

Social presence and isolation effects on intergroup bias: Task matters

Teresa Garcia-Marques*  / Pedro Figueira* 

* Ispa – Instituto Universitário, Williams James Centre for Research, Lisboa, Portugal

Abstract: This paper examines whether and how intergroup bias, typically studied in explicitly social contexts, extends to conditions of social isolation. Prior research has yielded mixed findings, varying both in how social contexts are operationalized and in how bias is assessed. Across two experiments, we compared intergroup bias under conditions of complete social isolation and co-action (social presence). Bias was measured using the Implicit Association Test (IAT; Experiment 1) and the Weapon Identification Task (WIT; Experiment 2). Results from both experiments demonstrated that intergroup bias reliably emerges even when individuals are socially isolated. However, partially replicating earlier findings, the IAT revealed lower levels of bias when participants were alone, whereas in the WIT, social isolation improved response control without reducing the magnitude of bias. These findings suggest that the expression of intergroup bias depends jointly on social context and task characteristics, pointing to distinct underlying cognitive mechanisms. We discuss the implications of these results for understanding how social presence and task demands shape intergroup cognition.

Keywords: Intergroup bias, Implicit association task, Weapon identification task, Social facilitation.

Introduction

As social beings, we constantly navigate a variety of social contexts in our daily lives, sharing spaces with others; whether strolling down a street, commuting on public transportation, or collaborating with colleagues. Yet there are moments of solitude, such as being at home in the bathroom or driving a car. This contrast between social interactions and solitary settings has long intrigued social researchers, leading them to examine how the presence of others influences our thoughts and behavior (e.g., Allport, 1920; Zajonc, 1965). Although social psychology has extensively investigated how our perceptions, thoughts, feelings, and behaviors are influenced by the presence of others (real or imagined; see Allport, 1954), most research has largely ignored how these social phenomena operate when we are socially isolated (see Aiello & Douthit, 2001).

Consider, for example, research on memory updating (e.g., Carneiro et al., 2021) and on how individuals form, maintain, and apply stereotypes (see Hamilton & Sherman, 2014). While we have a strong understanding of intergroup bias and prejudice in social settings, we know less about whether these biases occur when individuals are isolated. One possibility is that social context may not matter, as processing mechanisms are already shaped by social environments, or the perception of a social target itself may prime a social context. However, two studies suggest otherwise, indicating that social presence does influence the expression of intergroup bias.

Correspondence concerning this article should be addressed to: Inês Castro, Ispa – Instituto Universitário, Williams James Centre for Research, Lisboa, Rua Jardim do Tabaco, 34, 1149-041 Lisboa, Portugal. E-mail: gmarques@ispa.pt

Drawing on Zajonc's (1965) theory of social facilitation, which proposes that individuals rely on well-learned dominant responses differently in the presence of others compared to when alone, Lambert et al. (2003) argue that stereotypes, being well-learned dominant responses, are more likely to be expressed in public settings than in social isolation. From a different perspective, Castelli and Tomelleri (2008) applied equality norms theory, suggesting that social norms are activated by the social nature of a context. This increases individuals' attunement to egalitarian norms in public settings, resulting in reduced levels of implicit bias compared to isolated conditions.

Unfortunately, these two studies not only offer opposing conclusions but also use methodologies that limit our understanding of bias in true social isolation. Castelli and Tomelleri (2008) defined their "isolated condition" as one in which the experimenter was present, while the "social presence condition" included familiar peers. Lambert et al. (2003) characterized social isolation as a condition where participants did not expect to interact with others afterward. Neither study directly addressed whether intergroup bias emerges when individuals are fully isolated.

Our core assumption is that intergroup bias does emerge in socially isolated contexts, although its expression may differ from social settings. This is based on the premise of social cognition: cognition is socially modulated, and developmental processing is tuned to social environments (e.g., Sherman et al., 1989). The socially shared knowledge structures guiding intergroup bias (stereotypes) can influence judgments and behavior even in the absence of others (Garcia-Marques et al., 2006; Operario & Fiske, 2003). However, context may still play a role, either by restricting stereotype activation or increasing cognitive control over its influence (e.g., Casper et al., 2010).

Research suggests that social isolation can interfere with cognitive processes underlying bias, such as inhibitory control. Animal studies show that social isolation impairs learning, especially when it involves inhibiting previously learned responses (Schrijver et al., 2004). In humans, experimental manipulations inducing anticipated social isolation reduce self-regulation efficacy (Baumeister & DeWall, 2005). Research on social facilitation also indicates that executive control functions are less active in social isolation than in the presence of others (e.g., Garcia-Marques & Fernandes, 2023, 2024). These findings suggest that individuals may be more susceptible to stereotypes in social isolation, a hypothesis consistent with Baron's (1986) famous social facilitation distraction, conflict model, which posits that attention is divided in the presence of others, and overload can favor intergroup bias (e.g., Macrae et al., 1993).

Conversely, neuropsychological evidence indicates that brain activity in areas responsible for executive control is reduced when social isolation is primed (Campbell et al., 2006). According to the cognitive-neuropsychological model of social inhibition and facilitation, social isolation involves less engagement of executive and frontal systems, as well as reduced activation of automatic, non-executive processing (Wagstaff et al., 2008). This could imply that individuals are less prone to bias in social isolation, aligning with Zajonc's (1965) view if stereotypes operate as dominant responses.

Taken together, these findings suggest that the mechanisms underlying intergroup bias are modulated by social presence, but the direction of the effect remains unclear. In this paper, we address these hypotheses and examine how the presence of others influences the likelihood of bias.

Overview of the studies

In a laboratory context, we replicated the studies by Castelli and Tomelleri (2008) and Lambert et al. (2003), one as Experiment 1 and the other as Experiment 2, operationalizing the presence of others in a different way. Participants were tested either alone or in co-action (groups of 3-6 individuals), with the testing setup illustrated in Figure 1.

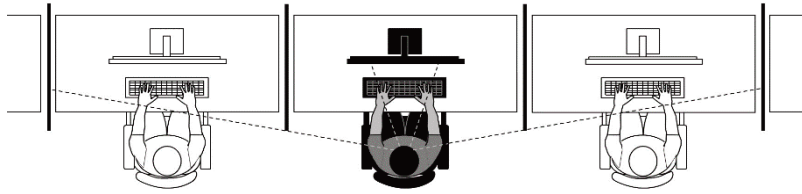


Figure 1. The experimental setting for manipulating the presence of others' conditions

In both experiments we measured intergroup bias and test for moderation by social presence, comparing alone (isolated) *versus* in others' presence, using two established tasks: the Implicit Association Task (IAT; Nosek et al., 2007) and the Weapon Identification Task (WIT; Payne, 2001). Despite some concerns about their reliability as implicit measures (Corneille & Hütter, 2020), these tasks provide valid evidence of bias, though results are sometimes inconsistent (e.g., Ito et al., 2015; Fazio & Olson, 2003).

The IAT assesses intergroup bias by measuring reaction times (RTs) that facilitate responses for Black-Negative and White-Positive associations versus the opposite associations, indexed by the D600 measure (Greenwald et al., 2003). The WIT examines higher error rates (ERs) on Black-Tool (White-Gun) *versus* White-Tool (Black-Gun) trials, allowing reliable separation of automatic and controlled components of responses using the Processing Dissociation Procedure (Jacoby, 1991). The IAT's reliability is less consistent, requiring adaptations in some cases (Ito et al., 2015; Payne & Bishara, 2009; Stewart et al., 2009).

We expect to find evidence of changes in levels of intergroup bias when individuals are performing these task alone than in other's presence. This changes may occur either because the bias: (a) reduces compared to social contexts (e.g., if stereotypes act as dominant responses, Zajonc, 1965, or if social presence increases cognitive load or control, Wagstaff et al., 2008), or because the bias (b) increases in social isolation (e.g., if cognition is more relaxed, Baron, 1986, or if control increases in social settings, Huguet et al., 1999; see also Garcia-Marques & Fernandes, 2024).

EXPERIMENT 1

Method

Participants

A total of 119 non-Black university students (10 men; $M_{age} = 20.97$, $SD = 5.89$) participated in the experiment. Social condition (alone *vs.* co-action) was manipulated between participants, and IAT block (incongruent *vs.* congruent) was manipulated within participants. Sample size was determined using Westfall et al.'s (2014) procedure for the current mixed design (Social condition \times Congruency), with a desired power of 0.80 and an alpha level of 0.05. This calculation was based on a main effect size for social facilitation ($d = 0.30$; Castelli & Tomelleri, 2008) and the number of trials (120 critical trials).

Materials

A set of 30 Black and 30 White emotionally neutral faces was selected from the Chicago Face Database (<https://chicagofaces.org>) for use in this study. Words were selected from Garcia-Marques

(2003), controlling for familiarity and concreteness. The final set included 30 positive words (e.g., hug, friend, love, kiss, child, embryo, fairy, fertile, flower, harp, oasis, paradise, tenderness, truth, virtue) and 30 negative words (e.g., infection, catastrophe, expulsion, ambush, degraded, corpse, wound, coffin, poison, bomb, rubble, avalanche, snot, maggot).

Procedure

After obtaining informed consent, participants took part in an experiment involving word and picture evaluation. Experimental sessions were conducted with participants either arriving alone or in groups. Those who arrived alone completed the IAT in a room without anyone present, including the experimenter. Participants who arrived in groups (6 - 10 individuals) completed the task individually in the same room, in the presence of others, while being unable to observe one another's performance. After welcoming the participants, the experimenter remained outside the testing room, meeting them again only to collect signed consent forms. During each session, the experimenter noted any disruptive behavior or participant characteristics (e.g., race or native language) that could have influenced the results. As none are reported as exclusion criteria, no such instances occurred.

Each participant read the IAT instructions presented on a computer screen, which explained that the task involved identifying a series of words and pictures that would appear individually. Participants were asked to categorize words as Positive or Negative, and pictures (e.g., faces) as Black or White. The Race IAT comprised five blocks:

Block 1: Participants evaluated 30 portraits (15 Black, 15 White), categorizing them as Black (left key) or White (right key).

Block 2: Participants evaluated 30 positive words using the left key for Positive, and 30 negative words using the right key for Negative (see Figure 2).

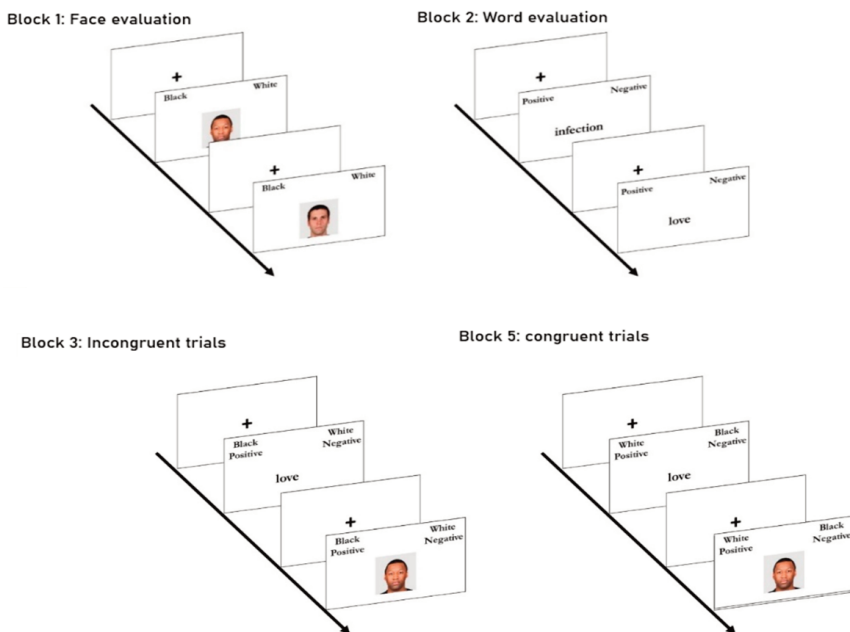


Figure 2. Structure of IAT trials across task and compatibility conditions

Block 3 (incongruent): Participants evaluated the same portraits and words, but the categories Black and Positive were presented together on the left, and White and Negative on the right, using the same keys as before. This block created an incongruent pairing with the Black-Negative stereotype association.

Block 4: Identical to Block 1, but the positions of the Black and White categories, and their respective keys, were switched.

Block 5 (congruent): Identical to Block 3, except Black and Negative were presented together on the right, and White and Positive on the left, creating congruency with the Black-Negative stereotype association (see Figure 2).

Each IAT trial began with a fixation point displayed for 500 ms, followed by the target (portrait or word), to which participants responded in order to proceed to the next trial.

Dependent variable

The *d600* index, the standard IAT measure of implicit bias (Greenwald et al., 2003), is computed through the following steps: (1) elimination of individual responses with reaction times (RTs) less than 300 ms or greater than 10,000 ms, and exclusion of participants with more than 10% of trials outside this range; (2) computation of mean RTs for correct responses in each critical block (i.e., Congruent and Incongruent), along with the pooled standard deviation across the two blocks; (3) replacement of each incorrect RT with the block mean plus 600 ms; (4) computation of the average RTs for the critical blocks and the difference between these averages; (5) division of this difference by the pooled standard deviation of the two blocks. Higher *D600* values indicate stronger implicit negative attitudes toward Black individuals.

Results

A preliminary analysis identified six participants with error rates (ERs) above 90%, an abnormal value for a task without time restrictions (see Nosek et al., 2014), that were not included in the analysis.

d600

The *d600* was first tested for significance ($M = .194$, $SD = .30$) and the results $t(112) = 6.80$, $p < .001$, were clearly suggesting the presence of a general bias towards favoring the white targets relative to the black ones.

The *d600* index was then compared between Social Conditions. Analysis revealed that participants in co-action ($M = .26$; $SD = .30$; 95% CI [.19, .36].) had a higher *d600* index than participants in alone condition ($M = .13$; $SD = .29$; 95% CI [.05, .19]), $t(111) = -2.19$, $p = .031$, $d = .41$ (see Figure 3). Nevertheless, in the alone condition, we still find evidence of a bias, as indicated by a 95% confidence interval that did not include zero.

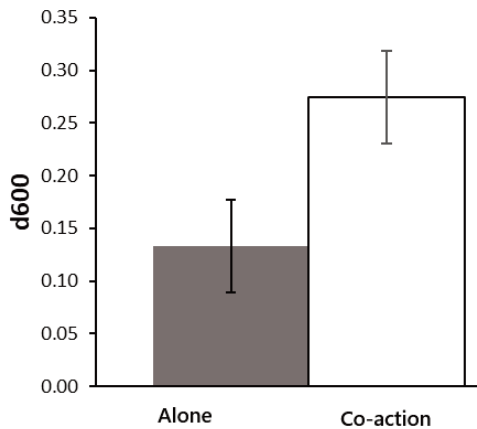


Figure 3. D600 index in alone and co-action conditions

Note: Errors bars denote one standard error around the mean.

EXPERIMENT 2

Methods

Participants

136 non-black undergraduates (21 men, $M_{age} = 22$; $SD = 4.21$) participated in the experiment and were randomly assigned to a 2 Social Conditions (alone vs. co-action) \times 2 Prime (Black vs. White portrait) \times 2 Target (Tool vs. Gun) design, with the two last factors being within-subject manipulations. The sample size was determined following Westfall et al.'s (2014) guidelines for a power of .80, based on effect sizes calculated from Lambert et al.'s (2003; but see also Rivers, 2017) experiment 2 data (intergroup bias effect, $d = .85$; and its moderation by their present condition, $d = .46$) and the number of trials (384 trials).

Materials

We relied on materials from Payne's (2001) studies, namely the face primes and object (weapon/tool) stimuli, which were retrieved from <http://bkpayne.web.unc.edu/research-materials>

Procedure

Participants provided informed consent for an experiment involving face and object identification. No references to race or social context were made until the end of the experiment. Sessions were scheduled either as group or individual to manipulate social conditions. Individual participants were left alone with a computer, while grouped participants performed tasks together (co-action). The instructions, displayed on computer screens using E-Prime 2 (Psychology Software Tools), explained that participants needed to identify objects as either a Tool or a Gun. Each object would be briefly preceded by a portrait, but participants were required to focus solely on identifying the objects correctly and quickly.

To familiarize participants with the targets and response times, they completed two practice blocks. In the first block, 32 objects were shown sequentially, and participants identified them as either a Gun or a Tool without any time restriction. In the second block, 40 objects were shown sequentially with a time interval of 550 ms, and participants had to identify them as a Gun or a Tool within that timeframe. After completing the practice blocks, the experiment began with the same materials used by Payne (2001, 2006). The task involved the same objects and identification process, but each object was preceded by a prime of either a Black or White portrait. Primes and Targets were 5.3 cm × 4 cm, and Primes included portraits of four Black and four White male portraits. Targets consisted of four different handguns and four different tools.

Each trial began with a visual pattern mask (500 ms), followed by the prime (200 ms), replaced by the target (100 ms). After the target, another visual pattern appeared (450 ms). Participants had a response window of 550 ms for each trial (target plus the last visual pattern). If no response occurred within the window, a red exclamation point appeared on the screen (500 ms) before the next trial to prompt a quicker response. The WIT had a total of 384 trials, with 128 trials per block. Finally, participants completed a set of control measures using 7-point rating scales to assess their subjective experience of the experimental conditions. For example, they rated the extent to which they felt “Alone” *versus* “Accompanied,” “Unevaluated” *versus* “Highly Evaluated,” and “Unobserved” *versus* “Observed” during the task (see Figure 4).

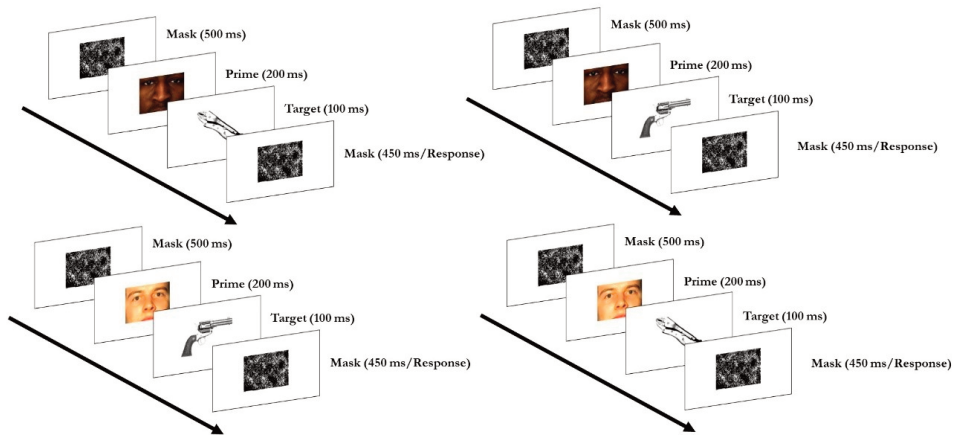


Figure 4. Weapon identification: Incongruent and congruent trials

Note: Left trials represent Incongruent trials, where Black(White) primes precede Tools(Guns) target. Right trials represent Congruent Trials, where Black(White) primes precede Guns(Tools) target.

Dependent variables

Error Rates (ERs) were calculated for each Prime-Target combination, where participants’ response errors were divided by the total number of completed trials.

PDP components (Jacoby, 1991) were computed following Payne (2001). The C-component, representing the likelihood of correctly discriminating the target, and the A-component, representing the likelihood of choosing a Gun when control fails, were calculated separately for each prime (C-component for Black primes, C-component for White primes, A-component for Black primes, and A-component for White primes).

For Black-prime trials, the C-component was calculated using the expression: Correct responses in Black-Gun trials (%) minus Incorrect responses in Black-Tool trials (%). Likewise, the A-component was computed as: Incorrect responses in Black-Tool trials (%) divided by (1 - C), reflecting performance when control fails.

To compare the C(A) Black component with the C(A) White component, the components for White trials were calculated in the same direction. The C-component was computed using the formula: Correct responses in White-Gun trials (%) minus Incorrect responses in White-Tool trials (%). Likewise, the A-component was computed as: Incorrect responses in White-Tool trials (%) divided by (1 - C).

Reaction Times of Correct Responses (RTs) were computed as an average of correct RTs for each Prime-Target combination.

Results

Preliminary data analysis revealed that some participants had difficulty responding within the time limit. Due to excessive non-responses (more than 80% of trials), data from eleven participants were excluded from further analysis (see, for example, Volpert-Esmond et al., 2020).

The two social conditions were first compared in terms of how much participants felt accompanied ($M_{CO} = 4.29$; $SD = 1.57$ vs. $M_{AL} = 3.71$; $SD = 1.86$; $t(122) = -1.90$; $p = .062$, $d = .34$), evaluated ($M_{CO} = 3.77$; $SD = 2.06$ vs. $M_{AL} = 4.10$; $SD = 2.06$; $t(122) = .87$; $p = .385$, $d = .16$), and observed ($M_{CO} = 2.15$; $SD = 1.53$ vs. $M_{AL} = 1.82$; $SD = 1.20$; $t(122) = -1.31$; $p = .194$, $d = .24$). Overall, these measures suggest that participants tended to feel more accompanied in the co-action condition, but did not differ in feelings of being evaluated or observed.

In this time-restricted version of the WIT, intergroup bias was measured using each participant's error responses, which had an overall mean proportion of 25%. These error rates (ERs) were analyzed within the experimental design using a mixed ANOVA (see Figure 5).



Figure 5. Mean error rates by target (gun vs. tool), prime (black vs. white), and task condition

Note. Error rates are shown for target type (gun vs. tool) and prime race (black vs. white) under alone and co-action conditions. Error bars represent ± 1 standard error of the mean.

Results provided evidence of a general intergroup bias, as indicated by the significant Target \times Prime interaction, $F(1, 123) = 22.59$, $p < .001$, $\eta_p^2 = .16$. As expected, participants misidentified

Tools (i.e., confusing them with Guns) more frequently when primed by Black face ($M = .26$, $SD = .15$; 95% $CI [.23, .28]$) than when primed by White faces ($M = .22$, $SD = .13$; 95% $CI [.20, .24]$). The reverse pattern was observed for Guns, which were misidentified more often when primed by White faces ($M = .25$, $SD = .14$; 95% $CI [.22, .27]$) than by Black faces ($M = .23$, $SD = .12$; 95% $CI [.21, .25]$).

The isolated main effect of the Prime was also significant, $F(1, 123) = 7.90$, $p = .006$, $\eta_p^2 = .06$, indicating higher ERs when participants were primed by Black faces ($M = .24$; $SD = .12$; 95% $CI [.22, .27]$) than when primed by White faces ($M = .23$; $SD = .13$; 95% $CI [.21, .26]$); which can be interpreted as a direct consequence of intergroup bias. In contrast, the isolated main effect of Target was not significant $F < 1$.

Contrary to our expectations, intergroup bias was not significantly moderated by Social Condition, $F < 1$. There was only a non-significant trend for a main effect of Social Condition, $F(1, 123) = 2.97$, $p = .087$, $\eta_p^2 = .02$, indicating a tendency for higher error rates in the co-action condition ($M = .26$, $SD = .12$; 95% $CI [.23, .29]$) compared to the alone condition ($M = .22$, $SD = .12$; 95% $CI [.19, .25]$). No other effects were significant, including the Target \times Social Condition interaction ($F < 1$) and the Prime \times Social Condition interaction ($F < 1$).

PDP components

Estimates of each PDP component were calculated for both Black and White trials for each participant (see components estimates and their standard deviations, Table 1).

Table 1

PDP components likelihoods (SDs) regarding primes and social conditions

Components	Social condition		Overall
	<i>Alone</i>	<i>Co-action</i>	
C-Black	.55(.21)	.48(.27)	.51(.24)
C-White	.57(.22)	.49(.28)	.53(.25)
A-Black	.52(.13)	.52(.14)	.52(.13)
A-White	.48(.14)	.46(.11)	.47(.12)

The analysis using the control C-component (likelihood of discriminating Tools from Guns) as the dependent measure in a mixed ANOVA, with Prime (Black vs. White) and Social Condition (alone vs. co-action) as factors, revealed a non-significant main effect of Social Condition, $F(1, 123) = 2.97$, $p = .087$, $\eta_p^2 = .02$. This effect was consistent with the hypothesis of slightly lower discriminability in the co-action condition ($M = .49$; $SD = .24$; 95% $CI [.31, .55]$) compared to the alone condition ($M = .56$; $SD = .24$; 95% $CI [.50, .62]$). The Social Condition \times Prime interaction was not significant, $F < 1$, suggesting that neither prime led to higher control than the other.

The main effect of Prime was significant, $F(1, 123) = 7.90$, $p < .006$, $\eta_p^2 = .06$, indicating higher response control (discriminability) on White-prime trials ($M = .53$; $SD = .25$; 95% $CI [.49, .58]$) than on Black-prime trials ($M = .51$; $SD = .24$; 95% $CI [.47, .56]$). Because this result was unexpected and, to our knowledge, has not been reported in previous WIT studies (see Lambert et al., 2003; Payne, 2001). We conducted follow-up simple-effects analyses separately for each social condition to determine whether the effect would emerge when each condition was examined independently, replicating in the original study, rather than as a contrast between conditions. These analyses showed that the pattern typically observed in this task was replicated

only in the co-action condition [Prime effect: $t(123) = -1.30, p = .197, d = .16$] but not in the alone condition, $t(123) = 3.04, p = .003, d = .39$.

For the automatic A-component, the mixed ANOVA (Prime \times Social Condition) revealed only a significant main effect of Prime, $F(1, 123) = 14.77, p < .001, \eta^2 = .05, \eta_p^2 = .11$, indicating a stronger likelihood of choosing a Gun on Black-prime trials ($M = .52; SD = .13; 95\% CI [.50, .54]$) compared to White-prime trials ($M = .47; SD = .12; 95\% CI [.44, .49]$). Neither the main effect of Social Condition, $F < 1$, nor the Prime \times Social Condition interaction, $F < 1$ was significant.

Correct reaction times

Reaction times (RTs) allow us to assess whether performance in this task replicates the typical tendency for individuals in co-action to respond faster than those performing the task alone (e.g., Triplett, 1898; see Figure 6).

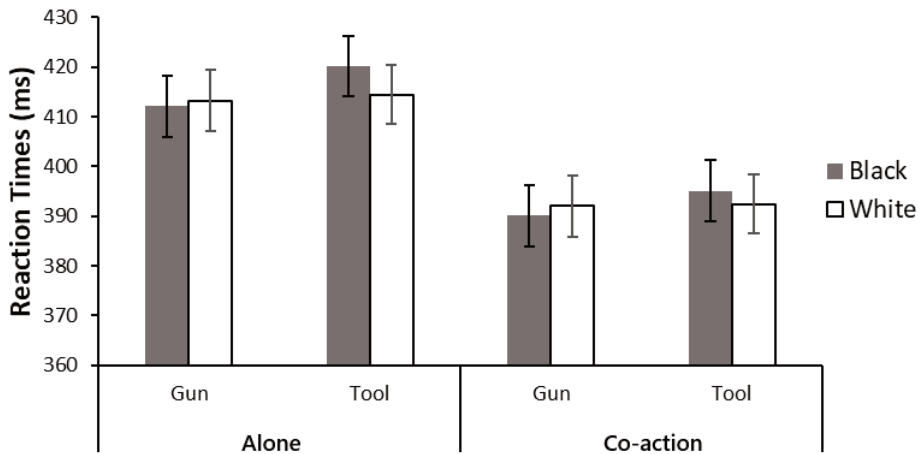


Figure 6. Mean reaction times for correct response, by target (gun vs. tool), prime (black vs. white), and task condition

Note. Reaction times reflect correct responses for target type (gun vs. tool) and prime race (Black vs. White) under alone and co-action conditions. Error bars represent ± 1 standard error of the mean.

The main effect of Social Condition, $F(1, 123) = 7.30, p = .008, \eta_p^2 = .06$, corroborated our expectations, indicating that participants in the co-action condition ($M = 392; SD = 46; 95\% CI [381, 404]$) responded faster than those in the alone condition ($M = 415; SD = 46; 95\% CI [403, 427]$). No main effect of Prime was observed, $F(1, 123) = 1.42, p = .235, \eta_p^2 = .01$. The main effect of Target, $F(1, 123) = 5.81, p = .017, \eta_p^2 = .05$, suggested that RTs were slower for Tools ($M = 405; SD = 47; 95\% CI [397, 414]$) than for Guns ($M = 401; SD = 47; 95\% CI [393, 410]$). Importantly, this effect was qualified by Prime: there was a significant Target \times Prime interaction, $F(1, 123) = 8.17, p = .005, \eta_p^2 = .06$, which is typically observed when bias effects emerge in RTs. Contrast analyses indicated that these differences were specific to Tool trials, $F(1, 123) = 8.49, p = .007, \eta_p^2 = .18$: participants were slower to correctly identify a Tool target when primed by a Black portrait ($M = 407; SD = 48; 95\% CI [399, 416]$) than by a White portrait ($M = 403; SD = 48; 95\% CI [.395, .411]$). No Prime-related differences were found for Guns, $F(1, 123) = 1.01, p = .316, \eta_p^2 = .03$. Importantly, in the overall analysis, this effect was not moderated by Social Condition (Social Condition \times Target, $F < 1$; Social Condition \times Prime, $F(1, 123) = 0.76, p = .386, \eta_p^2 = .01$; Social Condition \times Target \times Prime, $F < 1$).

Discussion

The results of the two experiments show that intergroup bias occurs in socially isolated contexts. However, they also indicate that the influence of context is detected differently depending on how bias is assessed. Experiment 1 indicated that when individuals are isolated from others, their intergroup bias, as assessed by the IAT, is likely to be less prominent than in social contexts. This finding was not fully replicated in Experiment 2, where we assessed implicit bias using the WIT, since no effect of social context was observed. Even so, we found evidence that social context influenced performance in this task: participants in the presence of others responded faster and made more errors compared to those in social isolation. This suggests that some form of control (not necessarily inhibitory control, as discussed below) is better exerted in the isolated condition, even if it is not sufficient to prevent a manifestation of bias (which also occurred in the alone condition).

Taken together, the two studies indicate that, although individuals in social isolation may in some of their performances show less intergroup bias, they are still influenced by shared stereotypical beliefs. Social isolation can alter cognition, but it does not change its fundamentally social nature. One straightforward interpretation of the differences observed between social isolation and social presence is that social contexts increase reliance on stereotypes, which can be framed as dominant responses (Zajonc, 1968), as proposed by Lambert et al. (2003). The dominant response being stereotyping. This general explanation is however limited given that it does not account for the differences between the two studies, as we will discuss below.

It should also be stressed that our data do not replicate Castelli and Tomelleri (2008), who suggested that the presence of others activates social norms and thereby reduces stereotyping. However, and importantly our findings do not rule out this possibility. Unlike the previous study, which was conducted in a school setting with the presence of colleagues, we ran our experiment in a laboratory, where the context was less likely to provide access to explicit social norms. Future studies should investigate what might occur if the context actively activated equality norms. If such a setting changes the results, leading the presence of others to reduce stereotyping, as observed by Castelli and Tomelleri (2008), then the two effects could be viewed as distinct, with one potentially able to override the other.

Although understanding intergroup bias in real-life contexts is critical, this study does not directly inform us about its everyday manifestations or about the ways in which social contexts might help mitigate it. Nonetheless, our results highlight a crucial gap in current knowledge: we still lack a clear understanding of how being inside or outside a social context shapes cognitive processing and sensitivity to bias. Importantly, by identifying the direction of these effects and the task-dependent differences, this research provides a framework for future studies to systematically investigate the mechanisms underlying intergroup bias and the conditions under which social context can amplify or attenuate it.

Results implication and future research

The results of the two experiments are likely highly informative regarding the effects of others' presence on cognition, as they reveal the processes underlying performance on each task. Previous research has suggested that the presence of others modulates both the activation of information in memory and the exertion of executive control (see Garcia-Marques et al., 2026, for a review). Although increased inhibitory control in the presence of others has been documented in previous studies (see Garcia-Marques & Fernandes, 2024, for a meta-analysis), the results of the two

experiments, do not provide evidence for such an effect compared to social isolation. However, they may offer insight into other forms of control processes.

The finding that IAT bias is less evident in a socially isolated context may suggest two possibilities. One is that the activation of bias is reduced under these conditions. The other is that the type of control required by the task is more effectively exerted when individuals are alone. The IAT reflects associative strength between categories (Greenwald et al., 1998), and evidence of control is referred to the participant's ability to manage or override automatic associations that interfere with correct responses in incompatible blocks. However, if social isolation reduces the level of activation of these associations, we may also observe lower levels of bias without evidence of increased control. This is plausible given evidence suggesting that memory activation processes are more efficient in the presence of others (e.g., Allport, 1920; Fonseca & Garcia-Marques, 2013; for a review, see Garcia-Marques et al., 2026). A parallel process may occur by assuming that IAT performance is likely influenced by other control processes beyond inhibitory mechanisms, such as attention, working memory, and response monitoring, as well as by factors that interfere with control, including the experience of incongruence (Oliveira et al., 2022) or learned associations (Mendonça et al., 2024). Taking into account that the evidence of increased bias in social presence was not replicated with the WIT adds clarity to these questions. The results likely suggest that the dynamic interplay between activation and control processes operates differently across the two tasks. Regarding WIT performance, equal outcomes in the two social presence conditions may simply reflect two different ways of achieving the same equilibrium between activation and control (Payne, 2001, 2005; see Garcia-Marques et al., 2026 for an integrative model). In both cases, the level of interference experienced in the task is managed with similar efficiency. For this reason, it is particularly worthwhile to focus on the differences between these two tasks.

Neither the IAT nor the WIT are process-pure tasks (Calanchini et al., 2014; Gawronski, 2019; Payne, 2001), and they may therefore capture cognitive processes that are modulated differently by social presence. Supporting this, evidence shows that only the C component of the WIT specifically captures inhibitory control (Ito et al., 2015; Payne, 2005), whereas the IAT D-score appears more related to other control functions, such as updating and task switching (Ito et al., 2015; Klauer et al., 2010). In Experiment 2, the data indicate that the C component increased in the presence of others, suggesting that inhibitory control was more effectively exerted under those conditions (Fernandes et al., 2021; Garcia-Marques & Fernandes, 2024; Huguet et al., 1999; Sharma et al., 2010), although this type of control is not the one that would enhance performance on the IAT.

The fact that IAT performance is more closely related to executive functions such as cognitive switching and working memory may explain why it was enhanced in the isolated condition. Social presence appears to impair both working memory performance when rehearsal is unavailable (Belletier & Camos, 2018) and cognitive switching abilities (Wagstaff et al., 2008).

In sum, the differences in social presence effects observed between tasks may reflect shifts in the dominant type of cognitive control engaged during task performance. Under social presence, participants are more likely to rely on later control processes (e.g., reactive control; Braver, 2012), responding quickly and correcting errors after conflict is detected. In contrast, in social isolation, individuals may allocate attention earlier in the task, with working memory supporting proactive control (Braver, 2012; Rydell et al., 2006). This allows greater temporal flexibility, enabling them to maintain task goals more effectively and preempt interference from automatic associations. Evidence from WIT and IAT components suggests that the C-component primarily captures reactive inhibition, whereas the IAT D-score may reflect more sustained, proactive control processes such as task switching and updating (Ito et al., 2015; Payne, 2005). Future studies should contrast these mechanisms in relation to the divergences observed between the two tasks.

Another difference between the two tasks, which may be relevant for future studies aiming to better understand our results, is that the target race is made salient and directly contrasted in the IAT, a feature that may enhance spontaneous associations. In contrast, participants in the WIT are instructed to identify the target object, whereas in the IAT they are also required to attend to faces. Additionally, the WIT likely measures more spontaneous interference from stereotype associations based on specific exemplars (Gawronski et al., 2010), while the IAT assesses a more category-related stereotype construct due to the salience of categories (De Houwer, 2001). As such, the two tasks may capture different biases or tendencies. The IAT assesses bias influenced by the memory strength of associations between general abstract concepts (such as racial or gender groups) and evaluative words (like “good” or “bad”). In contrast, the WIT examines how beliefs affect individuals’ identification of stereotype-relevant stimuli.

A likely key difference between the experiments, rather than the tasks, is that we only collected measures assessing participants’ perceived presence of others in Experiment 2. Although it is likely, given the similarity between the two settings, that participants in Experiment 1 also perceived themselves as accompanied, but not observed or evaluated, this difference in measurement represents a potential distinction between the studies, without guaranteeing that participants in Experiment 1 did not feel more evaluated or directly observed. Importantly, the measurement itself did not interfere with the results, as it was administered only at the end of the experiment.

A final implication of these studies concerns a methodological issue: the impact of others’ presence on cognition, which highlights the importance of the testing setting. Most psychological research is conducted in the presence of others, or in contexts where participants are aware of others, which, as highlighted in the literature of social presence, can influence performance, for example, by reducing IAT responses. Understanding the mechanisms behind these effects allows researchers to deliberately choose a testing context, rather than assuming that results obtained in one setting automatically generalize to another.

Limitation

Our studies are not without limitations and caveats. One important point to draw to the reader’s attention is that, although we interpreted the IAT D-score zero point as reflecting the presence or absence of intergroup bias, we recognize that this assumption has been subject to criticism (e.g., Blanton et al., 2009, 2015). Moreover, IAT results are not universally understood as directly assessing effects driven by stereotypes. Accordingly, it could be argued that differences in results across tasks may arise because each is configured to assess related but distinct constructs. Nevertheless, it should be emphasized that both tasks have been widely described as experimental measures of implicit racial or intergroup bias (see Lai & Wilson, 2021), even though their underlying processes only partially overlap (Ito et al., 2015; Volpert-Esmond et al., 2019, 2020).

An important caveat in our results is that we lack data to explain why, despite reduced control over their responses, participants in the WIT did not show evidence of increased bias in the presence of others compared to the isolated condition. Another result that warrants further investigation is that, in the alone condition, we did not observe the typical overlap of control for both primes associated with the WIT (see Payne, 2001, 2005). These two unexpected results may be related, as it appears that only in the alone condition does the prime modulate the levels of control exerted over stereotypic responses. In this isolated context, intergroup bias did not depend on control failures over the activated response but rather on reduced control activation for Black faces compared to White faces. Future studies should aim to clarify these potentially relevant cues regarding how our isolated minds exert cognitive control differently.

In future studies, more detailed process measures can be incorporated. The procedures of the IAT could be adapted to allow for the reliable calculation of the PDP components (e.g., Ito et al., 2015) or even broader approaches such as the Quad model (Conrey et al., 2005) and the ReAL model (Meissner & Rothermund, 2013) for both tasks. However, evidence has also suggested differences in how well these models fit the performance data for the two target tasks. For instance, the Quad model appears to provide a better fit for IAT data, while the PDP model offers a better fit for WIT data (Payne & Bishara, 2009). Although merely fitting these models does not yield meaningful insights into the validity of the conceptualization – since each model parameter must be independently validated for psychological significance (see Hütter & Klauer, 2016) – these analytic approaches may, in the future, provide greater insight into the mechanisms underlying the apparent differences between the two experimental conditions.

In conclusion, our studies investigate the replication of evidence for intergroup bias in contexts where individuals are isolated from others. The results suggest that stereotypes do indeed bias our responses, even when we are alone. However, the data also indicate that this bias may be less pronounced in social isolation than in the presence of others, where we tend to respond more quickly and may show less control over the content of our responses. To better understand these social facilitation and inhibition effects, further research is necessary.

Declaration of conflicting of interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data accessibility

All data and analysis are available here: https://osf.io/nyr8d/?view_only=09610e5980864bf9b89e463694d73a43

Ethical approval

Ethical approval for the two experiments was obtained from Ispa-Ethical Committee prior to data collection.

Informed consent

All participants provided informed consent to participate and the experiments were both conducted in compliance with the Declaration of Helsinki.

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Authors contribution

Conceptualization: TGM, PF; Data curation: PF; Formal analysis: TGM, PF; Writing – Original draft: TGM, PF; Writing – Review and edit: TGM, PF.

All the authors read and approved the final manuscript.

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Efeitos da presença social e do isolamento no enviesamento intergrupal: A natureza da tarefa é determinante

Resumo: Este artigo examina se, e de que forma, o favorecimento intergrupal, tipicamente estudado em contextos explicitamente sociais, se estende a condições de isolamento social. Investigações anteriores têm produzido resultados mistos, variando tanto na forma como os contextos sociais são operacionalizados como na forma como o favorecimento é avaliado. Ao longo de dois estudos experimentais, comparámos o favorecimento intergrupal em condições de isolamento social completo e de coação (presença social). O favorecimento foi medido através do Implicit Association Test (IAT; Experimento 1) e da Tarefa de Identificação de Armas (WIT; Experimento 2). Os resultados de ambos os estudos demonstraram que o favorecimento intergrupal emerge de forma consistente, mesmo quando os indivíduos se encontram socialmente isolados. No entanto, replicando parcialmente resultados anteriores, o IAT revelou níveis mais baixos de favorecimento quando os participantes estavam sozinhos, enquanto na WIT o isolamento social melhorou o controlo das respostas sem reduzir a

magnitude do favorecimento. Estes resultados sugerem que a expressão do favorecimento intergrupar depende conjuntamente do contexto social e das características da tarefa, apontando para mecanismos cognitivos subjacentes distintos. Discutem-se as implicações destes resultados para a compreensão de como a presença social e as exigências da tarefa moldam a cognição intergrupar.

Palavras-chave: Favorecimento intergrupar, Tarefa de associação implícita, Tarefa de identificação de armas, Facilitação social.

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