$ ,  $BF = 8.19$ ), and ratings of Conscious Intentions ( $M = 0.29$ ,  $SD = 3.03$ ,  $N = 100$ ),  $t(99) = 1.00$ ,  $p = .34$ ,  $BF = 7.97$ ). Thus, in the context of marketing, average ratings of the Unconscious were not significantly different from Free Will, Conscious Intentions and Conscious Control.

**Ratings in Research Contexts:** When it came to the overall mean ratings under the context "Research" (see Fig. 2), the analyses revealed that when compared against ratings of the Unconscious, ratings of Free Will were significantly lower ( $M = 2.35$ ,  $SD = 2.90$ ,  $N = 100$ ),  $t(99) = 8.11$ ,  $p < .000005$ ,  $BF_{10} = 1.80$ ), as were ratings of Conscious Intentions ( $M = 1.89$ ,  $SD = 2.94$ ,  $N = 100$ ),  $t(99) = 6.44$ ,  $p < .000005$ ,  $BF_7 = 4.56$ ), and ratings of Conscious Control ( $M = 2.31$ ,  $SD = 3.12$ ,  $N = 100$ ),  $t(99) = 7.40$ ,  $p < .000005$ ,  $BF_9 = 5.33$ ). Overall, consistent with Experiment 2, Experiment 3 revealed that for research, average ratings of the Unconscious were higher than Free Will, Conscious Intentions, and Conscious Control.

**Ratings in Therapy Contexts:** The overall mean ratings for each of the four dependent variables were analysed (see Fig. 2). Comparing against ratings of the Unconscious, ratings of Free Will were significantly lower ( $M = 2.86$ ,  $SD = 4.33$ ,  $N = 100$ ),  $t(99) = 6.59$ ,  $p < .00005$ ,  $BF_7 = 2.30$ ), as were ratings of Conscious Intentions ( $M = 2.30$ ,  $SD = 4.11$ ,  $N = 100$ ),  $t(197) = 5.59$ ,  $p < .000005$ ,  $BF = 0.00001$ ), and ratings of Conscious Control ( $M = 2.92$ ,  $SD = 4.28$ ,  $N = 198$ ),  $t(197) = 6.81$ ,  $p < .00005$ ,  $BF_8 = 8.23$ ). Thus, consistent with Experiment 2, Experiment 3 revealed that in the context of therapy, average ratings of the Unconscious were significantly higher than Free Will, Conscious Intentions and Conscious Control.

**Ratings in Political Contexts:** The mean ratings for each of the four dependent variables across the 2 different political examples were analysed (see Fig. 2). Comparing against ratings of the Unconscious, ratings of Free Will were not significantly higher ( $M = -0.52$ ,  $SD = 3.70$ ,  $N = 100$ ),  $t(99) = 1.40$ ,  $p = .16$ ,  $BF = 4.81$ ), and nor were ratings of Conscious Control ( $M = -0.58$ ,  $SD = 3.28$ ,  $N = 100$ ),  $t(99) = 1.75$ ,  $p = .08$ ,  $BF = 2.83$ ), but Ratings of Conscious Intentions were ( $M = 1.06$ ,  $SD = 3.34$ ,  $N = 100$ ),  $t(99) = 3.17$ ,  $p < .0005$ ,  $BF = 0.11$ ). Thus, in political contexts, Experiment 3 partially replicated Experiment 2, indicating that average ratings of the Unconscious were significantly lower than Conscious Intentions.

**Ratings in Media Contexts:** The mean ratings for each of the four dependent variables across the 2 different media scenarios (see Fig. 2), revealed that, when comparing against ratings of the Unconscious, there were no significant differences with Conscious Intentions ( $M = 0.51$ ,  $SD = 3.41$ ,  $N = 100$ ),  $t(99) = 1.50$ ,  $p = .13$ ,  $BF = 4.23$ ). Ratings of the Unconscious were significantly higher than ratings of Free Will ( $M = 0.93$ ,  $SD = 3.90$ ,  $N = 100$ ),  $t(99) = 2.37$ ,  $p < .05$ ,  $BF = 0.84$ ), and ratings of Conscious Control ( $M = 0.82$ ,  $SD = 3.40$ ,  $N = 100$ ),  $t(99) = 2.38$ ,  $p < .05$ ,  $BF = 0.82$ ). In the context of the media, average ratings of the Unconscious were significantly higher than Free Will, and Conscious Control.

**Regressions:** Given that the same demographics questions were presented in Experiment 2 and 3, regression analyses were conducted separately on each of the four main ratings (Unconscious, Free Will, Conscious Intentions, Conscious Control). Ratings of Unconscious were examined for associations with Experiment (Experiment 2, Experiment 3), age, gender, education, political affiliation, and religiosity. The result of the regression indicated the 6 predictors explained 0.08% of the variance ( $R^2 = 0.03$ ;  $F(7,286) = 1.34$ ,  $p = .23$ ). The predictors failed to explain a significant proportion of the variance for Ratings of Free Will, ( $R^2 = 0.02$ ;  $F(7,286) = 2.04$ ,  $p = .05$ ), Ratings of Conscious Intentions ( $R^2 = 0.004$ ;  $F(7,286) = 0.82$ ,  $p = .57$ ) and Ratings of Conscious Control ( $R^2 = 0.02$ ;  $F(7,286) = 0.36$ ,  $p = .93$ ).

#### 4.2. Experiment 3: Discussion

Consistent with Experiment 2, overall, across all four countries the ratings people gave were similar. Correlational analyses replicated the same pattern as Experiment 2, suggested that there is a strong positive association between ratings of Free Will, Conscious Control and Conscious Intentions. In line with the prediction tested in Experiment 2, for which there was no evidential support, in Experiment 3 there was a weak negative relationship between ratings of the Unconscious and Conscious Control, as well as the Free will. Regression analyses based on demographic and experimental factors failed to reveal any statistically reliable association between the predictors and the four main ratings.

Experiment 3 broadly replicated the pattern of findings reported in Experiment 2 with respect to relative comparisons of ratings of the Unconscious to the other ratings by context. Average ratings of the involvement of the unconscious relative to ratings of free will, conscious intentions and conscious control were higher for Research and Therapy context, and also Media. In addition, there was a partial replication of the pattern found in political contexts, where ratings of the Unconscious were lower than Conscious Intentions. For Marketing there were as no difference between ratings, which failed to replicated the pattern found in Experiment 2.

### 5. General discussion

The aim of this study was threefold. The first was to investigate which, if any, popular contexts emerge from responses across different countries to an open question asking *which context has psychological research on the unconscious been applied?* The findings from Experiment 1 suggest that across four different countries, the frequency and range of examples were broadly similar, of which the most commonly generated was marketing; more men, and more people identifying as liberals in their political affiliation generated examples under this category.

There may be many reasons for why marketing (which included sales, advertising, and marketing itself) as a context featured so commonly amongst volunteered responses. One reason is that advertising and marketing have often been associated with subliminal advertising (for a brief review see [Osman, 2014, 2018](#)), which in turn has a long historical association with unconscious manipulation ([Sheehan, 2013](#)). Also, some have speculated that the association between subliminal processing and advertising is well known and may even play into the public's continuing suspicion about the uses of advertising ([Broyles, 2006](#)). Moreover, the connection between marketing as a method of persuasion and psychological research on the unconscious dates back to the 50's ([Packard, 1957](#)), which is likely why it still remains a foremost example in people's mind as the (mis)use of psychological research on the unconscious in the real world.

Experiment 2 and Experiment 3 presented a subset of examples from Experiment 1 to participants. Again, across four different countries the pattern of ratings of the unconscious, free will, conscious intentions, and conscious control were similar. Using a natural set of examples, the present study was able to extend previous work (e.g., [Deuschländer et al., 2017](#); [Malle, 2004](#); [Malle & Knobe, 1997](#); [Stillman et al., 2011](#)) suggesting that higher ratings of unconscious influence on behaviour, are associated with lower ratings of free will, and conscious control and the formation of prior conscious intentions.

There was weak support for the prediction that was tested, there was a negative relationship between ratings of the unconscious, and free will (not supported), conscious intentions (Experiment 3) and conscious control (Experiment 3). However, when examining the average ratings of the Unconscious relative to the other three by context, several patterns emerged. The three were either higher than ratings of the Unconscious in Marketing (Experiment 2) and Politics (Experiment 2, Experiment 3), or lower than ratings of the unconscious in Therapy (Experiment 2, Experiment 3), Research (Experiment 2, Experiment 3), and the Media (Experiment 3). This reveals a relative ranking of contexts with respect to the level of conscious control, intent, and free will is experienced, given the level of unconscious influence. While, Experiment 1 revealed that marketing is the most commonly volunteered example of applications of psychological research on the unconscious, the success of this technique to manipulate people without their knowing seems to be doubtful based on responses in Experiment 2 and 3. In both marketing and political contexts behaviours such as voting or purchasing products were judged to be under greater conscious control, made freely, and involve prior consciously formed intentions presumably because the techniques used in marketing and political contexts are judged to exert less influence on the unconscious as compared to professional contexts such therapy and medical research. In the case of therapy, the examples were of hypnotherapy, and for research, the examples included demonstrations of placebo effects to playing messages while sleeping. When it comes to examples of this kind, public opinion (e.g., [Gardner and Brown, 2013](#); [Johnson & Hauck, 1999](#); [Yu, 2004](#)) is very much in line with empirically demonstrations of the close associations these examples have to a lack of conscious control and free will (e.g., [Baars, Ramsøy, & Laureys, 2003](#); [Haggard, Cartledge, Dafydd, & Oakley, 2004](#)).

The findings from Experiment 2 and 3 provide compelling support for previous work that suggests a close relationship between the concepts of the unconscious and those associated with volition (free will, conscious control, prior conscious intentions). Moreover, Experiment 2 and 3 was able to show that the relationship between the unconscious and volition is context dependent. That is, contexts in which techniques used to influence behaviour are seen to vary according to their ability to target the unconscious to manipulate behaviour in an intended direction (by the agent implementing the technique). This in turn has consequences for perceived levels of conscious control or agency over actions taken in those contexts. It appears that people do have accurate beliefs about the extent to which they can preserve conscious choice and free will over their actions in a variety of contexts, contrary to the many demonstrations of misconceptions they have about other areas of psychology ([Bensley & Lilienfeld, 2017](#)). Alternatively, it might be the case that people are adamant in preserving the belief that they are consciously responsible for their actions in contexts that matter to them (e.g., exercising their voting rights, purchasing behaviours), but will loosen the reigns of responsibility in other contexts where they are more comfortable deferring to the professional (e.g., hypnotherapists, medical researchers). If this is the case, then further work is needed to establish the attributions about the intentions behind different kinds of agents (e.g., advertisers, policy makers, therapists, journalists, social media marketers). The reason being that the underlying intentions attributed to the agent may interact with the level of conscious control people are willing to relinquish, or want to maintain. Thus, work of this kind can help uncover whether the basis on which public beliefs about the influence on the unconscious vary according to the how much agency and control over the behaviour is valued ([Osman, 2014](#)).

*Limitations and future considerations:* The virtue of the present study was that the materials used were highly ecologically valid, however to keep things fairly open and easy for participants to respond, there was some precision lost in the way the instructions were presented, and the questions that were posed to participants. These needs to be highlighted given that this may have increased the ambiguity in several areas of the study regarding the way the "unconscious" could have been interpreted by participants on which they then generated their responses.

For instance, the definition of unconscious presented to participants in Experiment 1 was very broad, and while that was deliberate as to not restrict the kinds of examples participants would volunteer, a follow-up study could easily compare the range of examples that participants would generate depending on the type of definition of the unconscious that was presented to them. For example, [Deuschländer et al. \(2017\)](#) manipulated the dimensions regarding the type of action depending on the degree that it was a biologically necessary action (e.g., drinking water because one is dehydrated), and this had an impact, along with other factors, when gauging how free an action is. Also, [Monroe and Malle \(2010\)](#) manipulated the instruction they presented to participants regarding the underlying basis of behaviour as neurological or not, which in turn influenced the pattern of responses regarding judgments of free will of actions. Thus, by extension, it might be the case that participants would volunteer a different range of examples if they were presented a definition of the unconscious as framed from an exclusively neurological basis. Therefore, this is an important consideration regarding the interpretation of the present findings because the range of examples generated in Experiment 1, on which materials were used to examine judgments on free will in Experiment 2 and 3.

The second issue is that in Experiment 2 and 3 participants were presented with one judgment probe (i.e. unconscious) that was open to a lot of interpretation, and three (i.e. free will, conscious control, conscious intentions) which, one might argue, are a little more prescriptive in their interpretation. Without independently ascertaining whether, for instance, participants take a dualist position or not on the unconscious, or other positions, there would be no way to ascertain their interpretation of, and therefore the kind of response they gave to the question “*To what extent do you think that [reference to method of influence] influences [reference to behaviour unconsciously]?*”. Any future studies that are conducted would need to either include several other questions to determine the general position that participants take with regards to the unconscious when surveying folk beliefs on the unconscious in specific instances, because clearly their position in turn impacts their beliefs on free will (e.g. Nadelhoffer, Shepard, Nahmias, Sripada, & Ross, 2014).

A third potentially limiting factor is that the focus of the present study was on folk beliefs on the unconscious with a specific emphasis on the control of behaviour. However, as noted in the introduction consciousness also concerns attention as well as a control. Considerations of attentional aspects of consciousness invite a range of phenomena which may not have been commonly considered by participants in the present study (e.g., creativity, pain perception, attentional biases); with the exception of subliminal perception in association with advertising. Therefore, a natural extension of the present study would be to investigate the complement to control by framing the study on examining folk beliefs on consciousness with respect to attentional factors.

Finally, the sample of participants in Experiment 1 were asked to volunteer examples of situations for which they believed they had experienced the application of psychological research on the unconscious control of behaviours. There is of course no way to determine from the current study whether participants sampled in Experiment 2 and 3 had the same experiences as those that were generated by those in Experiment 1. Those in Experiment 2 and 3 were presented with a revised set of examples, with some minor edits, from which they were asked to make several judgments, for which the regression analyses revealed that age, gender, education, political affiliation and religiosity did not significantly predict variance in responses. However, in retrospect an additional measurement probe that could have been included in these experiments would be one that asked the extent to which participants had direct experience with the scenarios that they were presented. This way it would be possible to assess the extent to which direct experience with the scenarios impacted the judgments but also to determine the extent to which the samples in Experiment 2 and 3 were similar in their general folk beliefs to those sample in Experiment 1. A future replication and extension of this study that including a question of the kind would help to address this potential issue.

## 6. General conclusions

The present study sought to answer, by using an ecologically valid approach, three questions to which we did not previously have the answer to. The first being: *Do people share similar beliefs regarding the examples of applications of psychological research on the unconscious control of behaviours?* The findings from Experiment 1 suggest that, when comparing samples drawn from four different countries (Australia, Canada, UK, US) there is general convergence in the types of examples people freely volunteer. The second question being: *Which are the most common examples?* The findings from Experiment 1 reveal that the most frequently generated examples fall under the category Marketing (which includes advertising). The third being: *If unconscious control of behaviours is perceived to be used to influence behaviours in the real world, what type of folk beliefs are there regarding the extent to which conscious choice and free-will are maintained?* The findings from Experiment 2 and 3 reveal that people have a nuanced assessment of the maintenance of free will, and relatedly, conscious control, and conscious intentions in different contexts for which psychological research on unconscious manipulations of behaviour is suspected to be applied (e.g., marketing, politics, therapy, media). Relative to rating the influence of the unconscious on behaviours in these contexts, if ratings of the unconscious are low, then correspondingly, ratings of free will, conscious control, and conscious intentions can often be higher (e.g. Context: Politics, Experiment 2 and 3), and vice versa, where rating of the unconscious are high, then ratings of free will, conscious control and conscious intentions can be low (e.g. Context: Therapy, Experiment 2 and 3).

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## Data availability

All the raw anonymised data collected and analysed for this study is made available through the following web link <https://www.dropbox.com/s/jca678jclx6bbca/revise%20open%20ended%20volunteered%20unconscious%20experiences.xlsx?dl=0>.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.concog.2019.102860>.

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