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Bridging brains: exploring neurosexism and gendered stereotypes in a mindsport

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ABSTRACT

Ingrained gendered discourses about women's abilities and skills impact on their participation in leisure and sport. This paper argues that gendered stereotyping extends to the serious leisure context of mindsport in the form of neurosexism. The card game bridge is played by a roughly equal proportion of men and women but at elite-level male players significantly outperform female players worldwide. Based on 52 semi-structured interviews, the paper explores the everyday gendered assumptions that exist and are reproduced by elite bridge players. Many of the research participants draw on ideas of male brains being more rational, logical and competitive whereas women's brains are perceived to be more emotive, unfocused and uncompetitive. These gendered stereotypes are used to explain and defend why more women are not playing at elite level. Such neurosexist and behaviourist assumptions actively reproduce inequality within mindsport to the detriment of women bridge players. This article shows that neurosexism reinforces ongoing, systemic inequalities around gendered experiences of serious leisure, thereby reproducing gendered inequalities and hindering greater participation and inclusion in mindsport.

RÉSUMÉ

Les préjugés sexospécifiques enracinés, qui visent les aptitudes et les compétences des femmes, ont un effet négatif sur la participation des femmes aux loisirs et aux sports. Cet article argue que les stéréotypes sexistes, exprimés sous la forme de neurosexisme, existent autant dans les loisirs sérieux que dans les jeux intellectuels. Partout dans le monde, une proportion à peu près égale d'hommes et de femmes pratiquent le bridge comme loisir, mais en compétition, les hommes performent considérablement mieux que les femmes. À la lumière de 52 entrevues semi-structurées, l'étude explore les préjugés sexospécifiques courants qui sont reproduits par les joueurs de bridge de haut niveau. Les participants sont nombreux à croire que le cerveau de l'homme est plus rationnel, logique et compétitif que celui de la femme, qui serait selon eux plus émotif, moins

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concentré et compétitif. Ces stéréotypes sexospécifiques servent à expliquer et à justifier pourquoi peu de femmes atteignent le niveau élite. Ces préjugés neurosexistes et comportementaux perpétuent les inégalités dans les jeux intellectuels, et ce, au détriment des femmes qui jouent au bridge. Cette étude montre que le neurosexisme encourage les inégalités systémiques persistantes entourant les loisirs sérieux qui tiennent compte du sexe des joueurs, qui perpétuent ainsi les inégalités entre les sexes, et empêchant une meilleure participation des femmes aux jeux d'adresse.

Introduction

Within the worlds of leisure and sport, gendered attitudes regarding the different aptitudes of men and women are well documented. In elite sporting arenas, men are consistently presented as stronger, faster and more competitive than women (Niederle & Vesterlund, 2007; Ors et al., 2013). Despite research challenging this (Jurajda & Munich, 2011; Lavy, 2008) and work which highlights the range of gendered barriers women need to continually overcome (Delamere & Shaw, 2008; Lincoln, 2021; Wachs, 2006), behaviourist and neurosexist explanations continue to flourish (C. Fine, 2013; Rippon, 2019). What is clear, is that explaining gender difference in terms of brains, physicality, competition and skill has a grip on the popular imagination that is hard to counter and erode.

Using the case study of bridge as a serious leisure activity, this paper explores the ways in which gender disparity and inequality at elite level is understood, explained and actively reproduced. Bridge, as a mindsport,[1] is a challenging card game involving four players, in two competitive partnerships, engaged in a game of strategy, focus and teamwork. Bridge is played at multiple levels and in diverse settings from a player's home to bridge clubs to national and international competitions (Brkljačić et al., 2017; Scott & Godbey, 1992). Some of the key qualities required to succeed at bridge include logical and analytical thinking, concentration and focus, dedication and competitiveness (Punch, 2021).

As with most sports and leisure pursuits, bridge features inequalities across its player base with men dominating elite-level competitive play and women dominating amateur bridge clubs (Scott & Godbey, 1992). That said, there are significant gender inequalities when it comes to bridge performance, with male players strongly outperforming women players worldwide. For example, only eight out of the highest-ranked 100 bridge players in the United States are women (American Contract Bridge League, 2018) and only two out of the 50 highest ranked players in England are women (English Bridge Union, 2018). Within the highest levels of the Open game, there are very few women who are considered as equal to the best men

players. At elite level, the open and women's events are concurrent, so the only way women can play in the open category is by withdrawing from the women's. Very few women have played on winning teams in major open championships, with a large part of the reason lying in the segregated nature of many events. Women tend to play more in women-only rather than open tournaments, and the women category is considered the technically inferior game (see Rogers et al., 2022). As a result, competitive bridge remains stratified along gender lines as women's events still exist whilst open tournaments (where in theory both men and women can play) continue to be dominated by men (Punch et al., 2022).

The aim of this paper is to consider the ways in which neurosexist and behaviourist tropes are harnessed and employed in the bridge community to the detriment of women players. In so doing, the paper explores the key question of why men dominate elite-level bridge. It begins by discussing some literature in relation to gender and competition in sport, before examining the arguments and critiques around sex differences between male/female brains. Interview data is presented that reveals gendered assumptions for why women are less successful in elite bridge compared with men, drawing on neurosexist and behaviourist explanations. Despite much neuroscientific research refuting ideas about gendered brains (Eliot et al., 2021; Rippon, 2019), biologically reductionist and behaviourist reasons continue to be put forward to defend and explain the lack of female representation at the top (Punch, 2021). Given the decline of bridge playing worldwide (Scott, 1991), such stereotypical and sexist responses damage the game's potential to recruit and retain young women. The paper shows the ways that neurosexist discourses are damaging and problematic to (mind) sports, thereby adding to serious leisure literature which highlights ongoing social barriers that hinder participation and inclusion in sporting and leisure contexts (Dacombe, 2013; Merrells et al., 2017).

Gender, competition and sport

Feminist and gender scholars point out that our understanding of gender roles is largely learned, repetitive and performed over time and place (Alsop et al., 2011; Henderson, 2013). However, there are numerous scholars who contend that biological differences are tangibly real and can be evidenced, with men's physical strength and prowess an oft-cited reason as to why men dominate across all fields of sport (Dyck, 2000). In mindsports like bridge and chess, however, where the brain is the key tool, male-domination is conventionally explained as being rooted in innate, undeniable and irreversible differences between male and female brains (G.A. Fine, 2015; Gur et al., 1999). However, the results from largely psychological studies have produced diverse findings (Lachini & Giusberti, 2004; Montello et al., 1999). Nevertheless, various

sociological and psychological studies reveal that logic and reason are typically associated with men and that emotion is typically associated with women (Lively & Powell, 2006; Simon & Nath, 2004).

In Western cultures, the male mind and masculine ways of thinking are characterized by logic, rationality and objectivity whereas emotion and emotion work have historically been associated with women and service sector caring professions (Hochschild, 1983). Girls and boys are educated, formally and informally, in very different ways (Talbot, 2017), with competition, sports and aggressive mentalities on 'winning' considerably more likely to be emphasized in a boy's childhood rather than a girl's. For example, male and female champions of bridge argued that the problem is 'that young girls are not trained to be as aggressive and competitive in the warlike atmosphere of big-time duplicate bridge' (Smith, 1987). Men have long been rewarded for ruthlessness, competitiveness and aggression, whilst women are punished as being 'deviant' for displaying the same qualities (Niederle & Vesterlund, 2007). As a result, men and women are socialized from an early age into culturally appropriate gendered behaviours. When a young boy expresses emotions through crying, parents are often quick to state that 'big boys don't cry' (Balswick & Peek, 1974). Such arguments reinforce the idea that emotions and caring [professions] are less valuable and important than those spheres of life that are seen as rational, logical and competitive.

Within the world of sport, such gendered attitudes can be seen around performance differences in competitive environments (Ors et al., 2013). Some studies argue that men are not necessarily more competitive than women (Jurajda & Munich, 2011; Lavy, 2008) and that gender inequalities prevail regarding how women in sport are portrayed, supported and enabled (Wachs, 2006). Fink (2016) states that while other areas of society have progressed to more subtle forms of sexism, 'overt sexism in sport is still quite common and often uncontested' and 'simultaneously unnoticed' (p. 2). She argues that in sport there are a lack of women in leadership roles, a dearth of funding and sponsorship, poor working conditions and limited media coverage. Women in sport frequently report feeling invisible, unimportant and overlooked compared with men, facing both institutional and interactional barriers (McGinnis et al., 2005). Furthermore, the recent banning of trans women athletes from women's competitive swimming for example (Ingle, 2022), and the challenges and discrimination facing women in sporting and leisure contexts, is both controversial and widely ignored. As a result, understanding gender differences in terms of physicality, aptitude and skill has a chequered social and scholarly history.

Gendered brains

Despite contested debates within the scientific research community, the dominant argument in popular discourse has enduringly been along the lines of, 'men are from Mars, women are from Venus' (Gray, 2015), suggesting that differences between male and female brains are both significant and biologically fixed. Such theories operate on the understanding that there are only two sexes: male and female. Given the expansion of sex/gender debates to include trans and non-binary individuals, this only further serves to exclude certain groups of people, whilst reinforcing gendered differences based on neurological wiring and gendered chromosomes. Although there is still much to learn about the brain (Feldman Barrett, 2018), in recent years, a growing number of critics have raised concerns about neuroscience's increased ability to 'enchant' the general public on the issue of brain sex differences (Hoffman & Bluhm, 2016; Rippon, 2016;). The high social status afforded neuroscience has seen it become the de facto authority on sex differentiation, despite evidence in this area being patchy and contested (Jordan-Young, 2010; Rippon, 2019). Those who oppose traditional neuroscientific arguments in this field – that men and women are significantly and irreversibly different due to biological, cognitive and chemical factors in the brain – provide various critiques in building their counter arguments.

The first major critique levelled against traditional neuroscience research in this area is that it has significantly overstated the extent and nature of human brain sex differences. A body of research has seriously challenged the binary distinction that has historically been drawn by neuroscientists between males' and females' brains, pointing to significantly more convergence rather than divergence between brains (e.g., Hamlin, 2014). For example, Joel et al. (2015) undertook a large-scale, in-depth study of over 1400 MRI scans in Tel Aviv, looking for evidence of sex differences. In stark contrast to the picture presented by more traditional neuroscientific research, Joel et al. (2015) found that less than 6% of the brains they studied could be clearly identified as belonging to a single sex, while the overwhelming majority were 'a patchwork quilt' of masculine and feminine features that varied significantly from person to person (Cool, 2016). Developing this further, Eliot et al. (2021) analysed three decades of MRI and post-mortem data on men and women's brains and the only noticeable difference they found was that the male brain on average is larger, but that this stabilizes over time and the difference is ultimately negligible. Task based fMRIs in verbal, spatial and emotion-based reasoning have also failed to find any significant gendered differences.

These findings mount a significant challenge to traditional, neuroscience-based arguments like those of Brizendine (2006) and Kimura (1992) as well as to popular narratives (e.g., Gray, 2015; Pease and Pease, 2010), which

have all suggested striking differences between the sexes. As Joel et al., 20155, pp. 15,468) conclude 'human brains cannot be categorized into two distinct classes: male brains/female brains'. This finding is also echoed by Eliot et al. (2021) who state that their research shows the 'human brain is not sexually dimorphic' (p. 667).

C. Fine (2013) critiques the credibility of traditional neuroscientific arguments further, pointing to the lack of evidence behind the often quite substantial claims. Focusing on a study which claimed 'major' sex differences between male and female brains (Ingalhalikar et al., 2014), C. Fine (2013) notes that the sex differences discovered were in fact 'trivially small'. She questions why the 'huge overlap' the researchers found between the sexes, and the researchers' inability to identify the sex of brains over 40% of the time, were not foregrounded in the study and its headline findings. It has been argued that traditional neuroscientific research on sex differences contains 'gaps, assumptions, speculation, leaps of faith and bad methodologies' (Hill, 2010). Spellman (1996) is similarly sceptical about the extent of sex differences claimed in such research, noting that differences *between* the sexes are in fact significantly smaller than those *within* the sexes.

According to critics, not only is evidence on the issue of sex differences inconsistent, but the interpretation of the results can be neurosexist and based on gendered assumptions (see also, Eliot et al., 2021; Rippon, 2019). Wizemann and Pardue (2001) point out that available research remains largely descriptive rather than experimental, with a lack of evidence sought or found to corroborate many well-known claims around brain sex differences (i.e. that males and females are 'wired' differently). Fine et al. (2013) list a number of what they term 'myths' around sex differences that have since been disproved, but which continue to feature in, and strongly influence, popular understandings of sex differences. These include assumptions that brain circuitry is determined by a fixed genetic blueprint and that there is a causal pathway from human genes to human behaviour through hormones (Fine et al., 2013). Rippon (2019) calls this the 'whack a mole' myth whereby 'mistaken assumptions keep popping up, despite . . . having been despatched by new and more accurate information' (p. 10).

Another argument, now discredited even by one of its original proponents, is the debate around 'left versus right thinking'. In short, this theory noted the left and right hemispheres of the human brain and argued that men have more neural connections in the left side of their brains (associated with logic, analysis and action), and that women have more neural activity in the right side of their brains (associated with intuition, emotion and thoughtfulness; Graetz, 2002; Ingalhalikar et al., 2014). Stafford (2013) critiques this study and others like it for adhering to what they perceive to be a gendered 'myth' about left versus right thinking in the brain, which has

little evidence to support it and extensive evidence challenging it (see, Dekker et al., 2012; Feldman Barrett, 2018).

Finally, for critics of traditional neuroscientific arguments in this field of sex differences, the issue is not only a lack of consistent evidence, but the consequences of these arguments for how men and women are understood, appraised and (de)valued in contemporary human society. C. Fine (2013) argues that neuroscientific arguments claiming significant, fixed, biological sex differences should be understood as examples of 'neurosexism', in that they tend to perpetuate stereotypes and generalizations about men and women by lending apparently scientific credence to the idea that, for example, women want to socialize and men want to compete, amongst other assumptions (Fine et al., 2013; Stafford, 2013). As Rippon notes:

> 'Neurosexism' is the practice of claiming that there are fixed differences between female and male brains, which can explain women's inferiority or unsuitability for certain roles. By spotting sex-dependent activity in certain brain regions … neurosexist studies have allowed an established 'go-to list' of sex differences to flourish. (Rippon, 2016, p. 1)

C. Fine (2013) points out that such 'neurosexist' research perpetuates gender inequalities in the same way that myths around skull volume and brain size did previously in the 1970s. Neuroscientific research which insists that men are better at reading maps and women are better at reading emotions has been argued to construct gendered hierarchies of capability and incapability, which appear ordained by nature (Fine et al., 2013). Neuroplasticity is now recognized as shaping the brain's wiring (Fu & Zuo, 2011). Feldman Barrett (2018, p. 35) argues that neuroconstruction is where 'experience wires the brain':

> That means that some of your synapses literally come into existence because other people talked to you or treated you in a certain way. […] As a consequence past experience helps determine your future experiences and perceptions. (Feldman Barrett, 2018, p. 34)

Nevertheless, despite significant challenges, populist neuroscientific ideas and sex differences remain powerful in contemporary culture, with self-help, parenting and relationship books, advertising, newspaper articles and social media fastening on such narratives of difference, perpetuating the gender essentialist perspective (C. Fine, 2013; Rippon, 2016). For critics, then, the traditional neuroscientific stance on sex differences is deeply problematic. The conclusions its research tends to generate are not only seen to be unsupported and sexist, but in turn are considered to present an inaccurate reflection of how the human brain is structured and operates. What is important for the purposes of our discussion are the ways in which these kinds of neurosexist arguments are used, reproduced and engaged with by our bridge participants to explain and justify why there are so few women playing at the highest levels of the mindsport bridge.

Gender participation in mindsport

Within the world of mindsport, it is widely acknowledged that female chess players are significantly underrepresented at every level of chess (Maass et al., 2008). Despite contradictory evidence, it is also recognized that the gender variance in achievement and participation in elite competitive chess, does not necessarily reflect disparity in skill. On the one hand, Howard (2014) has claimed that male dominance in elite chess was, at least partially, due to innate biological differences in men and women's intellectual abilities. Similarly, an earlier cognitive study found the dominance of young male players in the chess world was linked to the higher IQs and spatial abilities found in male participants than those among young female players (Frydman & Lynn, 1992).

On the other hand, a number of studies have critiqued innate explanations by arguing that methodologically it is not possible to control for the gendered and patriarchal disadvantage female chess players face due to the pervasive nature of structural gender inequality. For instance, De Bruin et al. (2008) argued that external factors which can inhibit players' ability to dedicate time to practice and attend tournaments influence women disproportionately. Maass et al. (2008) contended that external expectations, attributions and assumptions of women's abilities and aptitude for chess have a significant influence on their performance when competing against male players. More recently, Veličković and Radovanović (2018) state that:

> . . . despite different theories, there is no scientific evidence for sex specific intellectual performance differences [. . . instead] a motivational perspective may be better suited for understanding the underperformance of women as chess players. (p. 359)

They emphasize that gendered differences in chess are linked to the influence of widespread gendered stereotypes and processes of socialization. Within the chess community, in order to explain pervasive male domination, Stafford (2018) has stressed the need to focus more attention on the systematic factors which influence the unequal participation of men and women.

Compared with chess, there is comparatively little research on gender participation in the mindsport bridge. In a study with bridge players of all levels, Rogers et al. (2022) discuss the paradox of the women-only game which both helps and hinders women's participation. The women's game provides a space for women to compete internationally but simultaneously perpetuates gender inequality. Bridge is a unique mindsport as, unlike chess, it is a partnership game of incomplete information, relying on communication between partners competing against another pair. Thus, stereotypical perceptions that women tend to be weaker players than men, limit women's opportunities to form bridge partnerships with men at elite levels. The

current paper builds on this previous work by exploring elite players' perceptions of, and explanations for, gender differences in bridge. It unpacks the ways that ingrained gendered assumptions about cognitive abilities and social behaviour contribute to the persistence of gender disparity in achievement at elite levels of the game. The paper shows how our participants' use of neurosexism bleeds into ideas around behaviourism (men are rational, women are emotional for example) and that it is these characteristics which men 'innately' have in abundance that explains their success in a serious leisure pursuit.

Methods

The data presented here is part of a larger study called *Bridging Minds* (see https://bridgemindsport.org/home/research/bridging-minds/) undertaken by the project team, *Bridge: A MindSport for All (BAMSA*), who are developing the sociology of mindsport. An interpretive sociological approach was used to explore the lived experiences of elite players within the social world of bridge using qualitative insider interviewing. The interpretive approach sought underlying meanings in order to understand social behaviour (Bhattacherjee, 2019). Punch, an international bridge player who has represented Scotland since 2008, undertook all 52 semi-structured interviews utilizing her situational knowledge as a player. For example, if an interviewee referred to specific bridge tournaments, the age/gender categories for international bridge, the professionalization of bridge, or technical aspects of the game, Punch did not need to ask for clarifications of such bridge terminology. Bridge has its own language, such as 'dummy', 'declarer play', or specific techniques such as 'end play', executing a 'squeeze' or 'avoidance play'. Technical bridge terms or basic organizational structures did not need to be explained to a fellow bridge player and were likely to have presented many challenges for an outside interviewer. Punch's lived experience of combining work and leisure through researching the sociology of mindsport is discussed elsewhere (Russell et al., 2022).

The purposive sample included 20 women and 32 men aged 17–78 from the USA and Europe. Within the global bridge community, only a handful of women (fewer than five) would be readily named as being equals with the world's best men. Three of those women were part of this sample of 20 female elite players. None of the participants identified as gender neutral, non-binary or trans. The definition of 'elite' is that they have all represented their country in international championships. The research gained ethical approval from the University of Stirling and the participants are referred to by pseudonyms.

Due to her standing within the bridge community, Punch was able to interview elite players at international tournaments before or after matches.

On average the interviews lasted two hours and covered topics relating to participation, motivations, partnership and team dynamics, emotions, success and failure. For the topic of gender, players were asked open-ended questions regarding their general views of women's bridge including their perceptions of the women-only game. Follow-up questions included the perceived similarities and differences relating to men and women's bridge; why men dominate the top levels of the game; and whether and why they perceived sexism exists within the game. The methodological challenges of discussing potentially sensitive issues around gender and sexism are discussed elsewhere (Punch & Rogers, 2022).

The data analysis drew on the benefits of insider research, complemented by the outsider perspective of the non-bridge playing authors, thereby blending emic insider positionality (developing theory from the ground up) and etic outsider positionality of applying theory to qualitative data. The process of qualitative thematic analysis included four stages from initialization, construction, rectification to finalization (see Vaismoradi et al., 2016). Interview transcripts were coded according to a thematic coding framework that corresponded to the interview guide and was designed to generate codes that could be subject to further theoretical and conceptual analysis. For the whole project, 15 code sections (e.g., partners; professionalization) and 72 codes (e.g., partner qualities, forming partnerships; becoming a pro, sponsors, job security) were produced. The interpretation of data involved iterative processes of dialogue and reflexivity between the research team. The emerging themes addressed in this paper included gendered competencies, brain-related factors, single-mindedness, focus, competitiveness, opportunities, barriers, emotions and inferiority. We now turn to the findings regarding the key question for this paper: why men dominate elite-level bridge.

Findings

Gendered bridge brains

In the interviews, elite players were first asked their general perceptions regarding gender and bridge. Gender disparity in achievement at elite level was frequently mentioned:

> It's clear the women top players don't play anything near the level of the men, you can't possibly deny that. Of the 100 best players in the world at least 90 or 95 are men and the top 20 or 30 players are all men. (Charlie)

> If you just think about the best technical card players in the world and who is at the top, you see a lot are men. (Oliver)

For some, the achievement of elite men players was tangible evidence that men are better bridge players than women:

> Well, I do think actually that most men are a lot better than women. (Hayley)

> Is it sexist to say that someone is a better player than someone else when it's true? To be honest, I think most women feel that too. Men are generally better at a certain level than women. (Isla)

Whilst men are readily recognized as having achieved higher status in bridge, many players are unsure of the reasons why:

> If you compare men and women in the top 100 players in the world most of them are men and one of the reasons is that more men than women play at that level. I don't know why that is but that's how it is. (Barry)

> All I can do is reach conclusions from what I see, and what I see is that I think that there aren't enough women in the Open game at a high enough level, yet, for us to make any general conclusions other than that there aren't enough because they aren't good enough. Why they are not good enough? I don't begin to know. (Patrick)

Given bridge is not a physical sport, Natasha raises the question as to why women are not achieving as much at the highest levels of the game:

> All my friends seem really surprised that men and women should be different when it's not like a sport where there should be something stopping women being as good as men. I don't feel my sex is particularly affecting how good I am, but there obviously must be something that stops women being better. (Natasha)

However, some players attributed the difference in achievement to brain function: 'Because the structure of the brain is slightly different . . . the best bridge player is always going to be a man,' (Ray). Many of the interviewees referred to neurosexist discourse as an explanatory factor regarding the lack of women at the very top of the mindsport. Some of those made general references to brain differences:

> I just think they are wired differently, and I don't know how, but I am really curious about the brain, but I do know, and I've read that men's brains and women's brains are wired differently. (Lucy)

> I think it's inherent. I think it's a physical – and physical includes, you know, all parts of your mind – I think there's a brain cell in there which is better for bridge players to be men. (Grant)

Others referred to more specific brain-based, hard-wired gender differences that linked to perceived bridge skills: 'I do think that spatially men's brains work differently' (Rosemary). The majority of participants expressed views on the differences between men and women's bridge playing abilities, calling on ideas around rationality and logic, with some stating that the masculine brain is more suited to playing bridge than a woman's. What is

interesting to note here is that the innate cognitive attributes used to explain male success were offered by both men *and* women players.

> On a general level, men tend to be more logical . . . most good bridge players go to uni and do maths or similar sort of mathematical things and guys tend to be better at that sort of subject than girls do. (Nadine)

> It's established that women have more of their brain wired for emotion generally than men do. (William)

Many of the male and female interviewees held deeply rooted assumptions that the reason behind bridge being male-dominated is because the skills that bridge demands align much more closely with the innate, 'natural' cognitive abilities and composition of men than with those of women. Moreover, most of these assumptions were buttressed with references to traditional neuroscientific arguments about biological and structural differences between male and female human brains. Specifically, many research participants believed that men were better bridge players because their male brains were superiorly wired for logic, mathematics and single-mindedness, whereas female brains are better suited to emotion, nurturing and multitasking. Being able to focus on just one thing (ie. cards) was often referred to as a reason for men's success at bridge:

> The single-minded aspect makes men better technicians. (Ian)

> I'm no scientist but I think it's proven a bit that the male brain is better to just focus on one thing (Hayley)

However, as we shall see in the next section, there were mixed views about the extent to which such characteristics, like single-mindedness, are innate and/or whether they are related to more social reasons, as Steven illustrates:

> I think it's, at least for me, very hard to separate out whether its innate things or all sorts of social things that I think create barriers to women being more successful players. (Steven)

Single-mindedness, dedication and competitiveness

In response to a question about why men perform better at elite level, many of the bridge players referred to ideas around innate and essential characteristics, drawing on notions of gendered brains. Such responses were expanded and often linked to stereotypes of gendered behaviours.

> I know nothing about the brain and how it works but men seem to for some reason be able to isolate something better than women . . . Men sit down at the bridge table and all they can see are the four players, the table, the hand, whereas I think a lot of the

> time, for women, there's other stuff going on in their minds and they're thinking about other things. (Fred)

> I think that the male brain is built in a better way for bridge than women, like they're better at concentrating on one thing and like usually more competitive. (Hayley)

Other participants questioned whether the reason for gender disparity is brain-related, and they focused on more social explanations:

> Do we really believe that men's brains are better for bridge than women's brains are? I'm not 100% sure I'm convinced of that … And is it society or is it truly the fundamentals of how the brain works that makes the difference? (Joyce)

> I'm not an expert in this field though, but I find it hard to believe that our brains are wired differently. I mean, I think it's all to do with connections isn't it, and I think it may be to do with how you're brought up in the sense of what you are persuaded to do. (Hannah)

Many players suggested that single-mindedness was a key explanation, which they often related to the ability to focus and concentrate as well as being able to dedicate time to serious leisure. It was not always clear if they considered single-mindedness to be a fixed characteristic linked to gendered brains or a socially learned practice.

> I don't wish to sound sexist but there are very few women who can play at the level of men when it comes to the top level … a lot of it is to do with the fact that I just don't think a lot of women are prepared to dedicate themselves. It's that sort of focus and dedication to the game which actually makes a good player. (Ross)

> Men are better at bridge and a lot better at chess, and I genuinely think that men can concentrate – I really do believe that they can shut everything off and concentrate very deeply on one activity better than women … I think women often think about everything that's going on more and so I think that the only difference between men and women is concentration. (Nicolas)

There was often much certainty regarding gender differences at the bridge table, but much less certainty regarding the reason why, as Bill illustrates:

> One of the fundamental reasons why men are better at bridge than women are, is because they have this ability to focus on one thing to the exclusion of all others. I don't know if it's what we are trained to do from birth, men play with their guns and their cars and women play with their dolls. I don't know if it's something that starts almost from birth, that we are trained to, the girl will be shown by the mum to do all the things round the house and to concentrate on this and that and to be more diverse as a personality. And whether the father takes the son out to play football and tells him, concentrate on what you are doing, concentrate on what you are doing. It's just drilled into you that that is what you are supposed to do. And not often drilled into girls. (Bill)

Many bridge players believed women to be less focused than men, as well as men to be more competitive than women. The uncertainty as to whether

a gendered bridge-trait was linked to cognitive/biological or social reasons could also be seen in the discussions relating to competitiveness.

> As a very broad generalisation, girls are not encouraged to compete in the way that boys are, so they do not start. Do you play to actually crush the opposition with total focus and determination to win at all costs or do we not do that because we weren't doing that from a very early age? (Patrick)

Discussion around competition as a more 'masculine' trait tended to be based on wider generalizations about men and women, with a few players believing men to be more competitive:

> Are men definitely more competitive? Probably. I've got sisters, I wouldn't describe them as especially competitive. I'd say I'm more competitive than them. I don't see it as being something to do with how you think or anything like that … if we were younger playing a game or something, I'd care more about winning than them. (Jack)

When considering why men tend to be more successful at elite level, a few players linked the perceived competitiveness of men to the differences in the ways that boys and girls are raised from a young age:

> Well, for one thing, men do a lot of competitive sports when they're growing up, so the idea of winning is very important to men psychologically. Because of that I think they're doing their best when they play bridge all the time. Women are more interested in playing nice – being seen as a friendly person – they're more social. (Scott)

> Maybe it's that women aren't raised competitively and they're raised to think about their hair and their make-up. I don't know. … men have that competitive, killer instinct – no mercy. And that's what you need, you need the killer instinct at bridge so maybe it has something to do with that. There's no rhyme or reason for it that I can really detect. (David)

Within the interview data, there was a mix of neurosexist arguments alongside everyday behavioural sexist comments, that assign ideas around competitiveness, single-mindedness and rationality as a male sporting prerogative and multi-tasking, sociability and lack of competitiveness as relating to women. These were some of the key reasons offered to explain why women are less successful at playing elite-level bridge.

Reproducing gender inequality

The research participants suggested that since bridge requires a degree of mental toughness, confidence and competitiveness amongst other attributes, some women players may struggle:

> Because men are considered better players than we are, there's a general perception when you play together with them many women feel the pressure and don't perform as well. (Andrea)

> I do think that we still have the issue that boys tend to be brought up to be more competitive than girls . . . in game situations. And that's something that if it gets ingrained into your psyche when you're a kid, never really 100% gets cleared out. (Jim)

Some players indicated that gendered assumptions can lead to women internalizing ideas about their inferiority as players:

> I can imagine that part of it may be that everybody or almost everybody believes that men generally are better bridge players than women. And that's how we grow up as bridge players . . . If you are told every single day that these guys are better than you girls then that is learned behaviour. (Andrea)

> Women start believing men are better. (Rosemary)

Even when women do not directly assume they are inferior in skill and ability, they may still engage in deferential and apologetic responses to their male bridge partners if a mistake at the table is pointed out to them.

> And he was saying why didn't you lead a club? . . . And there's me saying, oh sorry, sorry! And I'm thinking, okay, I know that he's a really good player but he's what, some babe in arms and I've been playing bridge for millions of years and why should I sort of apologise . . . But it is easy to be a bit - I don't know, feel inferior. (Caitlin)

Despite the uncertainty for some players as to why men have achieved more at elite-levels of bridge, there is also recognition that gendered attitudes towards women players can result in prejudice:

> The only theory I have is that every top man started in his teens or earlier and spent a lot of time playing cards and most girls don't get to do that. It's a question to which there is no clear answer. I don't think the answer is that women are not as good because they are women. I just think that for some reason, women have not been able to rise to the very top level . . . There is discrimination. I think that the male view of how women play is overly negative. (Charlie)

The interviewees' explanations for men dominating elite-level bridge varied from biological, fixed differences of the brain, a mixture of internal and external factors, and more social reasons. Only a minority of players were certain that the reasons for gender differences are linked to socialization processes rather than innate characteristics.

> Maybe women don't devote their life to it the way men do. Most women get married, bring their children up and return to bridge when they've finished. Professional male players have time to learn, to play bridge. I don't believe that men's brains are wired differently, why should it make them better at bridge? They're not particularly better at science or medicine or politics. (Isla)

> Men are more likely to start playing games when they are young and then I think you have all these factors: men are encouraged to be single-minded; men are encouraged to compete. Women have more like, you got to be a mother or whatever, they are less encouraged to dedicate themselves to a game single-mindedly. I don't think there is

> any difference, I think if there were an equal amount of men and women started to play bridge and they all had the same opportunities and the same coaching that it would be an even distribution, half the best players would be women. I don't think there is anything biologically, but they are far less likely to start playing, far less encouraged, far less likely to get hired. Men might laugh at them. I don't know. I don't experience sexism, but it seems like bridge is a sexist world. (Craig)

Craig's final comment, like that of Charlie above, refers to the ways that sexism within the bridge world hinders women's opportunities to progress (see also, Rogers et al., 2022).

Challenging gendered stereotypes

We have shown that both men and women who play bridge at elite level draw on neurosexist ideas of men's brains being more rational and suited to bridge, which link to prejudiced attitudes based on the social construction of gendered brains and behaviour. Such ingrained gendered assumptions are presented as explanations for why so few women make it to the very top of the game. In the interviews, players discussed the play of the (few) women who are regarded as equal to their male counterparts at the highest level. They are described as competitive, rational and logical. When speaking of a specific elite female player, one male player said:

> She has some of the best focus of any player I've ever played with. Probably all really good bridge players are really competitive and she just doesn't ever have a lapse in concentration and she has an unbelievably keen analytical mind. (Colin)

Moreover, despite commenting that women are not as aggressive as men, Ryan, at a different point in his interview states ' . . . she's not the easiest woman. She's very aggressive both at and away from the table.' Therefore, it is clear that the players' descriptions of specific women do not fit the earlier ideas of women being less competitive, logical or focused. These women are described and given attributes formerly assigned to something specifically and innately present in male brains and play. Equally elite women players would shun ideas that they themselves were less competitive or more emotional:

> I want to go there and I want to concentrate on bridge and doing my best at the bridge table. I don't want to sit at the table and exchange baby pictures. (Andrea)

> I know that I am a very competitive person, but not all women are quite as competitive as I am so maybe it's something to do with not feeling competitive. (Hannah)

> Well, I don't get that affected by things that don't relate to me. [X is] really emotional, quite emotional, probably quite normal for a girl really. (Nadine)

Particularly in a mindsport such as bridge where men dominate the highest positions, in order to be seen as equally good as their male counterparts,

women have to directly embody the characteristics and attitudes of their successful male peers:

> . . . the best women players in general are slightly more male. [Elite woman player] for example, is a very, very tough cookie. (Bill)

> I had to toughen up a lot because if you're going to play with and against the men, or you're going to try and beat the men and if they're quite tough and aggressive then you have to be quite tough and aggressive both in your style of play, but also in your behaviour. (Megan)

Male players engaged in gendered assumptions about their female counterparts as seen by Sean who claimed that women get 'more offended more easily. Where a man might sort of roll with the punches a little bit better'. At the same time however, Sean repeatedly claimed to be very sensitive throughout his interview. Similarly, Jack expressed that women are discouraged from playing in the elite Open game because male players are intimidating, but later mentions how he is intimidated by a female player. This again highlights that, as men belong to the dominant bridge group, they can express intimidation and emotive behaviours without this automatically equalling inferior skill at the bridge table, a privilege not currently afforded women bridge players.

These examples demonstrate that rather than bridge play and skill being based on male brains that are analytically and logically superior to women's, characteristics of skilful and elite bridge play are attributes that are actively and systematically reproduced by both men and women players. As a result, inequality within elite bridge, whilst a numerical reality, is far more likely to be explained through endemic and historic opportunities afforded to men players that are not equitably granted to women players, rather than any measurable cognitive difference.

Discussion

This paper began by exploring the validity of longstanding arguments around sex differences in human brains. We have seen that traditional neuroscientific arguments have come to dominate how performance in the leisure activity and mindsport bridge is understood. However, an extensive body of research has consistently found more similarity than dissimilarity between male and female brains (Eliot et al., 2021; C. Fine, 2013) and that much of the call to neuroscience, actually connects to social and gendered behaviours (Feldman Barrett, 2018; Hoffman & Bluhm, 2016; Rippon, 2019). This was clearly in evidence in our data where most participants drew on both brain-related and behavioural explanations to explain the lack of female representation at elite level. Men were perceived to be more rational, logical thinkers, with brains better suited to the demands of

bridge than women, who were perceived to be less single-minded and more emotional. Men were also considered to be more competitive than women, who were characterized as 'less focused'. These assumptions of neurobiological differences were not only expressed by men, but were also readily endorsed by many of the women players interviewed.

This taps into the socially learned roles of gender and that women, over time, internalize these messages of inferiority and reproduce them in a variety of social situations and contexts. In the competitive environment of bridge, 'playing like a man' provides the most status. Therefore, in order to succeed at the top, women may inadvertently engage in casual sexism and discriminatory language regarding the aptitudes and abilities of other women players. According to Einhorn (2021, p. 482), this 'internalized misogyny' results in 'renewing the power relations of patriarchy'. In the context of bridge, such dialogue becomes normalized 'banter' and part of the game. The long-term ramifications of such discourses can be seen in the playing practices of women (and men) who do not respect or recognize the expertise of other elite women bridge players, but turn instead to elite men for coaching/advice. Alongside this, women and men consistently prefer to play with male partners and team-mates, rather than with other women (Rogers et al., 2022).

Many of the participants in our study drew on outdated neuroscientific arguments about the gendered brain as a purely biological organ, fixed in its processes and isolated from the external world. More contemporary neuroscience has revealed the brain to be dynamic, constantly evolving and closely connected to cultural context (for example, Feldman Barrett, 2018; May, 2011). Neuroplasticity has shown that the human brain is a deeply responsive organ, which is constantly restructuring and changing in reply to social events and expectations (Fu & Zuo, 2011). Apart from a few exceptions, like Oliver and Steven, the interviewees did not seem to be aware of such neuroplasticity debates which point to more social reasons for gendered brain differences (see, Spellman, 1996):

> Maybe it's a deeper-rooted problem with upbringing and not giving women as much of the stimulated upbringing when their brain is really very ready for it, because we have these pre-conceived notions that they're not as good, based on stereotypes. (Oliver)

> I'm not aware of much to test for innate mental abilities since by the time someone is old enough to meaningfully test them, they've already gone through a fair amount of socialisation. (Steven)

In contrast, there seemed to be a general acceptance that male players are inevitably 'better': '[men's] brains are more suited to bridge than women' (Shona). When men and women reproduce ideas that women are inferior players and alter their behaviour accordingly, these assumptions about skill

can come to be seen as fixed and innate rather than one of opportunity, access and support. This leads to potentially damaging and widespread beliefs that innate biological factors, rather than social ones, shape gendered performance in mindsport. Whilst such neurosexist notions may be inadvertent, they can have unintended consequences since they instil powerful ideas in the public imaginary about what men and women can and cannot, and should and should not, be doing in their personal and professional lives. This has serious implications for the sorts of opportunities open to, and actively pursued by, women and men (C. Fine, 2013). Similarly as Hoffman and Bluhm (2016) point out, 'Assumptions of "biological", "hard-wired", or "fixed" stereotypical sex differences may promote several deleterious outcomes for women' (p. 724).

Rippon (2019) has argued that despite recent evidence regarding the lack of neurological differences between men and women, such narratives continually and repetitively endure. This ties into wider feminist leisure research (Valtchanov & Parry, 2017) which highlights the ways in which particular sexist discourses serve to alienate and undermine the participation of minority social groups, whilst reinforcing and reproducing certain aptitudes and characteristics of success as always beyond their reach (Ratna, 2021). Given the culturally produced stereotype within many western contexts of women as emotional and sensitive (Hochschild, 1983; Simon & Nath, 2004), managing to display logic, rationality and competitiveness at the bridge table will require performing masculinity successfully whilst simultaneously not diminishing their status as women. It is perhaps unsurprising that so few women manage this level of performative commitment, given the other domestic and caring constraints in their lives. It is well known that beliefs about physical difference limit opportunities for women in sport and leisure (Lincoln, 2021). However, it is surprising that when there is limited physicality in mindsport, beliefs regarding physical brain differences also impact on access, training and participation for women. Gendered and neurosexist discourses, negatively impact girls' and women's experiences, resulting in many female bridge players preferring to play in the women-only game which is freer of the male gaze and discourses around women's brains/abilities (Rogers et al., 2022).

Furthermore, the intermeshing of neurosexist and behaviourist discourses are actively and systemically reproduced within our elite sample. Ideas around male brains being more logical, focused and competitive have been used to explain why so few women have succeeded at the highest level of the mindsport. Such stereotypes enable and assist in explaining away poor representation at the top as a biological, essentialist and fixed attribute, rather than socially learned and reproduced. Whilst it is known that gendered stereotyping negatively impacts on physical sports (Fink, 2016), this paper has extended this argument to serious leisure by showing how such

assumptions actively reproduce inequality within mindsport (whether intentionally or not) to the detriment of women bridge players.

Nevertheless, challenges to more neurological claims regarding success at bridge were undermined by the ways in which elite women were discussed by other players. Interestingly, the few women who are regarded as equal to their male counterparts were described as rational, competitive and focused. They were given the very male attributes that had initially been described by participants as a behavioural attribute of the best male players. Alongside this, other elite women players would describe their own play as competitive and logical, with some also shunning normative feminine interests around the home and family. What this shows is that elite women have to perform and display socially learned masculine behaviours of aggression, competitiveness and focus in order to be taken seriously by their peers. Women have the potential to be equal to their male counterparts in the mindsport, but they (and their male peers) actively reproduce sexist tropes around brains and ability to explain differences in play and lack of success at the game, to the detriment of women (see, McGinnis et al., 2005 in relation to golf). Women have to engage in multiple levels of strategy: strategy at the table in reading the situation and playing their cards (Punch & Snellgrove, 2021) as well as strategically performing a competitively masculine self. Elite women who are regarded as equals to the best male players, though the exception, are exceptional as they manage multiple and divergent roles and responsibilities. However, at times, the ability to 'play like a man' may include reproducing sexist or neurosexist discourses at and away from the table.

Conclusion

This paper speaks to the challenges and tensions of playing an elite mindsport in an unequal, gendered world. The paper has argued that there is little sound basis for neurological assumptions around gendered bridge brains. Yet gendered and exclusionary discourses around brains and competencies prevail within the bridge community. Such neurosexist and behaviourist stereotypes are unlikely to encourage younger women to dedicate the necessary time and effort to becoming an elite player. Indeed, given the global decline of bridge play and the well-documented challenges of recruiting and retaining promising young players, tackling this issue should be a priority for national and international bridge organizations. As Delamere and Shaw (2008) have pointed out in their research on digital sports, young women and girls can start to self-exclude themselves if they perceive the environment in which they are playing to be too openly hostile (see also, Fink, 2016). Many younger (and older) female players may be discouraged from participation in bridge because of the gendered assumptions about the

game being heavily suited to 'masculine' attributes and the perceived neurological wiring of men.

Furthermore, the existence and effects of neurosexist assumptions on elite bridge performance need to be recognized and challenged. Capacity for success and competent bridge play should be acknowledged as a learned and practiced skill rather than linked to internalized assumptions about gender and biology. Given that bridge operates in a gendered world, this is a challenge, yet the future continuity of the game relies on it being an inclusive and welcoming (as well as competitive and challenging) mindsport. It is important to acknowledge and question the ways in which neurosexist and behaviourist tropes are harnessed to male success and the male body, particularly in spaces that train and mentor players.

All of the interviewees in our study pointed to the gender differences at elite level, with a variety of reasons offered for the apparent disparities in achievement. Their responses included brain-related and social reasons, as well as a combination of the two. Whilst not all the elite bridge players believed that brain wiring impacts on bridge success, both men and women referred to gendered assumptions regarding bridge practices. Some elite women also had internalized notions of inferiority, which are likely to impact on confidence and motivation. The paper has shown that the bridge community needs to be more aware about what is actually known regarding gendered differences in competitive play, compared to the gendered assumptions underpinning some of the conclusions reached. As Fink (2016) argues, 'negative evaluations of women's abilities in sport' has 'substantial consequences' (p. 4) both within and outwith sport settings. Similarly, there are damaging implications of the persistence of gendered discourses relating to women's inferior cognitive and social competencies in mindsport. Furthermore, these implications are also likely to be relevant to the male-dominated mindsports of chess and poker.

The global bridge community needs to recognize and raise awareness about (neuro)sexism and gender inequalities. This could be followed up with unconscious bias training for coaches, captains, mentors, tournament organizers and team selection committees. The development of an Equality, Diversity and Inclusion (EDI) policy by the World Bridge Federation, the European Bridge League, the American Contract Bridge League and the South Pacific Bridge Federation could then be rolled out nationally, regionally and locally to bridge organizations and clubs. Positive, top-down change is required to promote equality and inclusion for all players, avoiding outdated notions of the wiring of brains or stereotypical gendered behaviours. The challenge (and promise) for the bridge world, lies in recognizing that elite women can be as good and equal to their male counterparts in rational, logical and competitive skill. Positive change has occurred in STEM subjects where assumptions around male and female capabilities

have been actively challenged within education, resulting in girls outperforming boys in some contexts (Wise, 2018).

Overall, this paper has shown how everyday learned gendered assumptions about women's abilities and skills (or lack thereof) are reproduced by both men *and* women at elite level in the mindsport bridge. By intermeshing neurosexism and learned cultural gendered norms around 'success', the bridge players in our sample create and reproduce a system that privileges the male body and brain as the de-facto norm and women as always inherently lacking. In particular, it highlights the pervasive and damaging nature of enduring biologically reductionist and neurosexist arguments as to why so few women reach the highest levels of the game. The world of bridge operates in a gendered, patriarchal world where the male body and brain continue to be positioned as the norm for competitive, bridge success. Such gendered discourses result in gendered opportunities and constraints which in turn offer an explanation for why men dominate elite-level bridge.

The paper speaks to understanding and managing the challenges of creating inclusive sporting and leisure spaces, when some of the rhetoric and discourses engaged in by players can be off-putting, offensive and sexist. Future research into the ways in which class, ethnicity and disability are at play (or not) within elite mindsport environments might complicate this picture further. This paper adds to our understanding of how gender equal representation in elite (mind)sports is undermined by neurosexism and gendered behaviourism. Whilst much is known about prevailing sexism in sport (Fink, 2016), much less is known about the ways that sexism and neurosexism can negatively impact mindsport. In bridge, neurosexism leads to both men and women players reproducing discriminatory language and practices, where the potential for success can be linked to fixed, biological factors instead of opportunity, access and support. The paper has suggested that men's dominance in elite mindsport can be explained through historic and structural opportunities that privilege men rather than gendered brain differences.

Bridge operates in a heterosexist world, where gendered differences, inequalities and attitudes are continually being reinforced and reinvigorated, as 'normal' and a 'biological given.' Gendered performance in mindsport is shaped and moulded by social factors and neuroplasticity, far more so than innate neurological wiring and the outdated notion of gendered brains. Neurosexism reproduces ideas of the male brain as innately rational, logical and competitive, thereby ensuring that success is a biological given, rather than one of social learning and privileged opportunity. For equity to be restored, ingrained neurosexist discourses need to be addressed leading to bridge becoming a mindsport for all. This paper contributes to understandings of serious leisure by showing the ways that neurosexism can limit the expectations and potential of female participants. It has argued that

neurosexist discourses create social barriers that have negative consequences on participation and inclusion in (mind)sport.

Note

1. Mindsport as the term suggests refers to people using their brains rather than their physical bodies to engage in a sport (see chess and e-sports). For further information see, Kobiela (2018) about the distinction between mindsport and sport.

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