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Effect of Identity Positioning on Visual Search Strategies and Decision-Making in Team Sports: An Exploratory Study with Professional Basketball Players.

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ABSTRACT

As the social identity approach gains prominence in sports psychology, the influence of team identification on performance metrics remains underexplored. This study investigates the impact of self-categorization levels on visual search strategies and decision-making among team-based sports athletes. We conducted evaluations of oculomotor behavior, encompassing measurements of eye fixation frequency and duration, alongside assessments of decision-making proficiency, among ten professional basketball players (Mean age = 26.3, SD = 4.67). Participants were exposed to fourteen first-person filmed video clips depicting 5-on-5 basketball

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games in a controlled environment designed to elicit varied levels of team identification. This was achieved by manipulating conditions to favor either individualistic or team-oriented goals, establishing a dichotomy between low and high team identification scenarios. Data analysis, based on 6,238 visual fixations and 271 decisions, showed a significant increase in shot attempts under personal identity conditions compared to social identity conditions, whereas the number of passes was higher in the latter. Oculometric data, however, showed no significant differences across conditions. These preliminary results highlight the complex interplay between team identification and cognitive-behavioral processes, underscoring the need for further investigation into how social identity affects team sports performance and decision-making.

INTRODUCTION

Team sports represent a sophisticated ecosystem where individual and collective objectives intricately intersect, creating a unique psychosocial landscape. This complex interplay catalyzes a nuanced environment, wherein personal goals seamlessly merge with group aspirations, contributing to dynamic variances in identity positioning and degrees of team identification[1]. Recognizing the critical role of these psychosocial processes unveils the profound impact they hold over team sports performance, underscoring the imperative to better understand how the equilibrium between individual ambitions and shared goals informs and transforms team performance process[2]. Investigating the intricate interplay between individual aspirations and collective objectives in team sports emphasizes the essential role of social identity in shaping performance psychology, offering crucial insights into mechanisms that optimize team performance[3,4]

Drawing on Social Identity Theory[5] and Self-Categorization Theory[6], Social Identity Approach[7] posits that the self can be categorized at a personal level (i.e., the "I" dominates, pursuing individual interests) or at a social level (i.e., the "we" is predominant, pursuing group-related interests). The literature on social identity in sport largely demonstrates positive links between team identification and performance factors such as cohesion and team confidence[8], increased effort[9], perceptions of self-efficacy, performance control, or social support[10], psychological safety, collective resilience, team performance satisfaction[11], and emotions[12]. However, research delineating the impact of team identification on performance predominantly hinges on self-reported methodologies[13]. This underscores a critical shortfall within existing literature, illuminating the dearth of research deploying objective metrics to examine the impact of social identity[14]. Our investigation endeavors to address this issue by adopting a rigorous

methodological framework, aimed at delineating the influence of team identification on cognitive processes involved in team performances.

Particularly, within the domain of sports sciences, contemporary research has progressively focused on the detailed examination of visual search strategies within athletic environments, emphasizing their essential role in advancing performance outcomes[15,16]. For example, the literature showed that expert athletes use visual pivots to gather information in peripheral vision[17,18], allowing them to make fewer ocular fixations of longer duration than their less skilled counterparts[19]. When their central vision is blurred, experts have a more accurate and faster response than novices, proving their superior ability to gather information through peripheral vision[20]. Furthermore, experts exhibit a longer quiet-eye (i.e., last visual fixation on a target before executing the movement)[21], focus on proximal rather than distal areas of an opponent's body[22], adopt exploration strategies of sports scenes based on back-and-forth movements between ball carriers and non-ball carriers[23], and have more stable visual exploration patterns over time[24]. Collectively, the body of research in this area highlights visual strategies as a pivotal factor in performance, evidencing that experts perceive their environment in ways that diverge markedly from novices[25]. This perception translates into more precise decision-making[26] and heightened tactical creativity[27], notably when operating under time constraints[28].

In parallel with advancements in understanding decision-making and visual strategies in sports performance, research beyond the realm of sports has demonstrated the profound influence of social identity processes on these cognitive mechanisms. Self-categorization, the process by which individuals categorize themselves as group members, has been shown to exert early effects on intergroup perception and behaviors[29]. For instance, studies have revealed that group identification can lead to biases in face perception, wherein individuals process the faces of ingroup members more thoroughly compared to those of outgroup members[30,31]. Moreover, perceptual biases extend to the domain of movement perception, as research has shown that individuals perceive the movements of ingroup members as faster than those of individuals not belonging to their group, even when movement speeds are identical[32]. Importantly, these perceptual biases can influence decision-making processes. When a shared social identity is salient, group decisions tend to converge towards a prototypical ingroup position and are more inclined to prioritize the success and interests of the group[7]. This alignment of decisions with ingroup norms and objectives can significantly impact strategic choices and performance outcomes.

The aim of our study is to investigate the influence of self-categorization on visual strategies and decisions making process in team sports, with a specific focus on basketball. We hypothesize that individuals' identification with their team influences decision-making tendencies, leading them to prioritize actions that enhance team performance, even if it entails sacrificing their own individual performance. Conversely, we anticipate that under conditions where personal identity is emphasized, individuals will prioritize actions that optimize their individual performance.

Our hypotheses predict a significant increase in shot and drive attempts under conditions emphasizing personal identity compared to those emphasizing social identity. Conversely, we expect to observe a higher frequency of passes in situations where social identity is salient. Furthermore, we propose that these differences in decision-making will be reflected in participants' eye behavior. Specifically, we hypothesize that when social identity is salient, participants will exhibit longer fixation times, a greater number of fixations, and prolonged fixations on areas of interest conducive to collective performance (e.g., non-ball carriers and their defenders), as opposed to when personal identity is salient. Conversely, when personal identity is emphasized, we anticipate that participants will allocate more attention to areas of interest conducive to individual performance (e.g., the ball, the ball-carrier and their defender, the direct defender) compared to when social identity is salient.

MATERIALS AND METHOD

Participants

Our participants were recruited within a French third division professional team (N = 10, M_{age} = 26.3, SD = 4.67) and covered various playing positions on the field (i.e., point guard, forward, center). Prior to their participation, they all signed an informed consent form.

Procedure and Measures

While this study is non-invasive and thus did not necessitate approval from an ethics committee in accordance with relevant institutional guidelines and regulations, we proactively sought validation from a consortium of independent researchers in the humanities and sports sciences. This verification process ensured that our study procedures adhered to the principles outlined in the Declaration of Helsinki, thereby upholding ethical standards in research conduct.

In our study, participants engaged in a task involving the viewing of 14 short video clips, which were presented under two conditions: personal identity and social identity. The video clips,

filmed from a first-person perspective, portrayed authentic 5-on-5 game scenarios to maintain ecological validity and enhance participant immersion. This methodological approach is consistent with previous research highlighting the significance of ecological validity in sport-related studies[15,23,33].

Participants were required to make decisions promptly by mimicking and verbalizing their responses at the moment of clip occlusion, thus preserving the perception-action coupling. This methodology ensures a close alignment between perceptual information and action execution, as supported by previous literature in the field[34,35].

Video Sequence Creation

To create first-person video clips, we equipped players with two GoPro Hero 8 Black cameras (GoPro, San Mateo, California, USA) and one GoPro Hero 6 camera (GoPro, San Mateo, California, USA) on their torsos during 5-on-5 game phases. These cameras recorded at a spatial resolution of 1920x1080 pixels, and a temporal resolution of 60 frames per second. The use of GoPro's "Superview" mode and stabilizer provided wide-angle images with minimal oscillation. During the recordings, players wore either blue or red jerseys. We consistently positioned the cameras on players in blue jerseys to immerse the participants in the role of a blue team player during their laboratory session.

We edited the clips using "Video Editor" software (Microsoft, Redmond, Washington, USA) to select temporal sequences where the camera-bearing player had the ball and a decision to make in the game, resulting in 58 eligible video clips. From these, we selected 14 clips for projection to the players. To select the clips, we chose those with the most stable field of view while being sufficiently long. The average duration of the selected clips was 10.43 s (*SD* = 3.69, *Min*. = 6 s, *Max*. = 18 s). We also selected 2 familiarization clips chosen from the remaining 44 clips, providing players with 2 "warm-up" clips for each session.

To create a clip sequence for each participant (i.e., the sequence), we generated a randomized list of numbers with RStudio using the "sample" function, ensuring the presentation order of clips was randomized across all experimental conditions.

Each video clip in the laboratory sequence began with a 3-second freeze-frame displaying the word "READY" on a white background, followed by a 3-second freeze of the first clip frame. At the clip's end, the last image was frozen for 5 seconds, allowing participants time to make their decision (see Figure 1A).

Clip Presentation

During the experiments, video clips (see above) were projected on a giant screen using a BenQ TH585 projector (BenQ, Taoyuan, Taiwan), positioned 4.10 m from the screen to project an image of 1.95 m in height and 3.5 m in width (Figure 1B). Participants were standing with a ball in their hands, positioned 3.3 meters from the screen. At this distance, the image had a size of 32.9 (height) by 55.9 (width) in degrees of visual angle (Figure 1C).

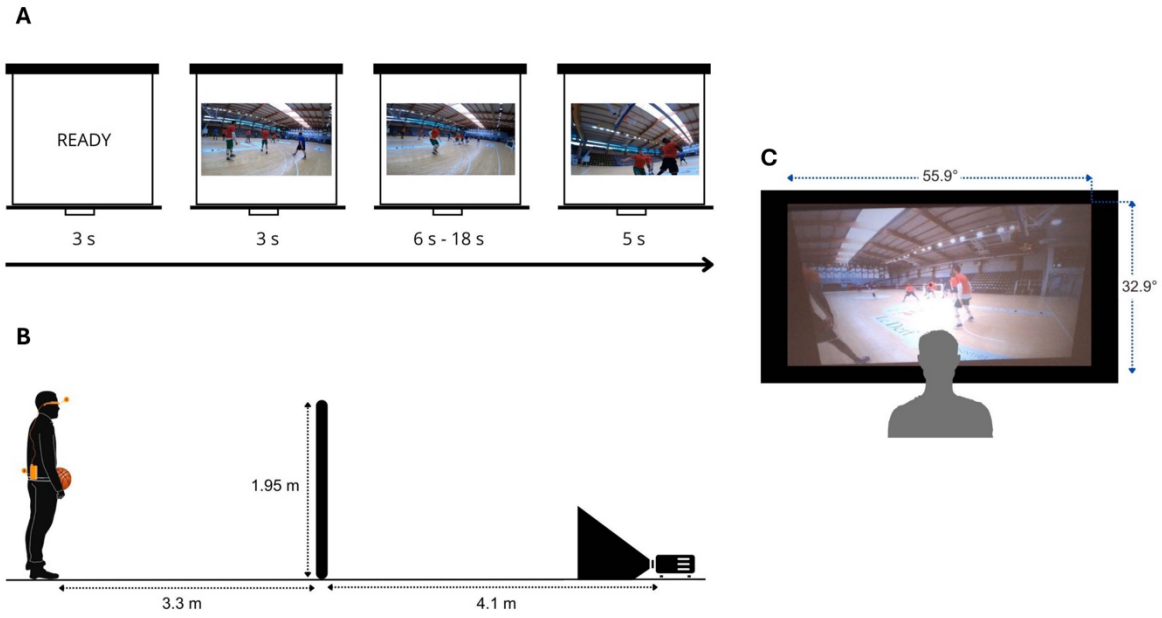

Figure 1. Experimental protocol. A) Trial description. Each trial begun with a blank screen ('Ready') for 3s, followed by a static image for another 3s. A short video sequence (6 to 18s) was then displayed. The last frame of this sequence remained on screen for 3s and participants had to report their choice ('Drive', 'Pass' or 'Shot', see the 'Materials and Methods' section). B) Side view of the experimental setup. Participants were positioned at 3.3 m from the screen. An 1.95 m high image was projected onto the screen by a video projector positioned 4.1 meters behind. C) Rear view of the experimental setup with an example of a frame presented to participants. The projected image had dimensions of 32.9 (height) by 55.9 (width) in degrees of visual angle. The red dot provides the current ocular fixation of this participant captured by the eye tracker (Tobii Pro Lab®). The red trace provides the eye displacement since last fixation.

Identity Induction Protocols

To manipulate participants' group identification level, we conducted two fictitious decision-making challenges (i.e., individual and collective decision-making challenges), aiming to manipulate their goals and thus their level of abstraction[1]. In both challenges, players, standing in front of the screen with a ball, were instructed to make a decision by miming and verbalizing it as the clip paused. We led the participants to believe that their decisions would be compared to those deemed optimal by three expert coaches in these specific match situations. They were told that a point would be awarded if their decision matched the coaches', otherwise, no point would be awarded. Finally, they were told that the experimenters would analyze their decisions at the end of the study to establish the individual or collective rankings, according to the experimental condition.

To induce the targeted level of self-categorization, we followed the general principles of identity theories to make personal or social identity salient. For the personal identity induction, upon entering the laboratory, participants were greeted with a screen showing a large image of themselves alongside their competitors. They were then instructed to write their name on a sheet attached to a black jersey, ensuring their jersey color differed from their teammates on screen. Participants were instructed to wear the black jersey and complete an induction questionnaire designed to reinforce personal identification by probing personal history, characteristics, and individual goals. A point was assigned if participants' decisions concurred with what was purportedly identified by the coaches as optimal for individual performance, without explicit instruction regarding the associated criteria. During the individual decision-making challenge, players aimed to make decisions that would enhance individual performance in the given situation. We informed participants that a ranking would be established at the study's end, pitting all participating players against each other. Every two clips, we reminded the players that they were competing individually in the individual decision-making challenge and that they needed to make decisions that would allow them to excel individually in this type of match situation.

For the social identity induction, the screen displayed a photo of each team supposed to participate in the challenge. Participants were then instructed to write their team's name on a sheet attached to a blue jersey, aligning their jersey color with their teammates on screen. They were instructed to wear the blue jersey and fill out an induction questionnaire aimed at reinforcing team identification by asking about team characteristics, distinctiveness, and pride in membership. In this challenge, players aimed to make decisions that would enhance team performance in the given situation. They were instructed to adopt a stance that would contribute

to their team's victory, competing on behalf of their team against the opposing team. A point was assigned if participants' decisions concurred with what was purportedly identified by the coaches as optimal for team performance, without explicit instruction regarding the associated criteria. Participants were informed that a ranking, comparing the two (fictitious) opponent teams, would be established upon completion of the study. Every two clips, we reminded the players that they were competing on behalf of their team in the collective decision-making challenge and that they needed to make decisions that would enable their team to perform well in this type of match situation.

Each decision was categorized into one of three predefined choices: shoot, drive, and pass.

Eye-Tracking Glasses Use

During these decisions, we employed Tobii Glasses 2 (Tobii Technology AB, Danderyd, Sweden), recording at a frequency of 50 Hz, to measure participants' eye fixations.

We used a one-point calibration procedure. Participants focused on the Tobii calibration card projected on the screen while the experimenter clicked the "calibrate" button on the Tobii Pro Glasses Controller software. To optimize calibration, we resized the card to match the size used during free-living glasses use. Calibration success was verified through a fixation task and a smooth pursuit task displayed on the screen.

Data were processed using Tobii Pro Lab software (Tobii Technology AB, Danderyd, Sweden). The data were labeled by the main author of the article, who was blind to the experimental condition. A fixation filter was applied to automatically detect visual fixations, with an upper fixation threshold set at 64°/sec. This choice permits to keep as an ocular fixation smooth pursuit of a player moving at 24 km/h in the video clip, reflecting the maximum speed at which high-level basketball players typically move [36]. The minimum visual fixation duration was set at 60 ms. Data were manually labeled using buttons representing our areas of interest (AOIs): ball, hoop, ball carrier, ball carrier defender, non-ball carrier, non-ball carrier defender, direct defender, space inside, space outside, others.

"Fixation count", "fixation duration" and “average fixation duration” data were directly exported as Excel spreadsheets from the Tobii software. "Fixation count" data represented the number of times a participant fixated on each area of interest throughout the recording. "Fixation duration" data represented the total fixation time on each area of interest during the recording. “Average fixation duration” data represented the mean duration of each fixation on each area of interest.

Statistical Analysis

To compare decision-making regardless of experimental condition, a one-way non-parametric ANOVA (i.e., Kruskal-Wallis test) was conducted with decision type as the factor and the number of decisions as the dependent variable. Given the data's non-normality, non-parametric mean comparison tests (i.e., Wilcoxon signed-rank tests) were performed with a Benjamini-Hochberg correction to identify sources of differences.

To analyze the effect of experimental condition (i.e., social identity condition vs. personal identity condition) on decision type (i.e., shoot, pass, drive), a Chi-square test of independence was conducted. To more precisely evaluate decision-making differences between experimental conditions, considering data non-normality, separate Wilcoxon signed-rank tests were conducted with a Benjamini-Hochberg correction.

To analyze the effect of experimental condition on information gathering, we compared total fixation duration, average fixation duration, and fixation count on each area of interest (i.e., other, direct defender, ball, hoop, ball carrier, space inside, ball carrier, non-ball carrier, non-ball carrier defender, space outside) according to experimental condition (i.e., personal identity condition vs. social identity condition) using paired Wilcoxon signed-rank tests, with a Benjamini-Hochberg correction.

RESULTS

Decision Making

Throughout the study, participants were required to make 280 decisions. After excluding one decision that did not fit into any category because the participant did not make any decision and removing 8 decisions due to data recording issues from one participant, 271 decisions were analyzed.

Overall Decision Making

Participants had an average of 15.3 (*SD* = 4.32) shots, 6.2 (*SD* = 3.26) passes, and 5.6 (*SD* = 2.31) drives. The Kruskal-Wallis test revealed a statistically significant difference between types of decisions, $H(2) = 17.9$, $p < .001$, $\eta^2_p = .588$. The effect size indicated a large effect among decision types. Post-hoc analyses revealed significant differences between the number of drives and shots, $V = 1.5$, *p-adjusted* < .001, and between the number of passes and shots, V = 3.5, p-adjusted < .001, but not between the number of drives and passes, $V = 42$, *p-adjusted* = .565

(Figure 2). Thus, participants were more likely to shoot and equally likely to pass as they were to drive towards the basket.

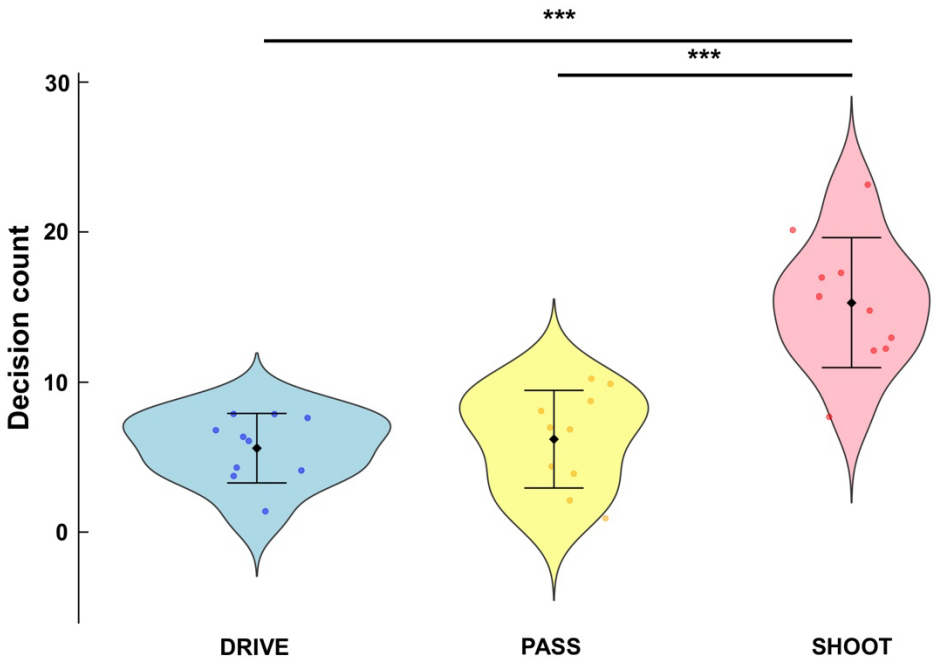

Figure 2. Distribution of the participant's decision throughout the study, combining the personal identity and social identity conditions. The black diamonds provide the group-level means and the error bars the corresponding group's standard deviation. The circles provide the individual data points of the distributions. Note that they were slightly offset horizontally to improve their visibility. Stars indicate significantly different distributions (***p < 0.001).

Decision Making by Experimental Condition

The chi-square test of independence showed a statistically significant association between the experimental condition (i.e., personal identity condition vs. social identity condition) and decision making (i.e., shoot, drive, or pass), χ^2 (2, N = 271) = 20.9, p < .001. This significant association suggested that identity (i.e., social vs. personal) influenced decision making. Post-hoc tests indicated that the number of shots was significantly higher in the personal identity

condition than in the social identity condition, $V = 34.5$, *p-adjusted* < .05, $r = .731$. Additionally, the number of passes was significantly higher in the social identity condition than in the personal identity condition, $V = 3$, *p-adjusted* < .05, $r = .745$. There was no difference in the number of drives between personal and social identity conditions, $V = 21$, *p-adjusted* > .05 (Figure 3, Table 1).

Decision making	Personal identity condition	Social identity condition	p-adjusted	Effect size (r)
Shoot	9,2 (2,821)	6,1 (2,470)	.037	.731
Pass	1,6 (1,776)	4,6 (2,547)	.037	.745
Drive	2,7 (1,636)	2,9 (2,424)	N/S	N/S

Table 1. Average number of each decision type according to the experimental condition.

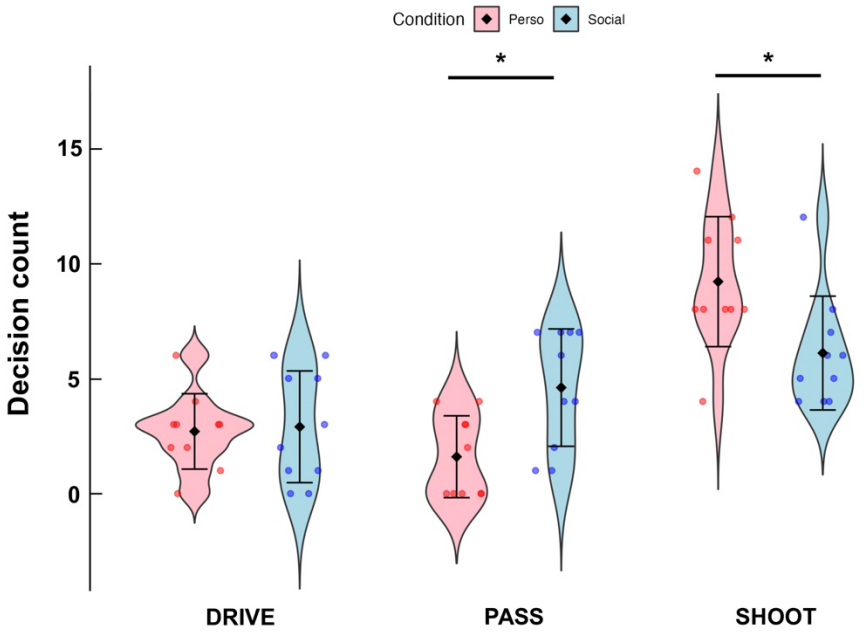

Figure 3. Distribution of decision-making during the personal identity (red) and social identity (blue) conditions (see Figure 2 for more details).

Visual search behavior

Average Fixation Duration

The combined average fixation duration of all 6,238 fixations was 406.29 ms (*SD* = 385.17, *Min*. = 60 ms, *Max*. = 4,377 ms). In the personal identity condition, the average fixation duration was 404.31 ms (*SD* = 386.94, *n* = 3,106). In the social identity condition, the average fixation duration was 408.25 ms (*SD* = 383.45, *n* = 3,132). After applying a logarithmic transformation to the data and assessing normality, a paired-samples t-test revealed no significant effect of the experimental condition on the mean fixation duration, *t*(3013) = -0.264, *p* = .792. Additionally, a paired Wilcoxon test for signed ranks revealed no effect of experimental condition on the mean number of fixation count, *V* = 30, *p-adjusted* = .846, nor on the mean total fixation time, *V* = 33, *p-adjusted* = .625.

Fixation location

All comparisons were non-significant, *p* > .05, indicating that the experimental condition did not affect the total time spent fixating on each area of interest (Figure 4), the average fixation duration on each AOI (Figure 5), or the number of fixations on each AOI (Figure 6).

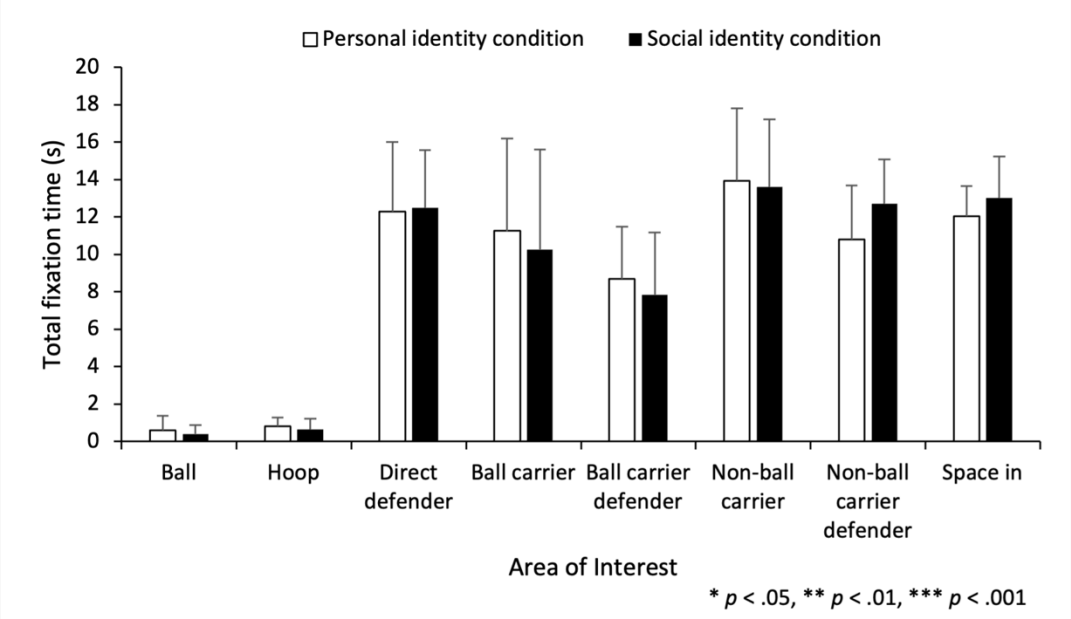

Figure 4. Total fixation times (*M* and *SE*) on each area of interest in personal identity (white) and social identity (black) conditions.

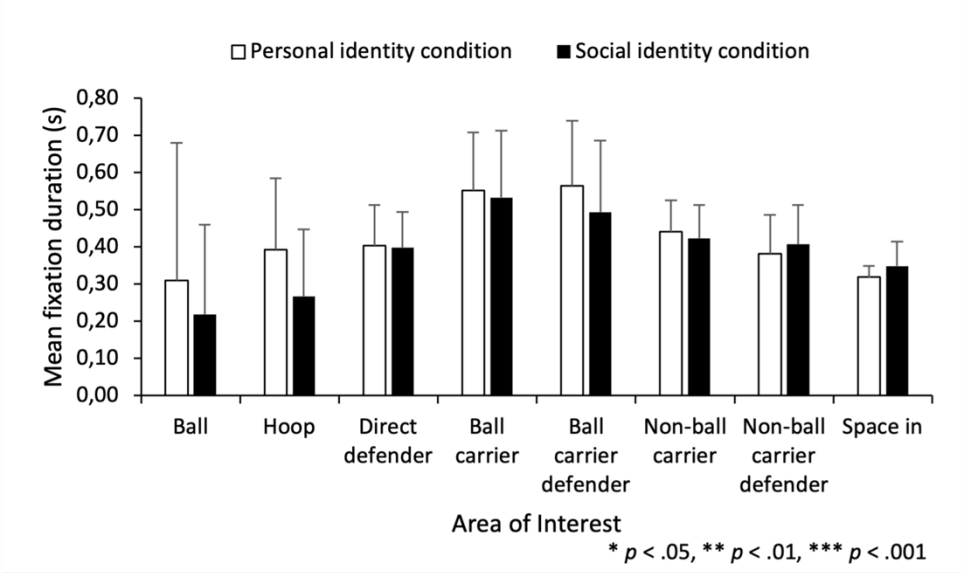

Figure 5. Mean fixation durations (*M* and *SE*) on each area of interest during the personal identity (white) and social identity (black) conditions.

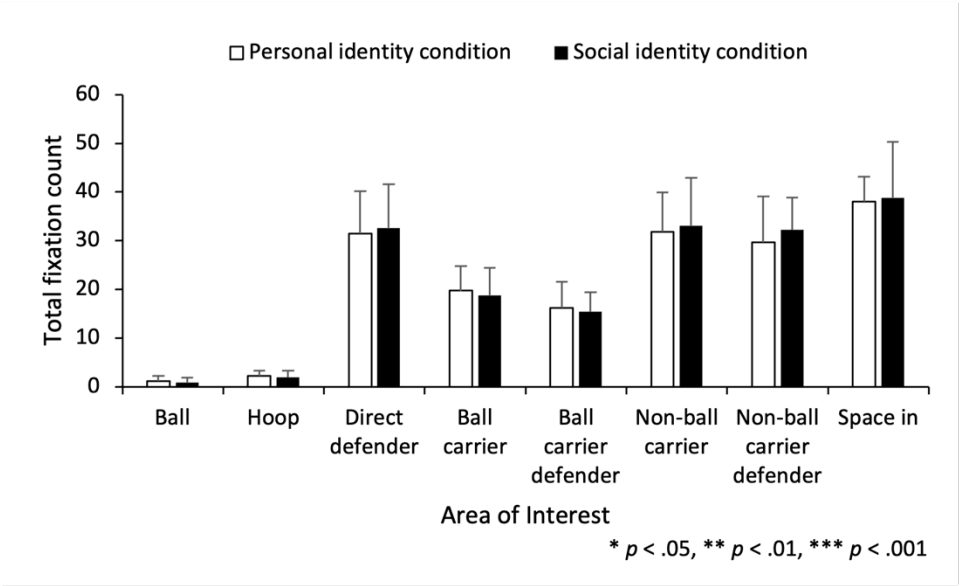

Figure 6. Total numbers of fixation (*M* and *SE*) on each area of interest during the personal identity (white) and social identity (black) conditions.

DISCUSSION

The aim of this study was to investigate the influence of self-categorization on visual strategies and decisions making process in basketball. We hypothesized that team identification influences decision-making in basketball, leading individuals to prioritize actions that enhance collective performance (i.e., passing), even if it comes at the expense of individual performance. Conversely, we hypothesized that when personal identity is prominent, individuals prioritize actions that improve their individual performance (i.e., shooting, driving). Furthermore, we expected that when social identity is prominent, participants focus more on areas of interest related to collective performance (i.e., non-ball carriers and their defenders) compared to when individual identity is prominent. Conversely, when personal identity is prominent, we hypothesized that participants focus more on areas of interest related to individual performance (i.e., the ball, the ball-carrier and their defender, the direct defender) compared to when social identity is prominent.

Regarding decision-making, our hypotheses are partially confirmed. We indeed found that identity positioning (i.e., personal vs. social identity) has a significant impact on decision-making. In the social identity condition, participants tended to make more passes than in the personal identity condition. Conversely, in the personal identity condition, players made more shots than in the social identity condition. Also, it can be noted that the number of drives did not differ across experimental conditions. This could be explained by the understanding that this action does not necessarily represent an individual action opportunity as we initially thought, but rather a more neutral action. Indeed, a drive may serve as either a shot opportunity or an opportunity to create additional space for a teammate.

In the current study, identity positioning influences decision-making, echoing existing literature. Indeed, social identity literature shows that group identification leads to collective decision-making in reference to a decision perceived as prototypical of the group and contributing to its success[7]. In our case, passing would be a decision perceived by players as prototypical of the group in team sports and promoting its performance. Similarly, research on cohesion shows that when social orientation (group cohesion) outweighs goal orientation, group members might forego their personal preferences to align with the group[37]. We can also explain our results in terms of the impact of emotions on decision-making. Indeed, it has been demonstrated in a sport context that athletes are more likely to make relevant decisions in a state of emotional comfort rather than discomfort[38]. Furthermore, Laborde and Raab[39] have highlighted a positive correlation between parasympathetic nervous system activity and

decision-making. Given that social identification impacts emotions both in sports[12] and outside of sports[40,41], this may explain why the level of team identification influenced decision-making in our study.

Nevertheless, self-categorization did not influence visual search strategies. This finding contradicts our initial hypothesis and existing research on the impact of self-categorization on perception. Indeed, it has been demonstrated that social categorization may direct the perceiver's attention toward aspects of the situation that confirm social categories[42], particularly in conditions where attentional capacity is not constrained[43]. Additionally, an eye-tracking study has revealed a significant attentional bias toward in-group members[44]. Our results seem to confirm some studies that focused on the effect of psychosocial states, primarily anxiety, on visual search strategies. For example, Nieuwenhuys et al.[45] demonstrated that climbers scan the same holds in both high and low anxiety conditions but choose holds closer to the body under high anxiety. Similar mechanisms were observed in police officers[46], where high anxiety led to decision bias, causing officers to shoot the assailant more frequently than in low anxiety conditions, despite no differences in visual search strategies. In addition, while Wadlinger and Isaacowitz[47] found that positive emotions lead to broadening of attention, other studies have not replicated these results[48,49]. This literature suggests thus that decision-making can be influenced by psychosocial variables without modifying the underlying visual search strategies.

In our study, several reasons could explain our results regarding visual search strategies. First, the visual search strategies of experts are more stable and less influenced by psychological variables such as anxiety compared to non-experts[24]. Given that our study involved professional players, it is possible that differences in visual search strategies are subtle and challenging to discern within such a population. Moreover, the impact of psychological variables on visual perception may not manifest at the scanning level but rather in the interpretation of visual information[50]. Indeed, as seen in studies by Nieuwenhuys et al.[45,46], participants may scan their environment in a similar manner across both experimental conditions, evidenced by similar eye movements. However, the difference in decision-making, which varies according to psychosocial states, could be explained by differences in the processing of this information. Thus, the same fixation on a player could be interpreted as offering different action possibilities depending on the identity positioning, explaining the decision biases.

Our study has highlighted a decision bias linked to group identification. We demonstrated that players tend to shoot more when personal identity is salient than when social identity is salient and pass more in the latter condition. These findings provide valuable insights into how cognitive biases related to group membership manifest in a sporting context, lending

support to the social identity approach for the preparation of elite athletes. However, our protocol did not allow us to determine whether these biases are beneficial or detrimental to performance. Indeed, research findings on the impact of group factors such as cohesion on decision-making quality yield mixed results. On a one hand, a positive group dynamic promotes good decision-making through better information sharing[37], on the other hand, a positive group dynamic can lead to a decrease in exploration of the best decision to make, which can in turn be detrimental to performance[51].

Limitations and Future Research

The relatively small size of our study's participant base could be considered a nuanced limitation, suggesting that future research might benefit from expanding this base to potentially reveal more robust findings. Furthermore, the experimental conditions, despite incorporating an identity induction procedure, may not have fully replicated the high-stakes environment typical of actual competitions. This usual difficulty in elicitation protocols could mean that the level of group identification experienced in the social identity condition might not have mirrored the intensity found in real-world scenarios, where the visibility and significance of social bonds are more pronounced. Finally, the lack of anticipated effects in our study might be attributed to the traditional eye-tracking data analysis methods employed. It is conceivable that the adoption of more sophisticated, data-driven analytical approaches, such as hidden Markov models, could offer a more refined mechanism for detecting behavioral distinctions between conditions[52].

Contributions

Alan Guyomarch (1st author): Conceptualization, Methodology, Investigation, Formal analysis, Investigation, Resources, Data Curation, Writing - Original Draft, Visualization, Project administration. Benoit R. Cottereau (2nd author): Methodology, Writing - Review & Editing, Visualization. Simon Martin (3rd author): Conceptualization, Methodology, Resources, Supervision. Emilie Pété (4th author): Validation, Data Curation, Writing - Review & Editing. Mickaël Campo (5th author): Conceptualization, Methodology, Resources, Writing - Review & Editing, Supervision, Funding acquisition.

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Data and Supplementary Material Accessibility

The data that support the findings of this study are available from the corresponding author, upon request.

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