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Eye-tracking Technology as a Research Tool in Sports Journalism: A Theoretical and Methodological Approach through the EYE-NEWS Project

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Abstract

The study of sports news consumption in the digital age has traditionally been based on subjective data or traffic statistics, which fail to capture readers' internal cognitive processes. This paper analyzes how the EYE-NEWS research project can transform research in sports journalism through eye-tracking technology. The aim is to develop an objective, non-invasive methodology for understanding users' visual attention and engagement with sports content. As part of the proposed research design, participants (digital media users) will be asked to read sports articles on different devices, such as smartphones and tablets. The main tool used will be an eye-tracking system, which records gaze data, supporting the research through fixations and saccadic movements. The research design focuses on identifying reading patterns depending on the type of content and the device used. For data analysis, metrics such as fixations, saccades, and gaze duration are recommended. The conclusions of this theoretical approach emphasize that the use of eye-tracking in sports communication provides objective data for the development of effective news presentation strategies and the optimization of the user experience (UX).

Keywords: eye-tracking, sports journalism, EYE-NEWS, visual attention

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Introduction

In recent years, Artificial Intelligence (AI) and online platforms have significantly influenced many aspects of society, enabling the development and adoption of effective processes and methods, such as eye tracking, by academic disciplines, including psychology, education, journalism etc. (Alemdag and Cagiltay, 2018; Carter and Luke, 2020; Katsaounidou et al., 2025; Latini et al., 2020). In this context, eye tracking has been used as an efficient method that measures the nonverbal cues given by individuals, including attention, emotion, understanding and salience, by tracking eye movements and pupil dilation (Jenke and Sullivan, 2025: p. 298). Within communication research, eye tracking has been established as a technique applied to advertising, news consumption and television viewing, with the aim of investigating attention allocation to different types of content (Cummins, 2017; Cummins and Hahn, 2022). Recent studies also reveal related applications in sports journalism to address research enquiries regarding selective exposure to information graphics (Cummins et al., 2016), viewers' attention to female and male reporters or presenters and its correlation to differences in perceived credibility etc. (Cummins et al., 2019; Cummins and Hahn, 2022).

Although eye tracking has gained scholars' attention as an effective experimental method, poor training and lack of information can lead to insufficient study design, inaccurate data analysis and reporting as well as to the production of non-replicable results (Carter and Luke, 2020). Such methodological concerns are evident across many disciplines, such as psychology, where studies frequently present low reproducibility rates (Open Science Collaboration, 2015). Such issues may be resolved by focusing on the development of best practices and related guides that strengthen eye tracking's position over traditional research methods (e.g. interviews, surveys etc.) that constantly present limitations associated with subjective factors (Carter and Luke, 2020; Schiessl et al., 2003).

Moreover, eye tracking may also provide accurate and objective measures for the study of reading behavior where the F-shaped scanning pattern is still prevalent (Moran, 2020). That is linked to the fact that individuals strategically seek information influenced

by factors changing how they select and consume digital content (Leckner, 2012; Parker, 2023). Additionally, objective measures may also be used to estimate the time individuals spend on online reading, considering that news websites often lead to the rapid consumption of related content in contrast to print media (e.g. newspapers etc.) that facilitated effortful learning (Kruikemeier et al., 2020). In this regard, differences in learning between online websites and print media that are associated with factors, such as linearity of news and user control, can limit readers' understanding regarding the content they prefer (e.g. political or social issues etc.) and/or frequently view via digital platforms (e.g. social media etc.) (Kruikemeier et al., 2020; Vraga et al., 2016), highlighting the need to adopt objective means, with the aim of identifying markers that enhance comprehension in the context of news consumption (Mézière et al., 2023).

Purpose

The main purpose of this study is to provide guidance regarding the effective utilization of eye tracking methodology within the field of sports journalism. To achieve its purpose, this study builds on the fundamentals of eye tracking technology and focuses on the methodology and equipment employed in the EYE-NEWS project that aims to investigate users' reading behavior within current digital environments (EYE-NEWS Project, 2025). In this way, this study seeks to support academics and professionals in avoiding common methodological pitfalls when applying eye-tracking techniques to design and produce replicable and accurate research.

Literature Review

Over the last years, the establishment of AI along with the widespread use of digital platforms have affected various societal aspects, enabling the adoption of efficient procedures and methods by different academic disciplines (e.g. psychology, education, journalism etc.) (Katsaounidou et al., 2025; Latini et al., 2020). In this context, eye tracking has been adopted as a technique for measuring the nonverbal cues given by individuals (emotions, attention, salience and understanding) by monitoring eye movements alongside pupil dilation (Jenke and Sullivan, 2025: p. 298). The widespread attention eye tracking has received is due to it provides insights regarding the connection between the nervous system and human eyes whose motion depends on neurological and cognitive procedures, potentially revealing the mind's functions. As a result, it has been a reliable research tool for studying the allocation of visual attention,

considering the eye-mind link that highlights individuals' tendency to move their gaze in what they are currently processing or thinking (Carter and Luke, 2020).

As mentioned above, eye tracking has been employed in different fields, like psychology, education and communication and journalism. Within communication research, scholars mostly apply eye tracking technology to investigate enquiries related to news consumption, advertising or television viewing, focusing on attention allocation to multimedia content (Cummins, 2017; Cummins and Hahn, 2022). Additionally, in sports journalism, which includes print, broadcast and online news coverage regarding both amateur and professional sports, eye tracking has been adopted for exploring viewers' selective exposure to different types of information graphics (Cummins et al., 2016), their attention to both female and male sports presenters or reporters and its relation to differences to perceived credibility etc. (Cummins et al., 2019; Cummins and Hahn, 2022). Even though eye tracking is an effective experimental methodology, insufficient information alongside limited training often leads to inaccurate research design and reporting, providing non-replicable findings (Carter and Luke, 2020).

According to Open Science Collaboration (2015), related methodological concerns are evident in the field of psychology, with several studies presenting low reproducibility rates over the last few years (Open Science Collaboration, 2015). In this regard, many scholars have focused on the development of supporting guidelines, presenting a series of effective practices regarding eye tracking's utilization. Such guidelines aim to encourage eye tracking's position over traditional research methods, like interviews, surveys, questionnaires etc., which include limitations associated with subjective factors. Moreover, they seek to ensure the production of replicable findings capable of interpreting human behavior, considering the main characteristics of eye movements (Carter and Luke, 2020; Schiessl et al., 2003).

The main attributes associated with eye movements are considered crucial factors for interpreting data produced via eye tracking technology. Analytically, human vision is linked to different categories, including foveal, parafoveal and peripheral vision. In this regard, foveal vision is responsible for providing the highest level of acuity for various tasks, including reading etc. Additionally, in order to perceive information, human eyes must remain still in a state defined as fixation that typically lasts between 150 to 600 milliseconds (Cummins, 2017). Moreover, among fixations are saccades, which are considered rapid and ballistic jumps that help the gaze move in different locations. In this stage, human brain suppresses visual intake, a phenomenon defined as saccadic

suppression, which means that the extraction of information occurs when stable fixation periods exist (Carter and Luke, 2020). During the reading process, saccades also span 7 to 9 characters, though they are influenced by factors, such as the difficulty of the narrative or the linguistic proficiency of the reader. Understanding these fundamental biological and cognitive constraints of human vision is a prerequisite for robust experimental designs in this field. Without a clear grounding in how fixations and saccades operate, researchers risk misinterpreting gaze data, which directly compromises the replicability of the findings. This methodological caution becomes particularly critical when moving from simple reading tasks to more complex environments, such as multimedia learning, where the visual system must dynamically process and integrate multiple streams of information simultaneously.

In terms of multimedia learning, eye tracking has been associated with the validation of several principles related to cognitive processing. Analytically, the cognitive theory of multimedia learning argues that effective learning requires specific procedures, including the selection of information, its organization into coherent mental models, as well as the combination of these models with existing knowledge (Mayer, 2014). Furthermore, gaze transitions between text and corresponding images is considered a predictor of successful integration. Furthermore, when readers change their focus between two types of content related to the same concept, they can build a deeper understanding associated with the corresponding information. On the other hand, seductive details, including fascinating but irrelevant images or text, affect learning by distracting readers' attention away from pertinent content (Alemdag and Cagiltay, 2018). In this regard, spatial contiguity, which is connected to the placement of text and visuals near each other, can reduce cognitive load and facilitate easier integration (Latini et al., 2020). Consequently, these multimedia learning principles effectively offer a set of methodological guiding principles for what to look and account for when operationalizing eye tracking metrics. With the establishment of these parameters, researchers can more easily isolate whether a user's gaze patterns stem from the structure of the content or the inherent nature of the medium itself. This approach is vital when applying eye tracking to investigate how the transition from print to digital news media alters reading behavior and comprehension.

Furthermore, the transition from print to digital media has introduced crucial shifts in terms of reading behavior and understanding. Analytically, digital environments seem to encourage human interaction and immediate rewards, supporting superficial

information processing (Annisette and Lafreniere, 2017). In accordance with Latini et al. (2020), who conducted a multimedia eye-tracking study comparing print and digital reading, individuals who read on paper demonstrated more integrative processing of visuals and narrative than those reading on a desktop screen. In this case, the increased number of gaze transitions mediated the effect of the medium on comprehension, highlighting that print media may support sustained attention, which is a requirement for deep cognitive processing. This effect can be magnified when reading time is more restricted, as users seem to skim more heavily under pressure (Delgado and Salmerón, 2022) (see figure 1).



Figure 1. Online reading behavior: scanning vs linear reading.

Moreover, news consumption has become a complex procedure within digital environments, underlying how online platforms' design can significantly influence readers' attention. According to Kruikemeier et al. (2020), traditional newspapers rely on bottom-up attention driven by editorial cues (e.g. headline size, layout etc.,) while online websites favor top-down attention driven by individual needs, preferences and selective control. In this regard, readers of print media tend to spend additional time on a range of news articles due to the linear structure of the paper. However, online readers are more likely to choose or engage with specific topics and articles, achieving a higher level of learning related to this information. This is associated with the fact that digital media

provide a trade-off between the breadth of information encountered and the depth of engagement with selected types of content. Furthermore, the use of visual material (e.g. photographs, graphics etc.) can also exert a dominant influence on a reader's view of a topic's severity and their participatory intentions (Dahmen, 2015).

Recently, the integration of artificial intelligence with eye tracking technology has introduced new ways for predicting consumer behavior. By using datasets of thousands of participants, AI technology and corresponding models are able to predict which layout areas are more likely to capture readers' attention within the first few seconds of exposure in an accurate and credible way. In this context, Šola et al. (2024) argued that such tools can provide accuracy rates as high as 97-99%, providing insights into focus, cognitive demand, and clarity. For instance, studies in online magazines (e-magazines) have revealed that background color contrast affects reader engagement. While white backgrounds are effective for sustaining attention over long periods, the black ones can achieve a higher level of clarity and immersion for specific types of content (Šola et al., 2025). Moreover, intelligible background speech seems to disrupt reading by increasing regressions and the overall reading time in tasks, requiring semantic processing (Šola et al., 2025).

Lastlt, eye tracking metrics can provide predictions in terms of measuring comprehension during the reading process. Analytically, Mézière et al. (2023) revealed that eye movement measures can clarify the variance in comprehension scores more than reading speed alone. Specifically, measures, including average fixation duration or local measures, such as first-pass skipping rate, could explain how well a reader understands a narrative. Interestingly, the relationship between these measures and comprehension is often task dependent. This is evident in tests that participants are able to revisit the text or answer the corresponding questions, employing more shallow processing strategies during the initial reading. In contrast, oral reading results in longer fixations and regressions, (Mézière et al., 2023).

It is worth noting that these are still significant research gaps in terms of eye tracking research. As Angele and Duñabeitia (2024) argued, most studies focusing on eye tracking are conducted in Western regions, using English-speaking populations. This limits the generalizability of findings, as reading patterns are inextricably linked to specific languages and writing systems. Hence, there is a need to develop more affordable tracking solutions, including webcam-based systems and increased international collaborations, ensuring that insights related to cognitive processing are

validated across diverse regions and contexts. The combination of eye tracking with other biometric measures can also provide a more comprehensive understanding of the emotional and cognitive states that currently drive human engagement.

Methodology

To address the methodological shortcomings, data inconsistencies, and regional biases highlighted in the literature, it is imperative to integrate eye tracking experiments through highly standardized protocols. In domains like sports journalism, where dynamic informational graphics and multilayered interfaces are commonly used to enhance the final product, mitigating potential research design flaws is essential for producing replicable results. Through the use of validation protocols and versatile cross-platform integration, this approach can be used to minimize the methodological errors that often undermine eye-tracking studies. Based on the above, the methodology and equipment employed in the EYE-NEWS project have been designed to establish a non-invasive and objective framework, which is primarily used to investigate how people read digital news and how their eye movements can be tracked, with the aim of understanding their reading behavior. For these reasons, the aforementioned framework is suitable for analyzing related parameters within the field of sports journalism. Additionally, the EYE-NEWS system utilizes eye-tracking technology to record gaze data from mobile devices (e.g., smartphones and tablets) and desktop screens up to 24 inches, at sampling rates of up to 250 Hz, reflecting the multi-platform nature of news consumption and enabling the analysis of fixations and saccades (EYE-NEWS Project, 2025). Moreover, the system's sampling rates are effective for conducting research that focuses on both reading behavior and interactive media, providing a high degree of temporal precision suitable for detecting and analyzing subtle eye movements (Cummins, 2017).

Furthermore, the experimental environment of the EYE-NEWS project consists of an integrated eye-tracking platform that includes specialized hardware and software. Within the project's environment, participants, representing users of online platforms, are encouraged to consume and engage with digital news content, such as sports news, while their eye movements are continuously recorded via specialized devices. To ensure data accuracy, the process begins with rigorous screening based on specific criteria, including participants' normal or corrected to normal vision (Carter and Luke, 2020). Moreover, an individual calibration process is performed for adapting the eye-tracking system to the physiology of each participant (Geise et al., 2020). Here, users follow a

series of markers depicted on a screen to ensure that any spatial error remains within an acceptable threshold, which must be less than 0.5 degrees of visual angle (Djamasbi, 2014; Mosconi, Porta and Ravarelli, 2008).

Additionally, the experimental stimuli comprise digital content, including sports articles presented in different formats and visual layouts. These articles are matched according to cognitive and visual factors that may influence eye movements (e.g. the complexity of the narratives, elements' size and image salience etc.) to achieve high internal validity. In studies comparing desktop and mobile consumption, the articles are formatted responsively to account for differences in viewing behavior, as users on smaller screens tend to scroll more frequently and focus primarily on content within the initially visible area Babich, 2020; Pernice, 2017). Hence, the overall research design identifies different reading patterns depending on whether the content is text-based or incorporates different multimedia elements, such as videos or infographics (EYE-NEWS Project, 2025).

In terms of EYE-NEWS project, the metrics suggested for the investigation of audience engagement with sports news include fixations, gaze duration and saccades. Fixations are time periods where the eyes remain still, ensuring the brain records and codes visual information from the experimental stimuli. Generally speaking, the duration and frequency of such fixations are representative of the informational value and processing difficulty of certain screen areas (Brunyé et al., 2019; Majaranta and Bulling, 2014). On the other hand, saccades are quick and ballistic jumps among fixations that reveal shifts in visual attention (Van Gog and Jarodzka, 2013). Even though no information is acquired during a saccade, the direction and length they provide can lead to insights regarding the scanning strategies users mostly adopt and the layout's visual hierarchy (Duchowski, 2007; Guo, Kim and Lee, 2024).

In addition to these basic movements, gaze duration is used to measure the total time spent by a participant on a specific area of interest (AOI). In the context of sports journalism, AOIs are pre-defined regions such as headlines, lead paragraphs, athlete photographs, or sponsorship logos (EYE-NEWS Project, 2025). High gaze duration on an AOI typically suggests a high level of interest or cognitive engagement with that specific element (Djamasbi, 2014; Punde, Jadhav and Manza, 2017). By aggregating these metrics across multiple participants, researchers can generate heatmaps and scanpath visualizations that clearly represent the distribution of attention across a news portal (Zambarbieri, Carniglia and Robino, 2008). These visualizations help designers

identify which elements successfully capture interest and which are being ignored, facilitating the optimization of the user experience (Schiessl et al., 2003).

Gaze duration is also used to measure the overall time spent by participants on specific areas of interest (AOI). Within sports journalism, AOIs can be theorized as predefined regions, like headlines, athletic photographs, lead paragraphs etc. (EYE-NEWS Project, 2025). Hence, increased gaze duration on a specific area of interest reveals an increased level of interest or cognitive engagement with the specific element (Djamasbi, 2014; Punde, Jadhav and Manza, 2017). By aggregating such metrics across participants, scholars can make heatmaps and scanpath visualizations, representing how visual attention is disseminated across a news portal (Zambarbieri et al., 2008). Lastly, these visuals support designers in identifying the elements that capture readers' interest, facilitating the optimization of user experience (Schiessl et al., 2003).

Lastly, the methodology focuses on ensuring data quality and ethical considerations. During the tracking task, qualified experts monitor factors, like participants' distance from the monitor and the quality of the infrared reflection to prevent data loss (Vraga et al., 2016). Moreover, data cleaning, including removing trials disrupted by excessive blinks or ineffective calibration, is recorded to strengthen transparency (Carter and Luke, 2020). Ethical standards are also ensured through informed consent, participant privacy protection and ethics committee approval prior to study commencement (EYE-NEWS Project, 2025), enabling the EYE-NEWS project to produce objective empirical data for sports marketing and news presentation research.

Challenges and Ethical Considerations

Due to the nature of eye tracking technology, there are a number of practical and ethical limitations that should be taken into account. Starting off by addressing the practical side of things, a fair number of these limitations stem from the complexity of the systems in question, as eye tracking requires significant technical expertise in order to manage the associated hardware, accurately calibrate the products, and subsequently interpret the high-frequency data in a meaningful way (EYE-NEWS Project, 2025). High levels of technical expertise are required in more than one area, namely not only on the hardware, but also on the software level, where complicated solutions are used in order to parse thousands of data points into meaningful behavioral metrics (Majaranta and Bulling, 2014).

More specifically, one of the most significant hurdles when it comes to eye tracking technology is related to calibration. Before these systems can be properly utilized, the end user is almost always required to undergo a calibration process, specific to each individual eye tracking system. The aim of this process is to ensure data quality, which is typically defined through the lens of accuracy (correspondence between the measured and actual eye position) and precision (consistency of measurements) (Reingold, 2014). Each manufacturer usually provides best-case scenario values for these metrics, but in practice, quality can vary significantly based on certain factors. No matter how advanced a system of this nature may be, the validity of the output results heavily relies on the correct execution of the calibration process, which in turn can prove to be a very sensitive operation (Carter and Luke, 2020). For instance, the unique physiological characteristics of the participants, including many seemingly innocuous factors such as the presence of droopy eyelids, heavy makeup, or specific types of corrective lenses, can obstruct the infrared reflection emitted by the eye tracking system, which can result in significant data loss or inaccurate gaze estimations (Majaranta and Bulling, 2014). The above factors are even more important for tools using high sampling rates, such as the 250 Hz sampling rate utilized by the EYE-NEWS system, as even minor positional corrections on behalf of the subject can necessitate complex drift corrections to maintain the integrity of the data (EYE-NEWS Project, 2025). This limitation is brought up repeatedly in the related literature, with many researchers pointing out the fragility of the calibration process, as well as the significance of acquiring representative data (Hooge et al., 2025).

Moreover, even if we assume that there are no adverse physiological conditions, the calibration process itself can present a challenge on a software level for certain participating audiences. Most high-performance systems require a 9-point or 5-point calibration procedure where the participant follows markers on the screen to adapt the system to their specific eye geometry (Geise, Heck and Panke, 2020; Šola, Qureshi and Khawaja, 2025). Failure to achieve a successful calibration often necessitates the exclusion of participants from the study, with related research showing that a percentage of up to 10% of the sample, or in some cases even more, may be disqualified due to technical issues or an inability to maintain a stable gaze (Kruikemeier, Lecheler and Boyer, 2018; Kim, Vraga and Cook, 2021). Furthermore, the transition toward mobile-based eye tracking, which is central to the EYE-NEWS objective of studying news consumption on smartphones and tablets, introduces additional environmental variables

such as changing ambient light and unrestricted head movement (Niehorster et al., 2018; Majaranta and Bulling, 2014). Such systems, despite their versatility, also have to contend with the possibility of variations on the hardware of end users, with certain mobile devices, particularly older ones, being unable to correctly complete the calibration process (Holland et al., 2013).

Beyond the hardware setup and calibration, the interpretation of eye tracking data presents a substantial analytical challenge in and of itself. Because researchers can measure everything from how long a participant's gaze lingers on a specific spot (average fixation duration) to the total time spent looking at various regions of a screen (dwell time on AOI), it becomes easy to accidentally find patterns that look meaningful but are actually just random statistical noise. This phenomenon is often referred to as “data fishing” and, although unintentional, it can lead to conclusions that seem concrete, but are actually based on circumstantial evidence (Carter and Luke, 2020). To prevent such phenomena, researchers are increasingly turning to preregistration by publicly publishing their specific hypotheses and exact data-analysis plans before running the experiment. In this way, the experimenters can clearly separate their original, planned predictions from insights discovered after the fact in a form of post hoc analysis (Nosek et al., 2018). Moreover, even if we assume a perfect interpretation of the output, the sheer volume of data points generated by high-frequency trackers can be overwhelming. This necessitates the use of specialized algorithms on behalf of the researchers, in order to segment raw coordinates into fixations and saccades and extract meaningful conclusions, a process which can be lengthy and prone to errors (Cummins, 2017).

Moving on from the practical considerations, there are also a fair number of ethical challenges that need to be overcome. Privacy is always a concern of utmost importance in academic research, and this fact is particularly relevant when it comes to handling information like gaze data, which, by many definitions, falls under the category of sensitive personal information, due to its biometric nature. Consequently, researchers face a heightened responsibility to secure this data, as eye-tracking records can inadvertently reveal deep cognitive processing, personal preferences, or involuntary behavioral traits that a participant might not realize they are sharing (Kröger et al., 2020). The project necessitates the formal approval of a Research Ethics Committee before any data collection commences (EYE-NEWS Project, 2025). Central to this process is the requirement for informed consent, where participants are fully briefed on the nature of

the eye-tracking task, the types of data being recorded, and how their information will be utilized (Šola, Qureshi and Khawaja, 2025).

Other standard privacy-related procedures, like data anonymization, are also paramount, especially when integrating eye tracking with other neuroimaging or biometric techniques. A common practice in laboratory settings is to blur users' pictures and names in stimuli to maintain the confidentiality of third parties whose content might appear in a simulated news feed (Vraga, Bode and Troller-Renfree, 2016). For digital media studies in particular, protecting participant identity involves the secure storage of raw gaze files and the removal of any identifying physiological features from the data before it is shared or published (Šola, Qureshi and Khawaja, 2025). The adherence to international standards such as the General Data Protection Regulation (GDPR) and the Berlin Declaration ensures that participants' biometric rights are upheld throughout the research lifecycle (Šola, Qureshi and Khawaja, 2025).

When broaching the subject of ethical experimentation in the field of social sciences as a whole, the debate expands to encompass other factors as well, such as the nature of the stimuli shown to participants. For instance, studies involving graphic or violent news photography must balance the inherent journalistic role of providing accurate information with the responsibility to minimize harm to the viewer (Dahmen, 2015). While eye tracking can objectively measure the impact of such images, researchers must be sensitive to potential audience desensitization or emotional distress caused by exposure to intense media content (McKinley and Fahmy, 2011). While this concern is usually less prevalent in the field of sports journalism in particular, it should still be taken into account for various edge cases that might depict scenes such as sports-related injuries, for example. Finally, the use of deceptive tasks, where the true purpose of the study is hidden from the participant during the initial pass, like, for instance, in cases where the researchers are studying fake news, must also be ethically justified and followed by a comprehensive debriefing (Simko et al., 2019; Kruikemeier, Lecheler and Boyer, 2018).

Lastly, ethical responsibilities also arise in the realm of transparency and moving towards open science. Given the reproducibility crisis in the social and behavioral sciences, eye-tracking researchers are increasingly expected to make their custom scripts, analysis code, and anonymized datasets available through platforms like the Open Science Framework or GitHub (Carter and Luke, 2020; Mézière et al., 2023). This level of transparency allows for independent verification of the results and ensures that

the findings contribute meaningfully to the global body of knowledge (Fiedler et al., 2019). This obligation is further underscored by the methodological complexities inherent to eye tracking research and the interpretation hurdles they often imply, as they were presented earlier in this section.

Discussion: Scientific Impact and Added Value

Historically, research related to sports news consumption has been mainly focused on web traffic statistics and interviews. However useful these metrics may be, they often fail to capture the internal cognitive and attentional processes of the audience, which is where eye tracking technologies come in, by helping the field move past the sole use of traditional subjective data, and into a multilayered, scientific approach (EYE-NEWS Project, 2025). By employing eye tracking technology, the project provides an objective and non-invasive methodology for measuring exactly how users interact with digital content. This empirical approach allows researchers to gain insights into subconscious behavioral patterns that self-reporting methods typically miss due to memory limitations or social expectation bias, which are very common disruptors in social sciences (Schiessl et al., 2003; Šola, Qureshi and Khawaja, 2025).

A significant added value of this research is the optimization of sports journalism presentation. Findings from the project can inform more effective strategies for presenting content, such as identifying the ideal placement for headlines, lead paragraphs, and multimedia elements to maximize engagement. For example, by understanding dominant reading behaviors like the F-shaped pattern, designers can optimize layouts so that critical information aligns with natural scanning paths (EYE-NEWS Project, 2025; Šola, Qureshi and Khawaja, 2024). This scientific approach to layout design reduces unnecessary cognitive load on the reader and ensures that key messages are successfully communicated even during brief interactions (EYE-NEWS Project, 2025; Šola, Qureshi and Khawaja, 2024). These implications also extend to the field of sports marketing, as high-temporal resolution data can provide a scientific basis for determining the most effective placement of sponsorships and advertisements (EYE-NEWS Project, 2025). Leading brands can utilize these insights to evaluate consumer behavior and optimize the customer experience by ensuring that key marketing messages receive sufficient visual attention (Punde, Jadhav and Manza, 2019). This data-driven approach to design is considered by many to be nearly mandatory in the modern digital environment, as it is paramount for staying competitive by helping

companies generate value both during and after the development cycle of a website (Djamasbi, 2014). The above use cases can also be further enhanced with the integration of artificial intelligence into functional eye tracking systems. The use of advanced AI algorithms trained on massive datasets allows for high-accuracy predictions of reader engagement and emotional responses (Šola, Qureshi and Khawaja, 2025). This fusion of technologies provides researchers with unprecedented insights into how specific design elements, such as background color contrast and content structure, influence reader immersion and excitement (Šola, Qureshi and Khawaja, 2025). Such advancements set a new standard for user experience measurement, moving the field toward more dynamic and predictive models of human-technology interaction (Šola, Qureshi and Khawaja, 2025).

Another aspect that the project can contribute to is the creation of more inclusive digital environments. Eye tracking is a powerful tool for studying diverse populations, including elderly readers and individuals with reading difficulties (Zambarbieri, Carniglia and Robino, 2008). By analyzing how these specific groups navigate news portals, researchers can identify barriers to information access and develop design interventions that help bridge the digital divide (EYE-NEWS Project, 2025). This emphasis on accessibility ensures that technological advancements in journalism benefit the widest possible audience, regardless of their computer expertise or physical abilities (Zambarbieri, Carniglia and Robino, 2008).

All of the discussion above is informed by the broader scientific challenge of reproducibility, which the EYE-NEWS project actively addresses by documenting its data processing thresholds and embracing open science practices. Ultimately, this commitment to transparency allows the project to serve as a comprehensive blueprint for conducting replicable eye tracking research and helps combat the ongoing reproducibility crisis in psychological and communication research, while putting greater emphasis on the field of sports journalism (Carter and Luke, 2020).

Future Research and Conclusion

Inevitably, the future of eye tracking research in the context of digital journalism is poised to move beyond simple gaze recording toward a more holistic measurement of the user experience. A primary recommendation for subsequent investigations is the integration of eye tracking with other biometric data sources (EYE-NEWS Project, 2025). Although incorporating many different disciplines and measuring methods is no easy

task, the combination of gaze metrics with other more niche and detailed methods such as Electroencephalography (EEG), Galvanic Skin Response (GSR), and Electrocardiography (ECG) can allow researchers to transition from simply observing where a person looks to understanding their internal emotional arousal and physiological responses to specific sports content (EYE-NEWS Project, 2025; Šola, Qureshi and Khawaja, 2025). This multimodal data fusion allows for a more granular assessment of cognitive workload and attentional processes, providing a comprehensive understanding of the neural correlates of reader engagement (Majaranta and Bulling, 2014; Šola, Qureshi and Khawaja, 2025). Such methods, however, can be classified as even more invasive compared to eye tracking and must therefore adhere to the same strict ethical and regulatory standards that were described earlier in the manuscript.

Technological advancements also suggest a move away from restrictive laboratory settings toward more natural and mobile environments. The development of high-resolution webcam-based tracking and the potential for built-in eye trackers in future laptops and tablets could facilitate large-scale, opt-in user studies that mirror actual news reception routines at home (Djamasbi, 2014; Majaranta and Bulling, 2014). Furthermore, the application of artificial intelligence and machine learning algorithms, as discussed earlier, can enhance the predictive power of these studies (Guo, Kim and Lee, 2024). AI models trained on massive datasets can accurately forecast focus, cognitive demand, and reader immersion, allowing designers to optimize layouts even before they are published (Šola, Qureshi and Khawaja, 2024; Šola, Qureshi and Khawaja, 2025).

Additionally, future research could address the sampling imbalance known as the "eye-tracking gap", which dictates that certain demographics are being examined far more than others within this area of study (Angele and Duñabeitia, 2024). Expanding the participant pool to include more diverse age groups, cultural backgrounds, and individuals with different reading abilities will ensure that theories of cognitive processing are universally valid (Angele and Duñabeitia, 2024; Simko et al., 2019). Additionally, transitioning from cross-sectional designs to longitudinal studies will offer critical insights into how visual strategies and news consumption habits evolve over time (Brunyé et al., 2019).

The methodology established by the EYE-NEWS project marks a significant shift toward an objective empirical understanding of digital news consumption. By capturing high-temporal resolution data across multiple devices, this approach bypasses the subjective biases inherent in traditional interviews and basic traffic statistics which have,

historically, been the main research vehicles in sports journalism (EYE-NEWS Project, 2025). Ultimately, this scientific framework provides the foundation necessary to optimize user experience and refine content presentation strategies within sports journalism, allowing publishers to design digital portals that effectively command reader attention and foster deeper engagement in an increasingly saturated media market (Punde, Jadhav and Manza, 2019).

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