

1 Impact of personalizing experiences of manipulation outside of awareness on autonomy

2

3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26

**Abstract**

Previous studies examining the relationship between beliefs about manipulation of behavior outside of awareness and free will reveal a weak association between both constructs. That is, people reconcile the two in such a way that there is room for free will despite mechanisms determining their behavior. The present study further explores the association between judgements of manipulation outside of awareness and free will, along with other judgments (ultimate control, personal experience, concern) in real world scenarios where manipulation is expected to occur. The aim was to examine whether the relationship between manipulation outside of awareness and free will could be amplified if personalizing the experiences of the real-world examples was emphasized. To this end, study 1a (N = 111) and 1b (N = 106) (replication) emphasized that people could have been manipulated, and in study 2a (N = 106) and 2b (N = 104) (replication) emphasized that they had actually been manipulated. The findings revealed that when the degree of personalization increased so did the strength of the negative correlation between judgments of manipulation without awareness and free will. A meta-analysis of all studies (8 studies, N = 1230) that examined this relationship was conducted to locate where (by context, by individual scenario) the relationship between manipulation outside of awareness and free will was strongest. The findings reveal that the strongest associations were found in scenarios that are most prototypically associated with the unconscious (e.g. sleep research, subliminal priming, subliminal advertising, hypnotherapy).

**Keywords:** Unconscious; Folk beliefs; Manipulation without awareness; Free will; Free Choice; personalized experiences, autonomy

27 **Introduction**

28 People may be generally aware that methods based on psychological research can be used to  
29 manipulate them unconsciously (e.g. subliminal advertising, hypnosis) (Osman, 2020; Osman  
30 & Bechlivanidis, 2021). However, by definition, people could not be aware of such  
31 manipulations at the time the methods are implemented in various contexts (e.g. consumer  
32 context, therapeutic context), or know at the time how the methods would be manipulating their  
33 behavior. However, it is likely that people recruit general beliefs, likely informed by shared  
34 cultural/societal knowledge to make judgments about the application of such methods and,  
35 relatedly, perseverance of free choice under such conditions (Osman, 2020). Real-world  
36 examples of manipulative methods (e.g. priming methods used in advertising, behavioral  
37 change techniques [e.g. nudging]) are often used to inform discussions on the relationship  
38 between manipulation and autonomy. We first begin by considering the different approaches,  
39 both conceptual and empirical, for determining the relationship between manipulation and  
40 threats to autonomy, limits to free will and free choice. From this analysis, the aim is to  
41 demonstrate the value of examining the relationship between the two concepts based on  
42 examining folk beliefs, which is the motivation for the present study.

43 Before, we proceed, it is worth highlighting that free choice, free will and autonomy  
44 have been referred to here in ways that seem interchangeable, so it is worth introducing some  
45 conceptual clarity as to what we take the terms to mean. Some, and we agree with them, assert  
46 that free choice, and free will as constituents of autonomy (Dan-Cohen, 1992; Downie &  
47 Telfer, 1971; Dworkin, 1988)<sup>1</sup>. While autonomy can also be conceptualized in many ways  
48 (Dworkin, 1988; Schneewind, 1998), we take it to mean self-determination, where in a global

---

<sup>1</sup> Downie and Telfer's exposition of autonomy in reference to autonomy of action – a capacity to choose what to do. Autonomy of action can be where there is freedom of choice (applied to all actions), and this is separate from freedom from obligation which applies to some actions. The latter of which is also of concern for Dworkin (1988) when discussing the nature of autonomy as self-determination. Dworkin (1988) considers ways in which self-determination conflicts with what is correct with respect to commitments (e.g., legal, social, religious).

49 sense, individuals' decisions and actions are their own, and viewed as such (Dworkin, 1988).  
50 As discussed previously (Osman & Bechlivanidis, 2021), free will as conceived in  
51 psychological research and understood by those taking part in studies on folk beliefs of free  
52 will, does not concern free will in a metaphysical sense (Fischer, 1994). Instead free will is  
53 closely aligned to the concept of free action; meaning to act in a way that is unhindered in  
54 pursuit of a personal self-set goal in line with intentions, unconstrained, and based on conscious  
55 deliberation (Deci & Ryan 2012; Monroe & Malle, 2014). Correspondingly, choosing from  
56 options that is unencumbered, devoid of coercion, essentially free from constraints is free  
57 choice<sup>2</sup> (Dan-Cohen, 1992).

58 **Approaches to examining threats to free choice based on manipulative methods targeting**  
59 **the unconscious**

60 There are at least three main approaches for examining why methods, based on  
61 psychological tactics that can manipulate us unconsciously, would pose a threat to free choice,  
62 and free will, which fall under the concept of autonomy.

63 *Theoretical Approach:* The first is to inspect this issue on conceptual grounds. Based  
64 on theoretical work in philosophy (e.g., Coons & Weber, 2014; Jongepier, & Klenk, 2022;  
65 Noggle, 1996; Todd, 2013), psychology (e.g., Clee & Wicklund, 1980; Handelman, 2009;  
66 Shaver & Scott, 1992), political science (e.g., Paulo & Bublitz, 2019; Schmidt & Engelen, 2020;  
67 Susser, Roessler, & Nissenbaum, 2019) and sociology (e.g. Kotnik, 2021), the claim is that, in  
68 principle, methods that manipulate people outside of their awareness, is a threat to their  
69 autonomy. However, there are detractors that have made explicit criticisms of the supposed  
70 link between manipulation and autonomy (Klenk & Hancock, 2019). Also, some have  
71 countered this core assumption on empirical grounds, because psychological processes

---

<sup>2</sup> As Dan-Cohen (1992) explains, the chooser doesn't not determine the choice-set this is because the options available in the choice set are constrained for a variety of reasons, the most obvious of which is the context in which a choice is made. But the choice made from the options presented allows the chooser to select from them in such a way that the they were the ones governing the choice – self-determinedly.

72 associated with measuring free choice depart from philosophical conceptual formulations of  
73 free choice and free action (e.g. Double, 1990; Gozli, 2019; Mudrik et al, 2022; Murray &  
74 Lombrozo, 2017; Rigoni, Cleeremans, & Brass, 2017). Moreover, there are issues concerning  
75 what actually constitutes manipulation and how this is differentiated from coercion (e.g.,  
76 Double, 1990; Schmidt, 2017; Sunstein, 2016; Saghai, 2013). The latter has practical  
77 implications, because discussions center on the value of guiding people to choices that despite  
78 being beneficial, people struggle to make (e.g., nudging). Whether unconsciously influencing  
79 one's behavior is always a form of manipulation, remains an open question since there are cases  
80 where people voluntarily subject themselves to such influences (e.g. therapeutic methods,  
81 hypnosis – which we discuss later in this section).

82         *Empirical Approach:* The second approach is based on practical grounds informed by  
83 evidence (e.g. Kiesel et al., 2006; Mudrik et al, 2022; Newell & Shanks, 2014). This can  
84 involve inspecting actual situations or simulating situations in the laboratory, where methods  
85 designed to manipulate people outside of their awareness are evaluated for their effectiveness.  
86 The fact that some are unsuccessful (e.g., Lin, Osman, & Ashcroft, 2017), would imply that  
87 the concern might be abated given insufficient empirical evidence to document threats to free  
88 choice. This type of analysis can involve going on case by case basis to identify methods that  
89 pose a threat because success of manipulation is evidenced, and methods that are not  
90 empirically successful and thus do not present a threat to free choice (e.g., Saghai, 2013).

91         Alternatively, for any methods used to manipulate people outside of their awareness,  
92 successful or otherwise, we should instead focus on the intentions and agendas of those  
93 developing and employing these methods (e.g., Bovens, 2009; Chukwuma & Ngwoke, 2022;  
94 Crisp, 1987; Handelman, 2009; Phillips, 1997; Wilkinson, 2013). This often requires extra  
95 theoretical analysis regarding the ethicality of the use of various manipulative tactics, and the  
96 context of application (e.g. advertising, business, gaming, democratic activities, social media)

97 (e.g., Gatti, Pizzetti, & Seele, 2021; Kriz, Kikkawa, & Sugiura, 2022; Noggle, 2021; Rubin,  
98 2022; Saura, Palacios-Marqués, & Iturricha-Fernández, 2021; Sunstein, 2021). This is because  
99 the intention to manipulate people outside of their awareness whether unconsciously or through  
100 deceit, is in and of itself a potential threat to autonomy, even where the manipulation is  
101 designed to be beneficial to the individual or society (e.g., Jones, Pykett, & Whitehead, 2013;  
102 Sunstein, 2021).

103 *Folk Belief Approach:* The third basis is also empirical but adopts a folk psychological  
104 perceptive, by examining either general beliefs on free choice (e.g., Berniūnas et al., 2021;  
105 Deutschländer, Pauen, & Haynes, 2017; Forstmann & Burgmer, 2018; Vonasch, Baumeister,  
106 & Mele, 2018), or particular assessments of actual or fictitious examples of methods designed  
107 to manipulate outside of awareness (Monroe & Malle, 2010; Shepard, 2015; Osman, 2020;  
108 Osman & Bechlivanidis, 2021; Stillman, Baumeister, & Mele, 2011). With respect to the latter,  
109 specifically what these studies include are measures of participants' beliefs about the influence  
110 of unconscious manipulations on their own ability to exercise free will, and not measures of  
111 the actual relationship between these unconscious manipulations and exercise of free will.  
112 These studies serve as a different kind of practical analysis because it can expose instances  
113 where, despite generally knowing that manipulation can occur and could lead to changes in  
114 choice behavior outside of awareness, people nevertheless perceive that they have free will.

115 What this can tell us is that, whether manipulating behavior outside of awareness goes  
116 on and in principle could result in lack of free will, people's day to day views involve  
117 consideration of other factors (e.g. their level of concern, the extent to which they are personally  
118 invested in the choice context), to determine the extent to which free will is nevertheless  
119 maintained (Monroe, & Malle, 2010; Osman, 2020; Osman & Bechlivanidis, 2021; Stillman et  
120 al., 2011). Also, this analysis can inform the two other aforementioned approaches by revealing  
121 the way people form their beliefs about free will. On this, current evidence would suggest that,

122 on the whole, people attribute free will even in situations where they themselves acknowledge  
123 that manipulation without awareness is occurring (Osman, 2020; Osman & Bechlivanidis,  
124 2021).

125 **An illustration: Subliminal advertising**

126 Subliminal advertising (for review see Vargas, 2018) refers to presenting  
127 advertisements to people at a speed that is undetectable at the threshold of conscious awareness  
128 (e.g. between 1-30 milliseconds) (e.g., Bermeitinger et al., 2009; Hsu & Chen, 2020;  
129 Karremans, Stroebe, & Claus, 2006; Verwijmeren et al., 2011; Verwijmeren, 2014). For  
130 instance, in many laboratory tasks images (e.g. branded products) are flashed on a computer  
131 screen to then measure whether they primed people towards certain consumer choices. The  
132 logic of the effects of this method on behavior can be examined in two basic ways. If the  
133 consumer choices are not in line with what participants would have chosen consciously in the  
134 absence of subliminal messages, then this would mean that the subliminal adverts are the  
135 guiding factor in their choices (e.g., Karremans et al., 2006; Verwijmeren et al., 2011).  
136 Alternatively, in the presence of subliminal adverts, the likelihood of participants selecting the  
137 primed products goes over and above the selection of those products in the absence of  
138 subliminal adverts, or the primes directly influence their emotional or physiological states (e.g.  
139 making them thirstier).

140 *Theoretical Approach:* The theoretical accounts presented in the first section would  
141 propose that this is a clear illustration where a method (subliminal advertising) is employed,  
142 and the mechanism of manipulation occurs outside of conscious awareness, and therefore limits  
143 free choice and free will. That is, people are making choices or experiencing states they would  
144 otherwise not have made or experienced had the priming method not been employed, while  
145 they are not in control of the factors affecting their own behavior.

146           *Empirical Approach:* On empirical grounds, the evidence that subliminal advertising  
147 can meaningfully and reliably influence actual consumer behavior is lacking or else is highly  
148 problematic methodologically (e.g., Madan, Rosca, & Bucovicean, 2021; Pratkanis &  
149 Greenwald, 1988; Smarandescu & Shimp, 2015; Wongtada, 2019). In fact, any demonstration  
150 of subliminal priming, a process on which subliminal advertising is dependent on, is fraught  
151 with methodological issues in psychological research and failures to replicate (Leins et al.,  
152 2021; Newell & Shanks, 2014; Röseler et al., 2021; Rothkirch & Hesselmann, 2017; Sand &  
153 Nilsson, 2016; Shanks, Malejka, & Vadillo, 2021; Shanks et al., 2013). In fact, subliminal  
154 advertising is actually a myth based on work in the 50's by Vicary that was later found to be a  
155 hoax because the data produced to evidence the effects of subliminal advertising were  
156 fabricated (e.g., for discussion see Moore, 1988, Sheenan, 2013). Nevertheless, regulation  
157 proposed at the that time, and since, prevents advertisers from employing this method (Osman,  
158 2014).

159           *Folk Belief Approach:* If we take the folk belief perspective, when asked to volunteer  
160 examples of day to day experiences where psychological tactics are used to manipulate  
161 people's behavior outside of awareness, one of the most common cases mentioned was  
162 subliminal advertising (Borovac-Zekan, & Zekan, 2022; Osman, 2020). Nevertheless, when  
163 people evaluate such methods, the expected negative correlation between the judged extent of  
164 manipulation outside of awareness, and the judged extent to which choice is still present is  
165 weak (Osman, 2020, Osman & Bechlivanidis, 2021). That is, even though manipulation without  
166 awareness is judged to be high for scenarios where subliminal advertising is thought to occur,  
167 there is no corresponding reliable judgment that free will is absent. To make sense of this we  
168 can consider other factors which have been discussed in other empirical work on related topics.  
169 For example, the choice to enter into the consumer context in the first place, is made  
170 consciously and is under the individual's conscious control and determined by their needs (e.g.,

171 Aylsworth, 2020). There might be, in other words, points in the causal chain (e.g. entering a  
172 shop, viewing different consumer products, evaluating the price of those products, purchasing  
173 those products) where people see their choice as pivotal to the final outcome (e.g. the  
174 purchasing of a product). Alternatively, because people are aware that such methods are  
175 employed by advertisers, they may be able to resist to their influences, thus maintaining free  
176 choice (Borovac-Zekan, & Zekan, 2022; Zanot, Pincus, & Lamp, 1983). Whether this is in fact  
177 feasible is an empirical question, but nonetheless, the belief in its feasibility may be one of the  
178 factors people recruit to remain the main arbiters of the choices they make in such consumer  
179 contexts.

180 In summary, taking subliminal advertising as a case study helps to show that the  
181 approach used to assume that manipulation, carries different implications for whether it is a  
182 threat to autonomy. A theoretical approach, along the lines of those proposed by philosophers,  
183 psychologists, sociologists and political scientists, suggests that subliminal advertising is a  
184 threat to free autonomy. The empirical approach examining the extent to which subliminal  
185 advertising can achieve predictable and reliable changes in consumer behavior, suggests that  
186 under laboratory conditions it may impact choice behavior (e.g., response times to primes).  
187 However, even under these conditions, there are wider issues regarding methodological factors  
188 that limit any strong conclusions formed regarding the direct influence of primes on behavior.  
189 Taken together, this approach would indicate that the evidence is mixed regarding the effects  
190 of subliminal advertising on behavior, and so, empirically there is less cause for concern that  
191 this manipulative method is an actual threat to free choice. A folk belief approach, on the other  
192 hand, indicates that even if people volunteer subliminal advertising as an example of a  
193 psychological method that influence behavior in the absence of awareness, it is still not seen  
194 as an absolute threat to their free will, because people recruit other contextual factors to  
195 determine the extent to which they believe they can preserve free will.

196 **Other examples**

197           The same type of analysis can be applied to several other cases where psychological  
198 methods are typically associated with targeting the unconscious, and in turn influence behavior.  
199 Hypnosis, and hypnotherapy, for example, involve an expert creating a state in which a client  
200 is, depending on the theory of hypnosis, either susceptible or suggestible (e.g., Acunzo &  
201 Terhune, 2021; Barnier, & McConkey, 2004; Linton & Sheehan, 1994; Oakley et al., 2020;  
202 Spanos et al., 1983) to the instructions of the expert, and are unaware of their behaviors during  
203 the session, or the influence of the technique post session. Again, on theoretical grounds this  
204 would be an illustration of manipulation that is a threat to free choice (e.g., Nahmias, 2010).  
205 However, work shows that there are considerable misconceptions that lay people, as well as  
206 experts hold regarding what hypnosis and hypnotherapy are and how they function (e.g., Lynn  
207 et al., 2020). Laboratory studies suggest that it is unclear whether people are actually fully  
208 unconscious and cannot preserve free choice during and after hypnotic sessions (e.g., Dienes,  
209 & Hutton, 2013; Facco et al., 2021; Green, & Lynn, 2010; Haggard et al., 2004; Kirsch &  
210 Lynn, 1998; Palfi et al., 2021). From a folk belief perspective, people volunteer this as an  
211 example of psychological manipulation outside of awareness, and perceive free choice to be  
212 lower compared with other contexts, but nevertheless not eliminated (Osman, 2020, Osman &  
213 Bechlivandis, 2021).

214           Similarly, the differentiation by approach regarding the implications of manipulation  
215 outside of awareness through use of psychological techniques can be applied to behavioral  
216 change methods, such as nudging (e.g., Lin et al., 2017; Oliver, 2015), social media (e.g.,  
217 Bastick, 2021; Fischer, 2022), and political campaigning (e.g., Gorton, 2016; Rieznik et al.,  
218 2017). All these are examples that people have freely volunteered in folk studies (e.g. Osman,  
219 2020), but where there is no strong correlation between manipulation and free will (Osman,  
220 2020; Osman & Bechlivandis, 2021).

221 **Present study**

222           The focus of the present study is twofold. Firstly, we want to look at the reliability of  
223 the relationship between manipulation outside of awareness and free choice, that previous work  
224 has shown to be weak (Osman, 2020; Osman & Bechlivanidis, 2021). Just to highlight again,  
225 the measures included in these studies are of participants' beliefs about the influence of  
226 unconscious manipulations on attributing free will, and not measures of the actual relationship  
227 between these unconscious manipulations and exercising free will.

228           To be able to use findings from folk belief research to potentially inform the other  
229 aforementioned approaches, the relationship between the two concepts needs to be further  
230 inspected. We speculate three reasons for the weak relationship previous reported. First, people  
231 may not feel personally invested in the examples presented to them. If so, emphasizing, through  
232 instructions, that examples where manipulation occurs could threaten their own free will ought  
233 to expose more strongly the impact on free will. Second, the previous findings reveal that not  
234 all contexts (e.g. marketing, political campaigning, therapy) where psychological manipulative  
235 techniques are implemented are treated the same, and there may also be differences between  
236 scenarios within the same context (e.g. promotional techniques vs. subliminal advertising).  
237 Therefore, an analysis of the relationship between the two concepts by context or by scenario  
238 would be needed to determine where this relationship is strongest. Third, consistent with  
239 previous findings, people may maintain a compatibilist view, where free will and determinism  
240 can be conceived of as reconcilable positions even though they appear to be mutually exclusive  
241 (Clark, Winegard, Baumeister, 2019; Vonasch, et al., 2018). Therefore, regardless of efforts to  
242 strengthen personal investment and independent of particular contexts or scenarios, people will  
243 maintain free choice/free will, because their general default position is a compatibilist one.

244           Furthermore, work examining first-person third-person effects (e.g., Davidson, 1983;  
245 Golan & Day, 2008, Osman, 2008, Perloff, 1993), and relatedly social distance (Perloff, 1999;

246 White, 1997) also has a bearing on the speculations presented here. Essentially, beliefs,  
247 judgments, and choices have been shown to be strongly influenced by whether they are framed  
248 in the third-person, or in the first/second person. Social distance concerns the association  
249 between self and others on factors that are deemed of relevance to the individual (e.g. level of  
250 education, socioeconomics, political opinions, religiosity). The most generic third person  
251 manipulations concern descriptions such as “this would require people to” and a second person  
252 description would be “this would require you to”, and first person would be “I would be  
253 required to”. For instance, people show greater support for behavioral change techniques (e.g.  
254 nudges) when considering the interventions as influencing behavior in the third person than the  
255 second person (Jung & Mellors, 2016, and this pattern extends to judgements of their  
256 effectiveness (Cornwell & Krantz, 2014; Gold et al., 2020). Here, the speculation is that people  
257 judge themselves as less susceptible to psychological manipulation, particular for situations  
258 where they feel strongly protective of the behaviors being manipulated. The present study can  
259 further inform this, as the meta-analysis looks at the way in which differences between third  
260 and second person framing potentially influence ratings of manipulation and free choices.

261 To investigate these speculations, the present work includes two empirical studies  
262 (Study 1a, Study 1b replication [second person past framing]; Study 2a, Study 2b replication  
263 [second person present framing]) which are designed to strengthen participants' personal  
264 investment in the scenarios they are presented with, and investigate the extent to which free  
265 will is maintained. The following Prediction 1 is tested: as the framing of the scenarios becomes  
266 increasingly personal, the negative correlation between ratings of influences on actions without  
267 awareness (ratings of Unconscious Manipulation) and free will (ratings of Free Will) would  
268 increase. In turn, both studies are then included into a meta-analysis that combines all studies  
269 that have used the same methodology (Osman, 2020; Osman & Bechlivandis, 2021) to examine

270 the relationship between the extent of manipulation and free choice by level of personalization  
271 and by individual scenario.

272 **Study 1 (a & b (replication)) Study 2 (a & b (replication)): Personalizing experiences of**  
273 **manipulation outside awareness**

274 The aim of Study 1 (a & b) and Study 2 (a & b) was to replicate and extend the original  
275 work by Osman (2020) and Osman and Bechlivanidis (2021), and to test the aforementioned  
276 prediction. The main difference between Study 1 and Study 2 was that in the former case the  
277 judgments were couched in a way that the critical choice in the scenario was described as  
278 “could have been manipulated unconsciously”, while in the latter, participants were asked to  
279 imagine being in the scenario described, and were told that their critical choice “was being  
280 manipulated unconsciously”.

281 **Methods**

282 *Participants:* In Study 1a there were a total of 111 participants from the UK (see Table  
283 1). The average age of the sample was  $M = 37.81$  ( $SD = 13.92$ ), with 52 males, 57 females, 2  
284 preferring not to say. In Study 1b there was a total of 106 participants from the UK. The average  
285 age of the sample was  $M = 39.21$  ( $SD = 14.03$ ), with 54 males, 49 females, 3 preferring not to  
286 say. In Study 2a there was a total of 106 participants from the UK. The average age of the  
287 sample was  $M = 39.25$  ( $SD = 14.92$ ), with 52 males, 54 females. In Study 2b there was a total  
288 of 104 participants from the UK. The average age of the sample was  $M = 43.51$  ( $SD = 15.05$ ),  
289 with 51 males, 53 females. For full details of age, gender, political affiliation, education level,  
290 and religiosity see Table 1.

291 All studies were presented via Qualtrics (<https://www.qualtrics.com/uk/>) which is an  
292 online platform for hosting experiments, and a crowdsourcing system (Prolific  
293 <https://www.prolific.co/>) was used to recruit participants. The system allows experimenters to  
294 specify inclusion criteria, and if fulfilled and participants indicate interest in the study, the

295 system allocates them to take part in the study. The process of participant recruitment via  
296 Prolific was volunteer sampling. To take part in the study, the criteria were, that participants  
297 were born and currently reside in the UK, that their age ranged between 18 and 80, and their  
298 first language was English. All participants were financially compensated for their time (2.5  
299 USD). When taking part in the study, participants were asked to provide responses to 5  
300 demographic questions (age, gender, education level, political affiliation, religiosity) which are  
301 summarized in Table 1. All studies (Study 1a, 1b, 2a, 2b) included here received ethical  
302 approval from University College London (UCL) ethics board, EP/2017/005.

303 *Insert Table 1 about here*

304 *Design:* In Study 1 (1a, 1b) and Study 2 (2a, 2b) there was the main set of dependent  
305 variables concerning ratings, along with the collection of demographic details (i.e. Age,  
306 Gender, Education level, Political affiliation). The ratings (5 ratings for Study 1, 6 ratings for  
307 Study 2) for 18 scenarios drawn from those volunteered by the subjects in Osman’s (2020)  
308 study (See Table 2). For each demographic question participants were provided with the option  
309 “prefer not to say”. The ratings were: ratings of Unconscious Manipulation, ratings of Free  
310 Will, ratings of Personal Experience, ratings of Concern, ratings of Ultimate Control, and  
311 ratings of Success of the Manipulation (Study 2a, 2b), all of which were on a scale ranging  
312 from 0 to 10. The order of presentation of the 18 scenarios was randomized for each participant,  
313 and the same was true for the order in which ratings were presented in each scenario.

314 *Insert Table 2 about here.*

315 *Materials:* The 18 scenarios were those used in Osman’s study (2020, Study 2) (see  
316 Table 2). The dependent measures used in Study 1 (1a, 1b) and Study 3 (2a, 2b) to assess  
317 judgments of the 18 scenarios are presented in Table 3. Each measure had a response scale  
318 ranging from 0 = not at all to 10 = completely. The critical difference between Study 1 and  
319 Study 2 being the emphasis on personalizing the experiences associated with each scenario,

320 which was manipulated by changing the phrasing of the questions from second person past  
321 framing to second person present framing. In Study 1 the questions included details regarding  
322 the fact that critical choices participants made “could have” been manipulated unconsciously.  
323 In Study 2 the questions included details that instructed participants to imagine they were in  
324 the scenario and they “are being” unconsciously manipulated.

325 *Insert Table 3 about here.*

326 It is worth noting that Table 3 includes the full set of dependent variables included in  
327 past studies (Osman, 2020, Osman & Bechlivanidis, 2021) as well as the two present studies.  
328 Crucially, the level of personalization differs between the studies. The ratings were not  
329 presented in a way that was designed to make them personalized in Osman’s (2020) original  
330 study, which is why they are referred to as no personalization (third person framing). Later in  
331 Osman and Bechlivanidis (2021) there were minimal changes to the phrasing of the ratings to  
332 personalize them (e.g. is the result of free choice, to is the result of your free choice) which is  
333 why are referred to as low level personalization (second person framing). Then there are Study  
334 1a and 1b, which are referred to as moderate personalization (second person past framing), and  
335 Study 2a and 2 which are referred to as high personalization (second person present framing).  
336 The descriptions of levels (None, Low, Moderate, high) of personalization are based on level  
337 of emphasis of how connected the participant is to the situation they are asked to make a rating  
338 about. The levels of personalization of the ratings across the studies are critical for the more  
339 detailed analysis presented in the meta-analysis section.

340 *Procedure:* Participants were first asked to provide their consent in order to take part  
341 in the study. Once consent was provided, participants were given instructions informing them  
342 that they would be presented with 18 real world scenarios they needed to read carefully, and  
343 then for each scenario they would be asked to make their ratings (ratings of the Unconscious  
344 Manipulation, ratings of Free Will, ratings of Personal Experience, rating of Personal Concern,

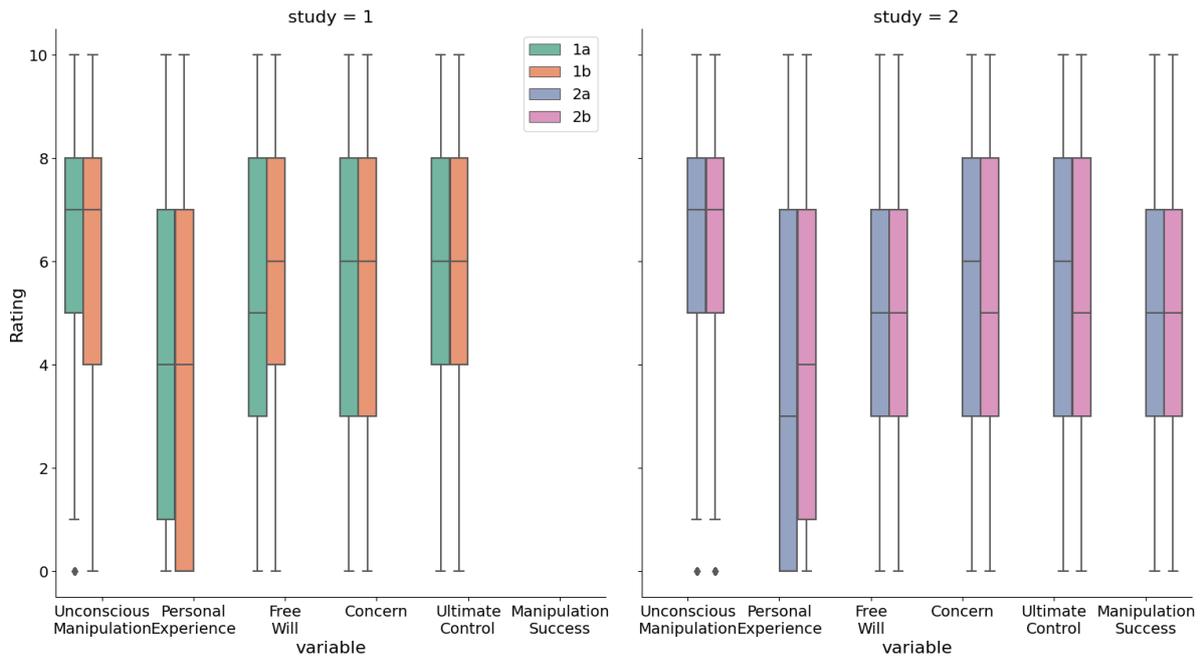
345 ratings of Conscious Control, ratings of Success of the Manipulation [Study 2a, 2b]). They  
346 were informed that after they had completed all ratings for each of the 18 scenarios, and  
347 provided their responses to the five demographic questions, the study was complete.

## 348 **Results and Discussion**

349         The first set of analysis were conducted to examine whether the pattern of responses  
350 was replicated between Study 1a and 1b (Table 4), and again for Study 2a and 2b (Table 4).  
351 Using JASP (JASP Team, 2019). Following current conventions for reporting Bayesian  
352 statistics (APA, 2020; Dienes, 2021), we conducted a series of Bayesian independent samples  
353 t-tests to examine whether the study variable could reliably predict any of the dependent  
354 variables (averaged per participant across all scenarios). As shown in Figure 1, there were only  
355 small differences between each study and its replication. For studies 1a and 1b, there was  
356 substantial support<sup>3</sup> for the null hypothesis for all 5 dependent variables ( $BF_{01} > 4.66$ ), and the  
357 same was true for the 6 variables in studies 2a and 2b ( $BF_{01} > 2.26$ ). Therefore, in what follows  
358 we have merged 1a and 1b into Study 1, and 2a and 2b into Study 2.

---

<sup>3</sup> Here and in what follows, we follow the convention of interpreting Bayes Factors between 1 and 3 as providing weak evidence, between 3 and 10 as substantial evidence and over 10 as providing strong evidence. In addition, when the computed Bayes Factor is very large, we present its natural logarithm instead – in all such cases the evidence is strong.

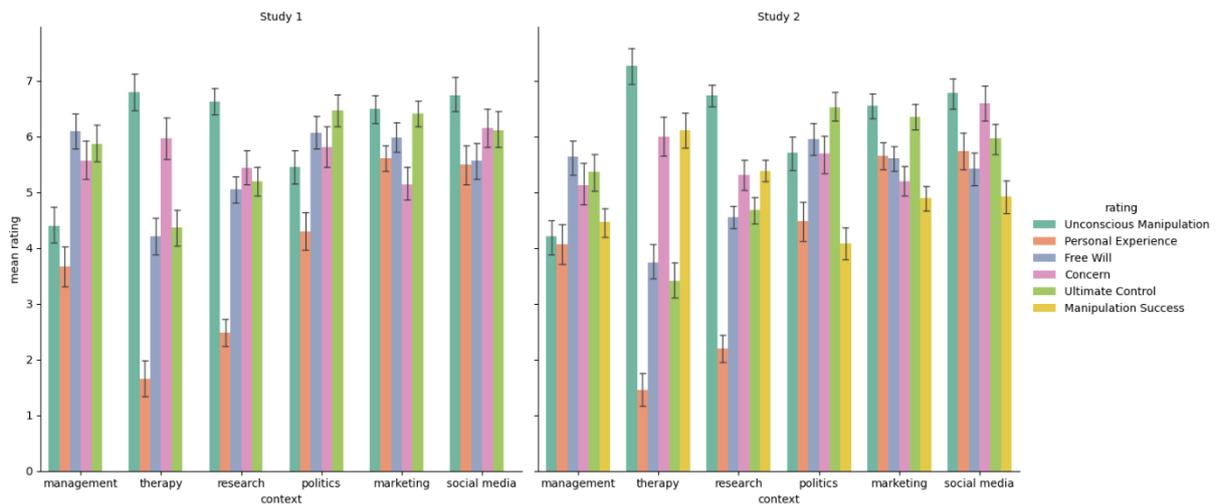


359

360 Figure 1: Ratings by study, showing minimal differences between original (1a, 2a) and  
 361 replication studies (1b, 2b)

362 *Overall Pattern of Ratings:* We conducted Bayesian Pearson’s correlation tests  
 363 separately for each study to examine whether, Unconscious Manipulation ratings would be  
 364 negatively correlated with the key rating of Free Will. We also examined correlations with the  
 365 other ratings included in the two studies. In Study 1, there was no support for a negative  
 366 correlation across scenarios between Unconscious Manipulation and Free choice ( $r=-.02$ ,  
 367  $BF_{10}=.76$ ) or between Unconscious Manipulation and Control ( $r=-.05$ ,  $BF_{10}=.11$ ) but there was  
 368 strong support for the correlation between Unconscious Manipulation and Personal Experience  
 369 ( $r=0.29$ ,  $\log(BF_{10})=7.19$ ), as well as Unconscious Manipulation and Concern ( $r=0.43$ ,  
 370  $\log(BF_{10})=20.03$ ). For Study 2, there was weak evidence for the predicted negative correlation  
 371 between Unconscious Manipulation and Free Will ( $r=-.16$ ,  $BF_{10}=1.29$ ), no evidence for the  
 372 correlation between Unconscious Manipulation and Personal Experience ( $r=.11$ ,  $BF_{10}=.36$ ) or  
 373 Unconscious Manipulation and Control ( $r=.11$ ,  $BF_{10}=.30$ ), and strong support for the  
 374 correlation between Unconscious Manipulation and Concern ( $r=.42$ ,  $\log(BF_{10})=17.80$ ) as well  
 375 as Unconscious Manipulation and Success ( $r=0.41$ ,  $\log(BF_{10})=17.43$ ).

376 *Pattern of Ratings by Context:* Looking at the type of context in more detail, the  
 377 findings indicate effects of Context for both Studies (Figure 2). We conducted one-way  
 378 Bayesian ANOVAs for Study 1, providing strong evidence for Context predicting the degree  
 379 of Unconscious Manipulation ( $\log(\text{BF}_{10}) = 79.89$ ), Free Will ( $\log(\text{BF}_{10}) = 48.83$ ), Personal  
 380 Experience ( $\log(\text{BF}) = 191.58$ ), Personal Concern ( $\log(\text{BF}_{10}) = 2.53$ ) and Control ( $\log(\text{BF}_{10})$   
 381  $= 61.27$ ). This same pattern was found in Study 2, where Context predicted the degree of  
 382 Unconscious Manipulation ( $\log(\text{BF}_{10}) = 125.47$ ), Free Will ( $\log(\text{BF}_{10}) = 68.26$ ), Personal  
 383 Experience ( $\log(\text{BF}_{10}) = 241.15$ ), Personal Concern ( $\log(\text{BF}_{10}) = 19.85$ ), Control ( $\log(\text{BF}_{10}) =$   
 384  $145.00$ ) and Success of Manipulation ( $\log(\text{BF}_{10}) = 52.92$ ).



385

386 Figure 2: Ratings by context in Study 1 (left) and Study 2 (right)

387 *Group Differences:* We conducted multiple main effects Bayesian ANOVAs, and  
 388 computed the model-average effects of age and gender on each of the ratings. We did not  
 389 perform a similar analysis for the other demographics, since the sample sizes were uneven,  
 390 making it hard to draw any strong conclusions. Note that also we grouped participants in three  
 391 age groups to ensure approximately equal group sizes (19-31:  $n=143$ , 32-44:  $n=140$ , 45-77:  
 392  $n=137$ ). Unlike past studies, we find that age and gender reliably predicted many of the ratings.  
 393 In Study 1, gender was a weak predictor of Unconscious Manipulation ( $\text{BF}_{\text{incl}}=2.71$ ) with  
 394 women ( $M = 6.50$ ,  $SD = 1.45$ ) giving higher ratings than men ( $M = 5.97$ ,  $SD = 1.67$ ). Age

395 predicted ratings of Free Will ( $BF_{\text{incl}}=4.60$ ) with older participants more likely to attribute free  
396 will to the situations they are presented (19-31:  $M = 5.09$ ,  $SD=1.16$ , 32-44:  $M = 5.58$ ,  $SD=1.50$ ,  
397 45-77:  $M = 1.90$ ,  $SD=5.97$ ). The same was true for ratings of Personal Concern ( $BF_{\text{incl}}=1.46$ )  
398 where older participants appeared more concerned than younger ones (19-31:  $M = 5.03$ ,  $SD$   
399  $=1.57$ , 32-44:  $M = 5.70$ ,  $SD = 1.87$ , 45-77:  $M = 5.97$ ,  $SD = 2.22$ ). No demographic variable  
400 reliably predicted Control ( $BF_{\text{excl}} > 2.55$ ) or Personal Experience ( $BF_{\text{excl}} > 3.56$ ) in Study 1. A  
401 similar analysis in Study 2, showed that no variable predicted Unconscious Manipulation  
402 ( $BF_{\text{excl}} > 1.45$ ) or Personal Experience ( $BF_{\text{excl}} > 1.99$ ). However, both gender ( $BF_{\text{incl}} = 3.08$ ) and  
403 age ( $BF_{\text{incl}} = 1.3$ ) were good predictors of Free Will and Success of Manipulation (gender:  
404  $BF_{\text{incl}} = 5.48$ , age:  $BF_{\text{incl}} = 1.51$ ). Specifically, women ( $M = 4.89$ ,  $SD = 1.17$ ) gave lower ratings  
405 of Free Will than men ( $M = 5.37$ ,  $SD = 1.21$ ) as did younger participants compared to older  
406 ones (19-31:  $M = 4.95$ ,  $SD = 0.93$ , 32-44:  $M = 4.9$ ,  $SD = 1.09$ , 45-77:  $M = 5.49$ ,  $SD = 1.43$ ), while  
407 women and younger participants were more likely to report that unconscious manipulations  
408 were successful (women:  $M = 5.27$ ,  $SD = 1.23$ , men:  $M = 4.78$ ,  $SD = 1.24$ ; 19-31:  $M = 5.38$ ,  $SD$   
409  $= 1.15$ , 32-44:  $M = 5.05$ ,  $SD = 1.22$ , 45-77:  $M = 4.67$ ,  $SD = 1.31$ ). Gender was a good predictor  
410 for Control ( $BF_{\text{incl}} = 21.24$ ), with men more likely than women to attribute control despite  
411 manipulations (women:  $M = 5.14$ ,  $SD = 1.17$ , men:  $M = 5.73$ ,  $SD = 1.26$ ). Finally, age was a good  
412 predictor of Personal Concern ( $BF_{\text{incl}} = 268.90$ ), with older participants appearing more  
413 concerned than younger ones (19-31:  $M = 5.19$ ,  $SD = 1.23$ , 32-44:  $M = 5.11$ ,  $SD = 1.39$ , 45-77:  
414  $M = 6.17$ ,  $SD = 2.08$ ) as was gender to a smaller degree ( $BF_{\text{incl}} = 1.28$ ) with women appearing  
415 slightly more concerned than men (women:  $M = 5.63$ ,  $SD = 1.73$ , men:  $M = 5.41$ ,  $SD = 1.65$ ).

416 In summary, the findings show that the replications were successful (Study 1b, Study  
417 2b) and so we collapsed across them for further analysis. We found that the personalizing  
418 manipulation increased the negative relationship between manipulation without awareness and  
419 free choice (Study 2). Consistent with all previous studies (Osman, 2020, Osman &

420 Bechlivanidis, 2021) the context was a strong determinant of all four judgments. Unlike  
421 previous studies (Osman, 2020, Osman & Bechlivanidis, 2021), Study 1 and 2 revealed the  
422 effects of demographics on judgments, most likely the result of the manipulations designed to  
423 make the materials personalized, particularly the consequences of manipulation tactics. In  
424 particular, women and younger participants reported that are more likely to be unconsciously  
425 manipulated and have less free will and control over the outcome of their choices, while older  
426 participants and women are more concerned about the effects of unconscious manipulations.

#### 427 **Meta-analysis of all studies examining manipulation outside of awareness and free will**

428         The aim of the meta-analysis was to explore the impact of personalizing the way the  
429 day to day scenarios were viewed where manipulation outside of awareness is suspected.  
430 Across 8 separate studies (see Table 3), the ratings were presented in ways that varied the level  
431 of personalization of the scenarios, no personalization (Osman, 2020, Study 2, 3; Osman &  
432 Bechlivanidis, 2021, Study 1), low personalization (Osman & Bechlivanidis, 2021, Study 3),  
433 moderately personalization (Present Study, 1a, 1b) and high personalization (Present Study,  
434 2a, 2b). As a result, it was possible to further test Prediction 1: as the personalizing aspect of  
435 the scenarios increased, the negative correlation between ratings of influences on actions  
436 without awareness increase (rating of Unconscious Manipulation) and free will (ratings of Free  
437 Will) would increase. The aim of the analysis was to also locate more specifically the effects  
438 of the manipulation in specific scenarios, where a second prediction was tested. Prediction 2:  
439 the effect of increasing the personalizing aspect of the scenarios, should increase the negative  
440 correlation between rating of influences on actions without awareness increase (rating of  
441 Unconscious Manipulation) and free will (ratings of Free Will) for scenarios that are  
442 prototypically associated with the unconscious (e.g. sleep, hypnosis, subliminal processing).

#### 443 **Methods**

444 *Participants:* A total of 1230 participants were included in the analysis. The demographic  
445 details of each of the samples from the 8 studies (Osman, 2020 (Study 2, 3); Osman &  
446 Bechlivanidis, 2021 (Study 1, 3) and current studies (Study 1a, 1b, 2a, 2b) included in the meta-  
447 analysis are presented in Table 1.

448         The recruitment methods for all studies included in the meta-analysis were the same,  
449 using Qualtrics (<https://www.qualtrics.com/uk/>) as the means of presenting the studies online,  
450 and Prolific (<https://www.prolific.co/>) to recruit participants. When taking part in the study,  
451 participants were asked to provide responses to 5 demographic questions (age, gender,  
452 education level, political affiliation, religiosity), these are summarized in Table 1. All of the  
453 studies either received ethical approval from Queen Mary University of London (QMUL)  
454 college ethics board, QMERC2018/54 (Osman, 2020; Osman & Bechlivanidis, 2021) or  
455 University College London (UCL) college ethics board, EP/2017/005 (current studies).

456         *Design:* In all 8 Studies there was the main dependent variable which concerned ratings,  
457 and five demographic questions (i.e. Age, Gender, Education level, Political affiliation). The  
458 ratings (rating of Unconscious Manipulation, rating of Free Will) for 16 scenarios drawn from  
459 those volunteered by the subjects in Osman’s (2020) study (See Table 2). While other ratings  
460 were included in the 8 studies, the focus of the meta-analysis is on the two ratings that  
461 consistently appeared in all 8 studies, albeit with different formulations.

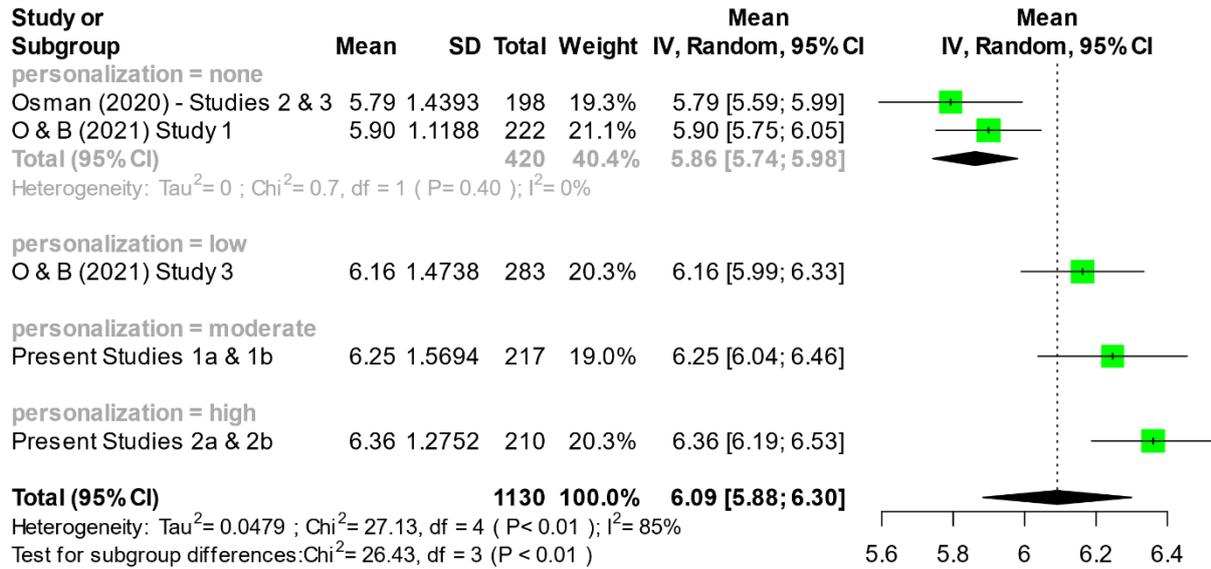
462         *Materials:* The 16 scenarios were those generated from Osman’s study (2020, Study 1)  
463 (see Table 2). We include only 16 instead of the 18 scenarios included in the present study and  
464 Osman & Bechlivanidis (2021), because not all scenarios were presented across the 8 studies  
465 (in particular, the two management scenarios, ‘Interviews’ and ‘Promotion’ were left out– see  
466 Table 2). The main dependent measures used for meta-analytic purposes in the 8 studies were  
467 the ratings of Unconscious Manipulation, and rating of Free Choice, both of which were on the  
468 same response scale ranging from 0 to 10. The critical differences between the studies were the

469 level of personalization of the scenarios based on the framing of the ratings, from impersonal  
470 (Osman, 2020, Study 2, 3; Osman & Bechlivanidis, 2021, Study 1), minimally personal  
471 (Osman & Bechlivanidis, 2021, Study 3), moderately personal (Present Study, 1a, 1b) and  
472 highly personal (Present Study, 2a, 2b).

473 *Procedure:* The same procedure was implemented across all 8 studies as described in  
474 the previous methods section. Participants were first asked to provide their consent in order to  
475 take part in the study. Once consent was provided, participants were then given instructions  
476 informing them that they would be presented with 16 real world scenarios they needed to read  
477 carefully, and then for each scenario they would be asked to make their ratings. They were  
478 informed that after they had completed all ratings for each of the 16 scenarios, and provided  
479 their responses to the five demographic questions, the study was complete.

## 480 **Results and Discussion**

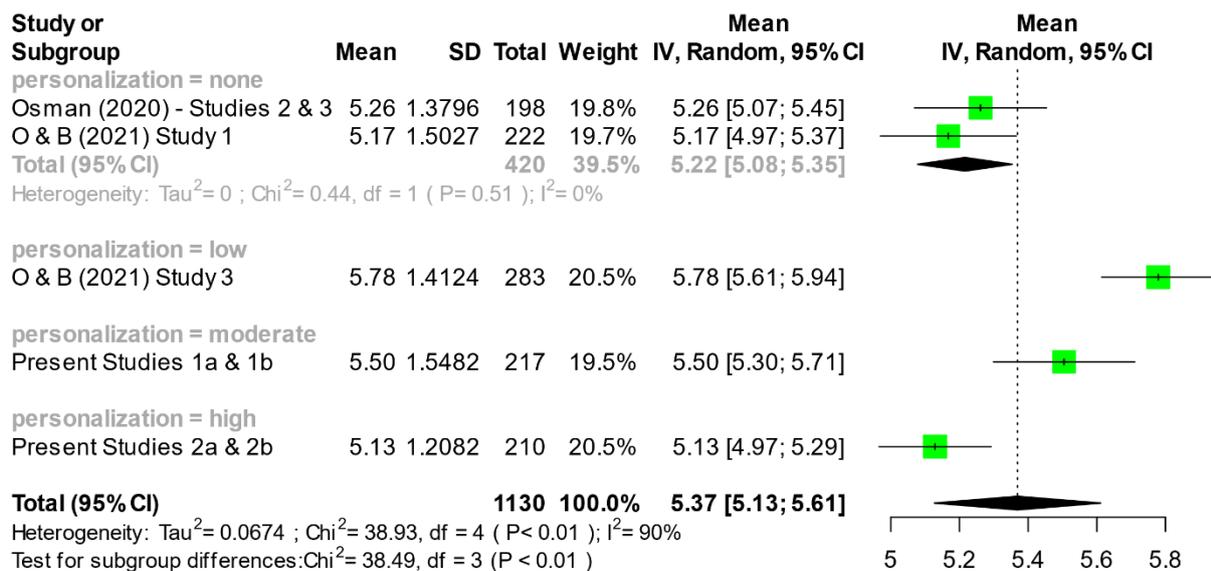
481 We conducted a random effects meta-analysis using the ‘meta’ package in R (v5.5-0;  
482 Schwarzer et al., 2015) to first examine whether there were overall differences in the ratings of  
483 Unconscious Manipulation by study (8 studies), and by level of personalization (none, low,  
484 moderate, high) (Table 4). As shown in Figure 3, there is a clear trend whereby as the degree  
485 of personalization increases, so does the average rating of Unconscious Manipulation ( $\chi^2(3,$   
486  $N=1130) = 26.43, p<.01$ ). This also serves as a manipulation check to indicate that our  
487 speculation as to the differences across studies entered into the analysis indicate a pattern of  
488 effects along the manipulation of personalisation.



489

490 Figure 3: Forest plot showing the effect of personalization (varied between studies) on ratings  
 491 of Unconscious Manipulation.

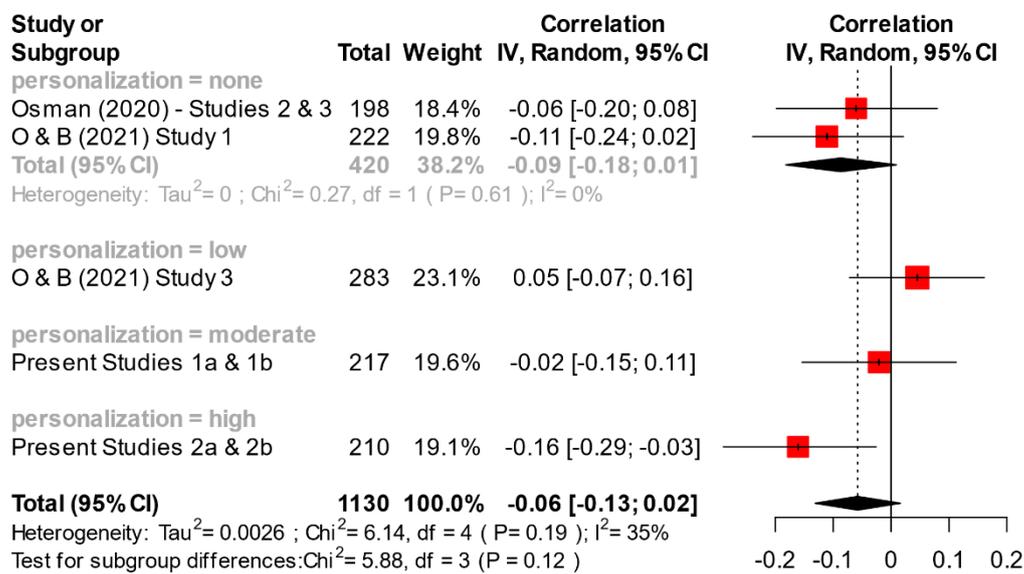
492 Repeating the same analysis for ratings of Free Will (Figure 4) shows that although the effect  
 493 of personalization is also significant ( $\chi^2(3, N=1130) = 26.43, p<.01$ ), the trend is less clear.  
 494 Nevertheless, if we take into account that some studies didn't emphasise personalised element  
 495 (Osman, 2020 and its replication, Osman & Bechlivanidis, 2021), we can still see that as the  
 496 degree of personalization increases, ratings of Free Will tend to decrease.



497

498 Figure 4: Forest plot showing the effect of personalization (varied between studies) on ratings  
 499 of Free Will.

500 This is also evident in the meta-analysis of the correlation between the two variables  
 501 (Unconscious Manipulation, Free Will) across studies and degrees of personalization. As  
 502 shown in Figure 5. Again, taking into account that for some there was no or little mention of  
 503 personalization (Osman, 2020); Osman & Bechlivanidis, 2021), the negative correlation  
 504 becomes stronger as the degree of personalization increases, and support Prediction 1.

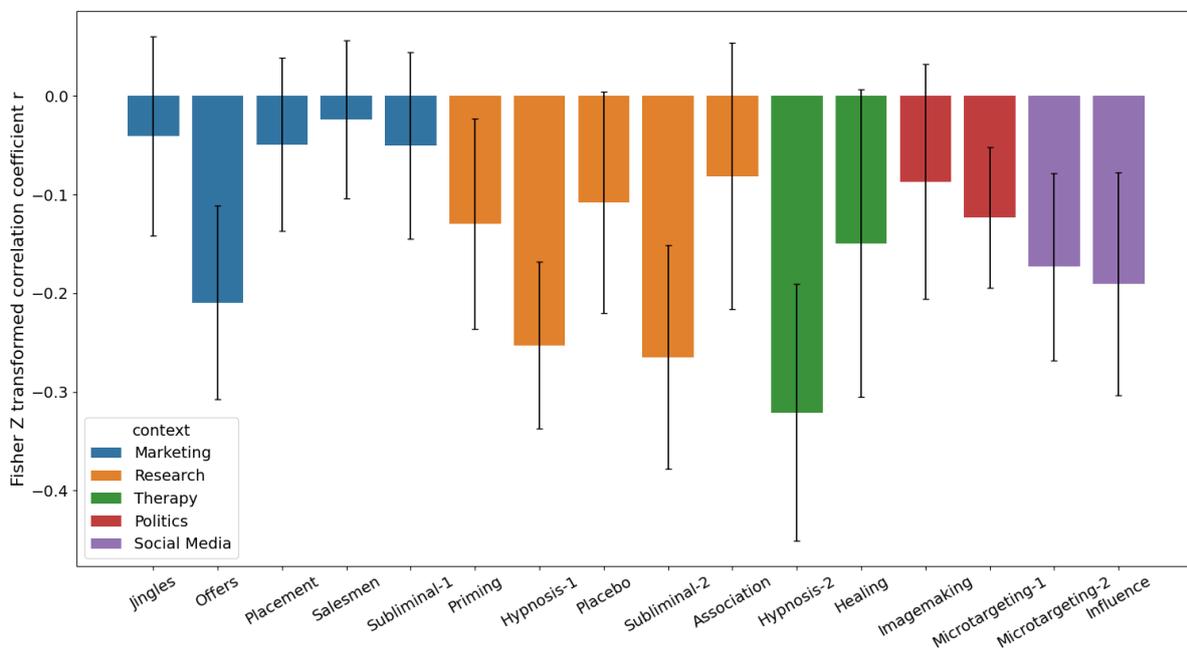


505  
 506 Figure 5: Forest plot showing the correlation between ratings of Unconscious Manipulation  
 507 and Free Will by degrees of personalization (varied between studies).

508 **Negative association between Unconscious Manipulation and Free choice, by Scenario**

509 Beyond the degree of personalization, we suspected that the variance in the strength of the  
 510 correlation between Unconscious Manipulation and Free Will could be due to the different  
 511 scenarios that were included in the studies. In other words, rather than applying a general rule  
 512 according to which, for example, free will decreases when choices are unconsciously  
 513 manipulated, participants may judge that in the presence of manipulation, free will is attributed  
 514 to different degrees, depending on the particular context and manipulation technique. To

515 examine this, we conducted multiple random-effects meta-analyses of the correlation between  
 516 Unconscious Manipulation and Free Will, one for each of the 16 scenarios (See Table 3 for  
 517 details) included in all 8 studies. The results indicate that, although the correlation between  
 518 Unconscious Manipulation and Free Will is negative for all scenarios (Figure 6), the (z-  
 519 transformed) correlation coefficient was significantly below 0 for exactly half the scenarios:  
 520 three research scenarios (hypnosis, subliminal probes), both social media scenarios  
 521 (microtargeting, general influence), one scenario from marketing (using 2-for-1 offers), one  
 522 from therapy (hypnosis) and one from politics (microtargeting).



523  
 524 Figure 6: Correlations between Unconscious Manipulation and Free Will for the 16 scenarios  
 525 included in all studies (the scenario labels refer to scenarios in Table 2). The error bars  
 526 represent 95% confidence intervals.

527 **General Discussion**

528 The aim of the present study was to further explore the relationship between  
 529 manipulation outside of awareness on free will, given that previous findings have revealed a  
 530 weak relationship between the two (Osman, 2020; Osman & Bechlivandis, 2021). The  
 531 motivation was to provide evidence that could inform the way in which we conceptualize the

532 threat that manipulation outside of awareness poses to free choice, based on what people judge  
533 themselves.

#### 534 **Summary of findings and support for predictions**

535 Lending support to Prediction 1, the empirical studies (Study 1a, 1b, Study 2a, 2b)  
536 showed that instructions designed to greater personalize the scenarios revealed a stronger  
537 relationship between judgments of manipulation and judgments of free will. This was achieved  
538 by emphasizing that participants were in the scenario (second person), as well as emphasizing  
539 that the manipulation *had occurred* to them (Study 2a & 2b), rather than *could have occurred*  
540 to them (Study 1a, 1b, Osman & Bechlivanidis, 2021 Study 3). Another way to interpret the  
541 role of personalization is related to responsibility attribution. The impersonal framing may be  
542 leading participants to judgements in relation to third parties, and, as a result, they may be less  
543 willing to attribute a lower level of responsibility even in the presence of manipulations. When  
544 the judgments become truly personal, participants may be thinking more about the  
545 manipulation mechanisms employed and be more open to accept diminished responsibility.  
546 This is of course a speculation that would require further empirical testing.

547 We have also found evidence for influences of personal characteristics on the various  
548 judgements, especially in Study 2, where the level of personalization was at its highest. These  
549 were unexpected, as they were not observed in previous studies where the framing was third  
550 person or second person but with minimal investment. This time we find that women provide  
551 higher judged unconscious manipulation overall, less free will, less control and more concern  
552 compared to men. Although older adults are also more concerned than younger adults, they  
553 attribute more free will and give lower judgements as to the success of the described  
554 manipulation. Given that we didn't have expectations about individual differences, our sample  
555 was not always balanced in that respect, suggesting that more focused work is needed. Such  
556 work should pay special attention to the way judgements are framed. Our results suggest that

557 the consensus across groups is generally observed when the materials are presented in an  
558 impersonalized manner. When the materials become personalized, participants consider the  
559 determinants of the manipulative tactics in the scenarios relative to their own behavior, and  
560 possibly their responsibility.

561 **Implications of the findings for different approach considering the relationship between**  
562 **manipulation and autonomy, free choice and free will**

563         Returning to the three different approaches outlined at the start, from a theoretical  
564 standpoint, many would propose that manipulation of behavior is a threat to autonomy, and by  
565 extension free choice and free will, which are constituents of autonomy. Therefore, no  
566 empirical evidence, either regarding the efficacy of the manipulative techniques, or folk beliefs  
567 on free will would impact the claims made by this approach. Nonetheless, the value of  
568 considering the theoretical approach is that it provides a necessary analysis of the ethics of  
569 psychological manipulation (e.g., Noggle, 2018), along with examining the responsibility and  
570 accountability of authorities that use psychological methods to regulate the behavior of citizens  
571 (e.g., Jones et al., 2013).

572         The implications of findings from folk psychological beliefs on the extent to which  
573 autonomy is preserved in light of psychological tactics is that it reveals where beliefs depart  
574 from the efficacy of the tactics based on the empirical approach. As indicated, work on  
575 hypnosis and hypnotherapy suggests that widely held beliefs in and out of academia, are  
576 inconsistent with what the evidence shows (e.g., Lynn et al., 2020). Myths and misconceptions  
577 include the belief that hypnosis produces a trance or special state of consciousness, neither of  
578 which are empirically supported (e.g., Kirsch et al., 2008; Mazzoni et al., 2009). Similarly,  
579 there are myths and misconceptions regarding subliminal advertising (Rogers, 1992), in  
580 particular, that we are all frequently confronted with subliminal adverts (Haberstroh, 1994), to  
581 date (Borovac-Zekan, & Zekan, 2022). As discussed previously, empirical work under

582 controlled laboratory settings finds it hard to establish any reliable influences of subliminal  
583 adverts on behavior (e.g., Smarandescu & Shimp, 2015), where, at best reliable effects are  
584 restricted to changes in emotional or physiological states (Karremans et al., 2006; Verwijmeren  
585 et al., 2011). Moreover, there are also issues raised as to whether people are in fact unaware of  
586 the presence of the primes that could influence their behavior unconsciously (Newell & Shanks,  
587 2014). The same issues extend to offline learning, that is either acquiring new information prior  
588 to sleep, or during sleeping, which later enhances memory or performance. One of the most  
589 common myths about sleep is hypnopedia, the ability to acquire new knowledge by playing  
590 recordings while asleep that could lead to learning a new language (e.g., Nouri, 2015), likely  
591 based on early work in the 50's (Hoskovec, 1966). However, the empirical work regarding  
592 offline learning, in its various forms is extremely mixed (Capezuti et al., 2022; Landry,  
593 Anderson, & Conduit, 2016; Nemeth et al., 2010; Schimke et al., 2021; Stickgold, 1998).

594         The implication here is that the empirical evidence regarding efficacy of these  
595 prototypical examples has not made it to the public domain, to inform accurate judgments of  
596 success of manipulative tactics. This also suggests that there is room for greater public  
597 understanding of behavioral science, and what it can offer, along with how the effects on  
598 behavior via methods that target unconscious processes are achieved, and where the limitations  
599 in achieving those effects lie. Resistance to correcting misapprehensions of psychology may  
600 be affected by the intuitive nature of the myths around hypnosis, subliminal advertising and  
601 sleep research. These may contribute to continuing skepticism of the science as whole  
602 (Lilienfeld, 2012), as well as problems in how psychology portrays itself, where it fuels  
603 apprehensions by overstating the reliability of findings (Ferguson, 2015; Trafimow & Osman,  
604 2022). Not only would greater efforts in science communication to the public increase  
605 understanding of the contributions and limitations of the field, it would also enable informed

606 public debates concerning the application of psychological methods in day to day contexts, and  
607 where the ethical boundaries should lie.

608 **Speculations as to why there are differences between the strength of the relationship**  
609 **between manipulation and free will**

610         Beyond the degree of personalization, we find that participants don't make the same  
611 attributions for each scenario. Our meta-analysis of the 8 studies, found that the strongest  
612 relationship between the critical judgments of Unconscious Manipulation and Free Will were  
613 in scenarios that are typically associated with unconscious (i.e. hypnosis targeting choice  
614 behavior, subliminal advertising, subliminal priming, influencing behavior by playing  
615 messages while asleep), as well as those related with novel techniques and media  
616 (microtargeting, social media). The weakest negative effects were found in a range of other  
617 scenarios, mostly in marketing contexts (i.e. communication styles of political leaders  
618 campaigning, jingles in supermarkets, product placement in supermarkets, sales tactics in car  
619 dealerships).

620         Consistent with Prediction 2, this suggests that there may be prototypical examples of  
621 psychological tactics employed to manipulate behavior outside of awareness, and this is where  
622 free choice is impacted the most. But the analysis revealed other scenarios where people were  
623 sensitive to manipulation. Taken together, it may be the case that for prototypical examples of  
624 psychological manipulation people recruit commonly held myths about the known processes  
625 that enable manipulation to occur. But for other new examples (e.g. microtargeting, social  
626 media) the mechanisms are unknown or too complicated to determine, and this is the basis on  
627 which manipulation is judged to be high, and free will is impacted. In other words, at the  
628 extremes, common knowledge about mechanisms that target the unconscious help to reveal the  
629 threat to free choice, but, the absence of such knowledge becomes itself a reason to judge the  
630 technique as a threat to free choice. This forms a viable basis on which to further investigate

631 where differences lie regarding day to day exposure of psychological manipulative tactics, and  
632 their impact on free choice. Of note, and consistent with previous findings (e.g., Clark, et al.,  
633 2019; Vonasch, et al., 2018), free choice was never entirely eliminated in any of the studies  
634 included in our analyses, suggesting that people still reserve some ability to do otherwise,  
635 resisting the total influence of the methods on their ability to exercise free choice.

### 636 **Limitations**

637         There are several limiting factors regarding the present study, and those included in the  
638 meta-analysis. First of all, the judgments are based around scenarios that were generated by  
639 participants in Osman's (2020) study. While they are examples that participants volunteered  
640 themselves, there are many other examples that could be included that are worth exploring, for  
641 instance, the use of algorithms to rank order popular news items in news feeds or in social  
642 media, or behavioral change interventions, such as nudges that can guide practical choices,  
643 such as what to eat, what settings to use on one's smartphone, or what exercise routine one  
644 employs. Thus, expanding the set of examples from which to examine folk beliefs on  
645 psychological manipulative methods on free will is important to further explore what drives  
646 the differences in strength of the relationship between the two constructs.

647         Another limitation is that not all judgments, and not all scenarios were employed  
648 consistently across the 8 studies, though the reasons for this were determined by the specific  
649 research questions addressed in each study. Moreover, some judgments were not included  
650 consistently across all studies. For instance, success of the manipulation was a judgment that  
651 was only used in Study 2 of the present work, while ratings of judged responsibility of the  
652 outcomes of a manipulation were only included in Osman and Bechlivanidis (2021, Study 3).  
653 So, for future work, the same bank of judgments could be used to better inform why the  
654 relationship between manipulation and free choice is found in some scenarios and not others.

655           Also, while the presentation of the judgments for each scenario were randomized, it is  
656 not possible to rule out that responses to one judgment may have informed responses to others,  
657 though we do show that not all judgments were consistently correlated with each other. A better  
658 demonstration would have been to use an independent design where conditions would separate  
659 out participants based on the types of judgment they would be required to make for each  
660 scenario. All these limiting factors could be overcome in future studies designed to further  
661 explore different psychological manipulative methods and their mechanisms that differentially  
662 impact perceived free choice.

### 663 **Conclusions**

664           Past work examining folk beliefs on the effects of manipulation without awareness on  
665 free will has revealed a weak relationship between the two. There were three speculations of  
666 this that the present study was designed to inform. It may have been the case that people were  
667 not previously invested in the day to day scenarios to see any impact on their free will as  
668 particularly important. By introducing manipulations that increased the personalized element  
669 of day to day examples people were presented, a strong negative relationship between  
670 psychological manipulative tactic and attributions of free will. Thus, personal investment  
671 matters. Second, a further reason for the prior weak relationship between manipulation without  
672 awareness and free will could be because it is specific to particular types of scenarios. In  
673 response, a meta-analysis was included of 8 studies examining folk beliefs of unconscious  
674 manipulation in day to day scenarios, which indicates that the negative relationship is sensitive  
675 to where the manipulation occurs. The findings show that the relationship is stronger in some  
676 scenarios that are prototypical examples of manipulation without awareness (e.g., hypnosis  
677 targeting choice behavior, subliminal advertising, subliminal priming, influencing behavior by  
678 playing messages while asleep) as well as examples of novel examples techniques and contexts  
679 (e.g. microtargeting of adverts, social media). Finally, a further consideration is that regardless

680 of the judged level of manipulation, people still attribute having free will. The findings show  
681 that overall people still maintain a compatibilist position, where even in the most extreme  
682 examples of manipulation, they still have free will.

683

684

Table 1. *Participants profiles* by study, Current Studies (1a, 1b, 2a, 2b), Osman 2020

685 (Study 2, 3) Osman & Bechlivanidis (2021) (Study 1, 3).

Study.	Sample	No.	Age	Gender	Education	Religiosity	Political affiliation
<b>Current 1a</b>	UK	111	Mean 37.81 ( <i>SD</i> = 13.92) ranging from 19-74	Male 47%, Female 51%, prefer not to say 2%	Graduate/post-grad 58%, Non-university 36%, prefer not to say 6%	Religious 23%, Non-religious 72%, Prefer not to say/other 5%	Liberal 29%, Centre 11%, Conservative 9%, prefer not to say/other 51%
<b>Current 1b</b>	UK	106	Mean 39.21 ( <i>SD</i> = 14.30) ranging from 19-71	Male 51%, Female 46%, prefer not to say 3%	Graduate/post-grad 52%, Non-university 37%, prefer not to say 11%	Religious 27%, Non-religious 71%, Prefer not to say/other 2%	Liberal 23%, Centre 10%, Conservative 7%, prefer not to say/other 60%
<b>Current 2a</b>	UK	106	Mean 39.25 ( <i>SD</i> = 14.92) ranging from 19-77	Male 49%, Female 51%	Graduate/post-grad 61%, Non-university 31%, prefer not to say 8%	Religious 34%, Non-religious 64%, Prefer not to say/other 2%	Liberal 36%, Centre 10%, Conservative 8%, prefer not to say/other 46%
<b>Current 2b</b>	UK	104	Mean 43.51 ( <i>SD</i> = 15.05) ranging from 21-77	Male 49%, Female 51%	Graduate/post-grad 65%, Non-university 21%, prefer not to say 14%	Religious 41%, Non-religious 57%, Prefer not to say/other 2%	Liberal 31%, Centre 7%, Conservative 15%, prefer not to say/other 48%
<b>Osman (2020) 2</b>	UK, US, Canada, Australia	198	Mean 31.06 ( <i>SD</i> = 8.93) ranging from 18-61	Male 49%, Female 50%, prefer not to say 1%	Graduate/post-grad 52%, Non-university 32%, prefer not to say 16%	Religious 50%, Non-religious 32%, Prefer not to say/other 18%	Liberal 35%, Centre 20%, Conservative 9%, prefer not to say/other 36%
<b>3</b>	UK	100	Mean 36.28 ( <i>SD</i> = 12.19) ranging from 19-66	Male 31%, Female 69%	Graduate/post-grad 58%, Non-university 29%, prefer not to say 13%	Religious 45%, Non-religious 36%, Prefer not to say/other 19%	Liberal 40%, Centre 0%, Conservative 9%, prefer not to say/other 51%
<b>O &amp; B (2021) 1</b>	UK, US, Canada, Australia	222	Mean 33.85 ( <i>SD</i> = 11.39) ranging from 18-70	Male 43%, Female 55%, prefer not to say 2%	Graduate/post-grad 68%, Non-university 28%, prefer not to say 4%	Religious 38%, Non-religious 45%, Prefer not to say/other 17%	Liberal 49%, Centre 8%, Conservative 8%, prefer not to say/other 35%
<b>O &amp; B (2021) 3</b>	UK, US, Canada, Australia	283	Mean 34.39 ( <i>SD</i> = 11.50) ranging from 18 = 69	Male 36%, Female 63%, prefer not to say 1%	Graduate/post-grad 61%, Non-university 33%, prefer not to say 6%	Religious 27%, Non-religious 51%, Prefer not to say/other 22%	Liberal 43%, Centre 6%, Conservative 10%, prefer not to say/other 41%

686

687

688

689

690

691

692

693 Table 2. Contexts and scenarios (from Osman, 2020)  
694

<b>Context</b>	<b>Scenario</b>	<b>Name</b>
<b>Advertising Marketing</b>	Advertisement jingles that are used so that people think of the product when they hear the jingle and then buy the product.	Jingles
	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.	Offers
	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.	Placement
	Car Dealerships that employ staff to steer people by the way that they pose certain questions so that people spend more money.	Salesmen
	Subliminal adverts (messages flashed so quickly that people are not aware of seeing them) that show a product so that it stays in people's mind and they then go and buy the product.	Subliminal-1
<b>Management</b>	When those in senior management in an organisation are interviewing candidates to join a team and making judgement calls on who best suits the job.	Interviews
	When those in senior management positions are considering who from the team should be nominated for promotion.	Promotion
<b>Research</b>	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.	Priming
	Research studying people sleeping that involves playing messages to them while they are asleep to examine the influence on their mind.	Hypnosis-1
	Research that involves giving people sugar cubes posing as pills to study the influence on peoples’ mental belief that the pills will have a positive effect on their health.	Placebo
	Research that flashes up positive or negative information so quickly that people are not aware of seeing it, and then studying the effect on peoples’ attitudes towards the quickly flashed up information.	Subliminal-2
	Research that examines biases by creating either positive or negative links with a neutral piece of information, and then studying how it effects the way people then perceive the information.	Association
<b>Therapy</b>	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.	Hypnosis-2

	Hypnotic methods that are used on people to uncover hidden memories so that it is possible to heal them from past traumas.	Healing
<b>Political campaigning</b>	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.	Imagemaking
	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.	Microtargetting-1
<b>Social Media</b>	Social Media that use advertisements targeted towards specific groups of people in such a way as to influence their opinions.	Microtargetting-2
	Social Media that is designed in such a way so that the people experience it in such a way that it influences the way that they think.	Influence

695  
696  
697  
698  
699  
700

701

702 Table 3. Ratings used in Study 1 (1a, 1b) and Study 2 (2a, 2b)

Level of personalization	High	Moderate	Low	None
Ratings type	Current Study 2a & 2b	Current Study 1a & 1b	Osman & Bechlivanidis (2021) Study 3	Osman (2020) Study 2, 3; Osman & Bechlivanidis (2021) Study 1
Rating of the Unconscious Manipulation	Imagine you are in a situation like this right now. To what extent do you think your critical choices ARE BEING unconsciously manipulated through the processes described here? (0 = not at all unconsciously manipulated to 10 = entirely unconsciously manipulated)	To what extent do you think that your critical choices in this situation COULD HAVE been unconsciously manipulated? (0 = not at all unconsciously manipulated to 10 = entirely unconsciously manipulated)	To what extent do you think that [reference to method of influence] influences [reference to the choice behavior] you unconsciously? (0 = not at all unconsciously manipulated to 10 = entirely unconsciously manipulated)	To what extent do you think that [reference to method of influence] influences [reference to behavior] unconsciously? (0 = not at all unconsciously manipulated to 10 = entirely unconsciously manipulated)
Ratings of Free Will	Imagine you are in a situation like this right now. To what extent do you think your critical choices in this situation are FREE, given that they ARE BEING unconsciously manipulated? (0 = not at all free to 10 = completely free)	To what extent do you think your critical choices in this situation are FREE, given that they COULD HAVE been unconsciously manipulated? (0 = not at all free to 10 = completely free)	To what extent do you think that [reference to the behavior] under the influence [reference to method of influence] is the result of your free choice? (0 = not at all free to 10 = completely free)	To what extent do you think that [reference to the behavior] under the influence [reference to method of influence] is the result of free choice? (0 = not at all free to 10 = completely free)
Ratings of Personal Experience	To what extent have you had personal experience with something like what is described in the scenario? (0 = no experience at all to 10 = highly frequent experiences)	To what extent have you had personal experience with something like what is described in the scenario? (0 = no experience at all to 10 = highly frequent experiences)		
Ratings of Personal Concern	Imagine you are in a situation like this right now. To what extent do you care given that your critical choices here ARE BEING unconsciously manipulated? (0 = do not care at all to 10 = care hugely)	To what extent do you care that your critical choices COULD HAVE been unconsciously manipulated? (0 = do not care at all to 10 = care hugely)		

*Personalizing experiences of manipulations outside of awareness*

---

Ratings of Control	Imagine you are in a situation like this right now, to what extent do you have ultimate control over your critical choices here given that they ARE BEING unconsciously manipulated? (0 = no control at all to 10 = complete control)	To what extent do you have ultimate control over your critical choices given that they COULD HAVE been unconsciously manipulated? (0 = no control at all to 10 = complete control)
--------------------	---	--

---

Ratings of Success of the manipulation	Imagine you are in a situation like this right now, to what extent do you think your critical choices ARE BEING successfully unconsciously manipulated through the processes described here? (0 = not at all successful to 10 = entirely successful)	
--	--	--

---

703

704

705

706

707

708

709 Table 4. Mean (SD) ratings by study, Current Studies (1a, 1b, 2a, 2b), Osman 2020 (Study 2,  
710 3) Osman & Bechlivanidis (2021) (Study 1, 3).

711

<b>O &amp; B (2022)</b>	<b>Unconscious manipulation</b>	<b>Free Will</b>	<b>Personal Experience</b>	<b>Concern</b>	<b>Control</b>	<b>Success of manipulation</b>
<b>1a (N = 111)</b>	6.34 (2.80)	5.43 (2.73)	3.99 (3.35)	5.44 (3.03)	5.79 (2.68)	
<b>1b (N = 106)</b>	6.15 (2.87)	5.58 (2.81)	3.88 (3.36)	5.56 (3.08)	5.74 (2.78)	
<b>2a (N = 106)</b>	6.36 (2.74)	5.17 (2.75)	3.78 (3.42)	5.56 (3.04)	5.45 (2.83)	5.05 (2.57)
<b>2b (N = 104)</b>	6.36 (2.66)	5.09 (2.72)	4.08 (3.33)	5.48 (2.98)	5.41 (2.81)	5.01 (2.49)
<b>O &amp; B (2021)</b>						
<b>1 (N = 198)</b>	5.89 (2.57)	5.16 (2.78)				
<b>3 (N = 100)</b>	6.16 (2.71)	5.78 (2.65)				
<b>O (2020)</b>						
<b>2 (N = 222)</b>	5.79 (2.65)	5.26 (2.67)				
<b>3 (N = 283)</b>	6.00 (2.62)	4.75 (2.84)				

712

713

714

715

716

717

718

719

720

721

722

723

724

725

726

727

728

729

730

731

732

733

734

## References

- 735 Acunzo, D. J., & Terhune, D. B. (2021). A critical review of standardized measures of  
736 hypnotic suggestibility. *International Journal of Clinical and Experimental*  
737 *Hypnosis*, 69(1), 50-71.
- 738 Aylsworth, T. (2020). Autonomy and manipulation: Refining the argument against persuasive  
739 advertising. *Journal of Business Ethics*, 1-11.
- 740 Barnier, A. J., & McConkey, K. M. (2004). Defining and identifying the highly hypnotizable  
741 person. *The highly hypnotizable person: Theoretical, experimental and clinical*  
742 *issues*, 15, 30-61.
- 743 Bastick, Z. (2021). Would you notice if fake news changed your behavior? An experiment on  
744 the unconscious effects of disinformation. *Computers in human behavior*, 116,  
745 106633.
- 746 Bermeitinger, C., Goelz, R., Johr, N., Neumann, M., Ecker, U. K., & Doerr, R. (2009). The  
747 hidden persuaders break into the tired brain. *Journal of experimental social*  
748 *psychology*, 45(2), 320-326.
- 749 Berniūnas, R., Beinorius, A., Dranseika, V., Silius, V., & Rimkevičius, P. (2021). The  
750 weirdness of belief in free will. *Consciousness and Cognition*, 87, 103054.
- 751 Bovens, L. (2009). The ethics of nudge. In *Preference change* (pp. 207-219). Springer,  
752 Dordrecht.
- 753 Borovac-Zekan, S., & Zekan, I. (2022). Subliminal messages in advertising: Do they really  
754 work? In *DIEM: Dubrovnik International Economic Meeting*, 7, 1, 102-113.
- 755 Capezuti, E., Pain, K., Alamag, E., Chen, X., Philibert, V., & Krieger, A. C. (2022).  
756 Systematic review: auditory stimulation and sleep. *Journal of Clinical Sleep*  
757 *Medicine*, 18(6), 1697-1709.
- 758 Chukwuma, J. N., & Ngwoke, H. C. (2022). Moral and ethical issues in advertising. *Journal*  
759 *of Legal, Ethical and Regulatory Issues*, 25(3).
- 760 Clark, C. J., Winegard, B. M., & Baumeister, R. F. (2019). Forget the folk: moral  
761 responsibility preservation motives and other conditions for compatibilism. *Frontiers*  
762 *in psychology*, 10, 215.
- 763 Clee, M. A., & Wicklund, R. A. (1980). Consumer behavior and psychological  
764 reactance. *Journal of consumer research*, 6(4), 389-405.

- 765 Coons, C., & Weber, M. (2014). *Manipulation: theory and practice*. Oxford University Press.
- 766 Cornwell, J. F., & Krantz, D. H. (2014). Public policy for thee, but not for me: Varying the  
767 grammatical person of public policy justifications influences their support. *Judgment*  
768 *and Decision Making*, 9(5), 433.
- 769 Crisp, R. (1987). Persuasive advertising, autonomy, and the creation of desire. *Journal of*  
770 *Business Ethics*, 6(5), 413-418.
- 771 Dan-Cohen, M. (1992). Conceptions of choice and conceptions of autonomy. *Ethics*, 102(2),  
772 221-243.
- 773 Davison, W. P. (1983). The third-person effect in communication. *Public opinion*  
774 *quarterly*, 47(1), 1-15.
- 775 Deci, E. L., & Ryan, R. M. (2012). Self-determination theory. In P. A. M. Van Lange, A. W.  
776 Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (Vol.  
777 1, pp. 416–437). Thousand Oaks, CA: Sage.
- 778 Deutschländer, R., Pauen, M., & Haynes, J. D. (2017). Probing folk-psychology: Do Libet-  
779 style experiments reflect folk intuitions about free action?. *Consciousness and*  
780 *cognition*, 48, 232-245.
- 781 Dienes, Z., & Hutton, S. (2013). Understanding hypnosis metacognitively: rTMS applied to  
782 left DLPFC increases hypnotic suggestibility. *Cortex*, 49(2), 386-392.
- 783 Double, R. (1990). *The non-reality of free will*. Oxford University Press.
- 784 Downie, R. S., & Telfer, E. (1971). Autonomy. *Philosophy*, 46(178), 293-301.
- 785 Dworkin, G. (1988). *The theory and practice of autonomy*. Cambridge University Press.
- 786 Facco, E., Bacci, C., Casiglia, E., & Zanette, G. (2021). Preserved critical ability and free will  
787 in deep hypnosis during oral surgery. *American Journal of Clinical Hypnosis*, 63(3),  
788 229-241.
- 789 Ferguson, C. J. (2015). “Everybody knows psychology is not a real science”: Public  
790 perceptions of psychology and how we can improve our relationship with  
791 policymakers, the scientific community, and the general public. *American*  
792 *Psychologist*, 70(6), 527–542
- 793 Fischer, A. (2022). Manipulation and the Affective Realm of Social Media. In *The Philosophy*  
794 *of Online Manipulation* (pp. 327-352). Routledge.

- 795 Fischer, J. M. (1994). *The metaphysics of free will* (Vol. 1). Oxford: Blackwell.
- 796 Ford, A., Eadie, D., Adams, J., Adamson, A., White, M., & Stead, M. (2020). Parents' and  
797 carers' awareness and perceptions of UK supermarket policies on less healthy food at  
798 checkouts: A qualitative study. *Appetite, 147*, 104541
- 799 Forstmann, M., & Burgmer, P. (2018). A free will needs a free mind: Belief in substance  
800 dualism and reductive physicalism differentially predict belief in free will and  
801 determinism. *Consciousness and cognition, 63*, 280-293.
- 802 Golan, G. J., & Day, A. G. (2008). The first-person effect and its behavioral consequences: A  
803 new trend in the twenty-five year history of third-person effect research. *Mass  
804 Communication and Society, 11*(4), 539-556.
- 805 Gold, N., Lin, Y., Ashcroft, R., & Osman, M. (2020). 'Better off, as judged by themselves':  
806 do people support nudges as a method to change their own behavior?. *Behavioural  
807 Public Policy, 1-30*.
- 808 Gatti, L., Pizzetti, M., & Seele, P. (2021). Green lies and their effect on intention to  
809 invest. *Journal of business research, 127*, 228-240.
- 810 Gillespie, B., & Joireman, J. (2016). The role of consumer narrative enjoyment and persuasion  
811 awareness in product placement advertising. *American Behavioral Scientist, 60*(12),  
812 1510-1528.
- 813 Green, J. P., & Lynn, S. J. (2010). Hypnotic responsiveness: Expectancy, attitudes, fantasy  
814 proneness, absorption, and gender. *International Journal of Clinical and  
815 Experimental Hypnosis, 59*(1), 103-121.
- 816 Gorton, W. A. (2016). Manipulating citizens: How political campaigns' use of behavioral  
817 social science harms democracy. *New Political Science, 38*(1), 61-80.
- 818 Gozli, D. (2019). Free Choice. In *Experimental psychology and human agency* (pp. 113–  
819 136). Cham: Springer.
- 820 Haberstroh, J. (1994). *Ice Cube Sex: The Truth about Subliminal Advertising*. Notre Dame:  
821 Cross Cultural Publications.
- 822 Haggard, P., Cartledge, P., Dafydd, M., & Oakley, D. A. (2004). Anomalous control: when  
823 'free-will' is not conscious. *Consciousness and cognition, 13*(3), 646-654.
- 824 Handelman, S. (2009). *Thought manipulation: the use and abuse of psychological trickery*.  
825 ABC-CLIO.

- 826 Holmes, Y. M., Beitelspacher, L. S., Hochstein, B., & Bolander, W. (2017). "Let's make a  
827 deal:" Price outcomes and the interaction of customer persuasion knowledge and  
828 salesperson negotiation strategies. *Journal of Business Research*, 78, 81-92.
- 829 Hoskovec, J. (1966). Hypnopedia in the Soviet Union: A critical review of recent major  
830 experiments. *International Journal of Clinical and Experimental Hypnosis*, 14(4),  
831 308-315.
- 832 Hsu, L., & Chen, Y. J. (2020). Neuromarketing, subliminal advertising, and hotel selection:  
833 An EEG study. *Australasian Marketing Journal (AMJ)*, 28(4), 200-208.
- 834 Jones, R., Pykett, J., & Whitehead, M. (2013). Behaviour change policies in the UK: an  
835 anthropological perspective. *Geoforum*, 48, 33-41.
- 836 Jongepier, F., & Klenk, M. (Eds.). (2022). *The Philosophy of Online Manipulation*. Taylor &  
837 Francis.
- 838 Jung, J. Y., & Mellers, B. A. (2016). American attitudes toward nudges. *Judgment &*  
839 *Decision Making*, 11-62.
- 840 Karremans, J. C., Stroebe, W., & Claus, J. (2006). Beyond Vicary's fantasies: The impact of  
841 subliminal priming and brand choice. *Journal of experimental social*  
842 *psychology*, 42(6), 792-798.
- 843 Kiesel, A., Wagener, A., Kunde, W., Hoffmann, J., Fallgatter, A. J., & Stöcker, C. (2006).  
844 Unconscious manipulation of free choice in humans. *Consciousness and*  
845 *Cognition*, 15(2), 397-408.
- 846 Kirsch, I., & Lynn, S. J. (1998). Dissociation theories of hypnosis. *Psychological Bulletin*,  
847 123(1), 100-115.
- 848 Kirsch, I., Mazzoni, G., Roberts, K., Dienes, Z., Hallquist, M. N., Williams, J., & Lynn, S. J.  
849 (2008). Slipping into trance. *Contemporary Hypnosis*, 25(3-4), 202-209.
- 850 Klenk, M., & Hancock, J. (2019). Autonomy and online manipulation. *Internet Policy*  
851 *Review*, 1. Retrieved from [https://policyreview.info/articles/news/autonomy-and-](https://policyreview.info/articles/news/autonomy-and-online-manipulation/1431)  
852 [online-manipulation/1431](https://policyreview.info/articles/news/autonomy-and-online-manipulation/1431).
- 853 Kotnik, V. (2021). The Rise of Transparent Manipulators and Countless Trumps in the Age  
854 of Deep Manipulation: What Have They Done to Manipulation?. *Italian Sociological*  
855 *Review*, 11(2).
- 856 Kriz, W. C., Kikkawa, T., & Sugiura, J. (2022). Manipulation through gamification and  
857 gaming. In *Gaming as a Cultural Commons*, 185-199.
- 858 Landry, S., Anderson, C., & Conduit, R. (2016). The effects of sleep, wake activity and time-

- 859 on-task on offline motor sequence learning. *Neurobiology of learning and*  
860 *memory*, 127, 56-63.
- 861 Leins, J., Waldorf, M., Suchan, B., Diers, M., Herpertz, S., Paslakis, G., & Steins-Loeber, S.  
862 (2021). Exposure to the thin beauty ideal: Are there subliminal priming  
863 effects?. *International Journal of Eating Disorders*, 54(4), 506-515.
- 864 Lilienfeld, S. O. (2012). Public skepticism of psychology: why many people perceive the  
865 study of human behavior as unscientific. *American Psychologist*, 67(2), 111-129.
- 866 Lin, Y., Osman, M., & Ashcroft, R. (2017). Nudge: concept, effectiveness, and ethics. *Basic*  
867 *and Applied Social Psychology*, 39(6), 293-306.
- 868 Linton, C. P., & Sheehan, P. W. (1994). The relationship between interrogative suggestibility  
869 and susceptibility to hypnosis. *Australian Journal of Clinical and Experimental*  
870 *Hypnosis*, 22, 53-53.
- 871 Lynn, S. J., Kirsch, I., Terhune, D. B., & Green, J. P. (2020). Myths and misconceptions  
872 about hypnosis and suggestion: Separating fact and fiction. *Applied Cognitive*  
873 *Psychology*, 34(6), 1253-1264.
- 874 Madan, A., Rosca, M. I., & Bucovicean, M. (2021). Theoretical Approach of Subliminal  
875 Advertising. In *Eurasian Business and Economics Perspectives* (pp. 293-302).  
876 Springer, Cham.
- 877 Mazzoni, G., Rotriquenz, E., Carvalho, C., Vannucci, M., Roberts, K., & Kirsch, I. (2009).  
878 Suggested visual hallucinations in and out of hypnosis. *Consciousness and Cognition*,  
879 18(2), 494-499.
- 880 Monroe, A. E., & Malle, B. F. (2014). Free will without metaphysics. In A. R. Mele  
881 (Ed.), *Surrounding free will* (pp. 25-48). New York, NY: Oxford University Press.
- 882 Monroe, A. E., & Malle, B. F. (2010). From uncaused will to conscious choice: The need to  
883 study, not speculate about people's folk concept of free will. *Review of Philosophy*  
884 *and Psychology*, 1(2), 211-224.
- 885 Moore, T. E. (1988). The case against subliminal manipulation. *Psychology &*  
886 *Marketing*, 5(4), 297-316.
- 887 Mudrik, L., Arie, I. G., Amir, Y., Shir, Y., Hieronymi, P., Maoz, U., ... & Roskies, A. (2022).  
888 Free will without consciousness?. *Trends in Cognitive Sciences*.
- 889 Murray, D., & Lombrozo, T. (2017). Effects of manipulation on attributions of causation, free  
890 will, and moral responsibility. *Cognitive science*, 41(2), 447-481.
- 891 Nemeth, D., Janacek, K., Londe, Z., Ullman, M. T., Howard, D. V., & Howard, J. H. (2010).

- 892 Sleep has no critical role in implicit motor sequence learning in young and old  
893 adults. *Experimental brain research*, 201(2), 351-358.
- 894 Newell, B. R., & Shanks, D. R. (2014). Unconscious influences on decision making: A  
895 critical review. *Behavioral and brain sciences*, 37(1), 1-19.
- 896 Nahmias, E. (2010). "Scientific challenges to free will." In O'Connor, T. and Sandis, C.  
897 (eds.), *A Companion to the Philosophy of Action*. New York, NY: Wiley-Blackwell.
- 898 Noggle, R. (1996). Manipulative actions: A conceptual and moral analysis. *American*  
899 *Philosophical Quarterly*, 33(1), 43-55.
- 900 Noggle, R. (2021). Manipulation in politics. In *Oxford Research Encyclopedia of Politics*.  
901 Oxford University Press.
- 902 Nouri, A. (2015). Cognitive neuroscience of foreign language education: Myths and  
903 realities. *Research in English language pedagogy*, 3(1), 40-47.
- 904 Oakley, D. A., Walsh, E., Lillelokken, A. M., Halligan, P. W., Mehta, M. A., & Deeley, Q.  
905 (2020). United Kingdom norms for the Harvard group scale of hypnotic susceptibility,  
906 form a. *International Journal of Clinical and Experimental Hypnosis*, 68(1), 80-104.
- 907 Oliver, A. (2015). Nudging, shoving, and budging: Behavioural economic-informed  
908 policy. *Public Administration*, 93(3), 700-714.
- 909 O'Shaughnessy, N. J. (2004). *Politics and propaganda: Weapons of mass seduction*.  
910 Manchester University Press.
- 911 Osman, M. (2008). Positive transfer and negative transfer/antilearning of problem-solving  
912 skills. *Journal of Experimental Psychology: General*, 137(1), 97-115.
- 913 Osman, M. (2014). *Future-minded: The psychology of agency and control*. Macmillan  
914 International Higher Education.
- 915 Osman, M. (2020). Overstepping the boundaries of free choice: Folk beliefs on free will and  
916 determinism in real world contexts. *Consciousness and cognition*, 77, 102860
- 917 Osman, M., & Bechlivanidis, C. (2021). Public perceptions of manipulations on behavior  
918 outside of awareness. *Psychology of Consciousness: Theory, Research, and*  
919 *Practice*. Advance online publication.

- 920 Palfi, B., Parris, B. A., McLatchie, N., Kekecs, Z., & Dienes, Z. (2021). Can unconscious  
921 intentions be more effective than conscious intentions? Test of the role of  
922 metacognition in hypnotic response. *Cortex*, *135*, 219-239.
- 923 Paulo, N., & Bublitz, C. (2019). Power to the people? Voter manipulation, legitimacy,  
924 and the relevance of moral psychology for democratic theory. *Neuroethics*, *12*(1),  
925 55-71.
- 926 Perloff, R. M. (1993). Third-person effect research 1983–1992: A review and  
927 synthesis. *International Journal of Public Opinion Research*, *5*(2), 167-184.
- 928 Perloff, R. M. (1999). The third person effect: A critical review and synthesis. *Media*  
929 *psychology*, *1*(4), 353-378.
- 930 Phillips, M. J. (1997). *Ethics and manipulation in advertising: Answering a Flawed*  
931 *Indictment*. Greenwood Publishing Group.
- 932 Pratkanis, A. R., & Greenwald, A. G. (1988). Recent perspectives on unconscious processing:  
933 Still no marketing applications. *Psychology & Marketing*, *5*(4), 337-353.
- 934 Rieznik, A., Moscovich, L., Frieiro, A., Figini, J., Catalano, R., Garrido, J. M., ... &  
935 Gonzalez, P. A. (2017). A massive experiment on choice blindness in political  
936 decisions: Confidence, confabulation, and unconscious detection of self-  
937 deception. *PLoS One*, *12*(2), e0171108.
- 938 Rigby, G. (2011). *Brand Identity And Culture: An Instant Guide for Entrepreneurs*. Harriman  
939 House Limited.
- 940 Rigoni, D., Cleeremans, A., & Brass, M. (2017). Causes and consequences of the belief in  
941 free will. In *The science of lay theories* (pp. 229-242). Springer, Cham.
- 942 Rogers, S. (1992). How a publicity blitz created the myth of subliminal advertising. *Public*  
943 *Relations Quarterly*, *37*, 12-12.

- 944 Röseler, L., Schütz, A., Blank, P. A., Dück, M., Fels, S., Kupfer, J., ... & Seida, C. (2021).  
945 Evidence against subliminal anchoring: Two close, highly powered, preregistered,  
946 and failed replication attempts. *Journal of Experimental Social Psychology*, *92*,  
947 104066.
- 948 Rothkirch, M., & Hesselmann, G. (2017). What we talk about when we talk about  
949 unconscious processing—A plea for best practices. *Frontiers in psychology*, *8*, 835.
- 950 Rubin, V. L. (2022). Manipulation in Marketing, Advertising, Propaganda, and Public  
951 Relations. In *Misinformation and Disinformation* (pp. 157-205). Springer, Cham.
- 952 Saghai, Y. (2013). Salvaging the concept of nudge. *Journal of medical ethics*, *39*(8), 487-493.
- 953 Sand, A., & Nilsson, M. E. (2016). Subliminal or not? Comparing null-hypothesis and  
954 Bayesian methods for testing subliminal priming. *Consciousness and cognition*, *44*,  
955 29-40.
- 956 Saura, J. R., Palacios-Marqués, D., & Iturricha-Fernández, A. (2021). Ethical design in social  
957 media: Assessing the main performance measurements of user online behavior  
958 modification. *Journal of Business Research*, *129*, 271-281.
- 959 Schimke, E. A., Angwin, A. J., Cheng, B. B., & Copland, D. A. (2021). The effect of sleep on  
960 novel word learning in healthy adults: A systematic review and meta-  
961 analysis. *Psychonomic Bulletin & Review*, 1-28.
- 962 Schmidt, A. T. (2017). The power to nudge. *American Political Science Review*, *111*(2), 404-  
963 417.
- 964 Schmidt, A. T., & Engelen, B. (2020). The ethics of nudging: An overview. *Philosophy*  
965 *Compass*, *15*(4), e12658.
- 966 Schneewind, J. B. (1998). *The invention of autonomy: A history of modern moral philosophy*.  
967 Cambridge University Press.

- 968 Schwarzer, G., Carpenter, J. R., & Rucker, G. (2015). Small-study effects in meta-analysis.  
969 In *Meta-analysis with R* (pp. 107-141). Springer, Cham.
- 970 Shanks, D. R., Malejka, S., & Vadillo, M. A. (2021). The challenge of inferring unconscious  
971 mental processes. *Experimental Psychology*, 68(3), 113–129.
- 972 Shanks, D. R., Newell, B. R., Lee, E. H., Balakrishnan, D., Ekelund, L., Cenac, Z., ... &  
973 Moore, C. (2013). Priming intelligent behavior: An elusive phenomenon. *PloS*  
974 *one*, 8(4), e56515.
- 975 Sheehan, K. B. (2013). *Controversies in contemporary advertising*. Sage Publications.
- 976 Shepherd, J. (2015). Consciousness, free will, and moral responsibility: Taking the folk  
977 seriously. *Philosophical Psychology*, 28(7), 929-946.
- 978 Shaver, K. G., & Scott, L. R. (1992). Person, process, choice: The psychology of new venture  
979 creation. *Entrepreneurship theory and practice*, 16(2), 23-46.
- 980 Smarandescu, L., & Shimp, T. A. (2015). Drink coca-cola, eat popcorn, and choose  
981 powerade: testing the limits of subliminal persuasion. *Marketing Letters*, 26(4), 715-  
982 726.
- 983 Spanos, N. P., Radtke, H. L., Hodgins, D. C., Bertrand, L. D., Stam, H. J., & Moretti, P.  
984 (1983). The Carleton University Responsiveness to Suggestion Scale: Relationship  
985 with other measures of hypnotic susceptibility, expectancies, and  
986 absorption. *Psychological Reports*, 53(3), 723-734.
- 987 Stickgold, R. (1998). Sleep: off-line memory reprocessing. *Trends in cognitive*  
988 *sciences*, 2(12), 484-492.
- 989 Stillman, T. F., Baumeister, R. F., & Mele, A. R. (2011). Free will in everyday life:  
990 Autobiographical accounts of free and unfree actions. *Philosophical*  
991 *Psychology*, 24(3), 381-394.

- 992 Sunstein, C. R. (2016). *The ethics of influence: Government in the age of behavioral science*.  
993 Cambridge University Press.
- 994 Sunstein, C. R. (2021). Manipulation As Theft. Harvard Public Law Working Paper No. 21-  
995 30, Available at  
996 SSRN: <https://ssrn.com/abstract=3880048> or <http://dx.doi.org/10.2139/ssrn.3880048>
- 997 Susser, D., Roessler, B., & Nissenbaum, H. (2019). Technology, autonomy, and  
998 manipulation. *Internet Policy Review*, **8**, 2, 22.
- 999 Todd, P. (2013). Manipulation, in *The International Encyclopedia of Ethics*,  
1000 ed. Hugh LaFollette, Oxford: Wiley-Blackwell: 3139–45.
- 1001 Trafimow, D., & Osman, M. (2022). Barriers to converting applied social psychology to  
1002 bettering the human condition. *Basic and Applied Social Psychology*, *44*(1), 1-11.
- 1003 Vargas, M. (2013). If free will doesn't exist, neither does water. *Exploring the illusion of free*  
1004 *will*, 177-202
- 1005 Vargas, P. T. (2018). Implicit consumer cognition. In *Handbook of consumer psychology* (pp.  
1006 482-509). Routledge.
- 1007 Verwijmeren, T., Karremans, J. C., Stroebe, W., & Wigboldus, D. H. (2011). The workings  
1008 and limits of subliminal advertising: The role of habits. *Journal of consumer*  
1009 *psychology*, *21*(2), 206-213.
- 1010 Verwijmeren, T. (2014). *The Working and Limits of Subliminal Advertising*. Netherlands:  
1011 GVO Drukkers and Vormgevers.
- 1012 Vonasch, A. J., Baumeister, R. F., & Mele, A. R. (2018). Ordinary people think free will is a  
1013 lack of constraint, not the presence of a soul. *Consciousness and cognition*, *60*, 133-  
1014 151.
- 1015 White, H. A. (1997). Considering interacting factors in the third-person effect: Argument  
1016 strength and social distance. *Journalism & Mass Communication Quarterly*, *74*(3), 557-564.

1017 White, M. D. (2013). Why Nudges Are Unethical. In *The Manipulation of Choice* (pp. 81-  
1018 102). Palgrave Macmillan, New York.

1019 Wilkinson, T. M. (2013). Nudging and manipulation. *Political Studies*, *61*(2), 341-355.

1020 Wongtada, N. (2019). Subliminal persuasion on a consumer's cognitive process: a  
1021 review. *Journal of Applied Economic Sciences (JAES)*, *14*(65), 804-817.

1022 Zano, E. J., Pincus, J. D., & Lamp, E. J. (1983). Public perceptions of subliminal  
1023 advertising. *Journal of Advertising*, *12*(1), 39-45.